Second Opinion Financial Advisory

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ESTIMATION OF DEBT MARGIN

FOR USE IN

REVISED ACCESS ARRANGEMENT 2010-2014

FOR

MID-WEST AND SOUTH-WEST GAS DISTRIBUTION SYSTEMS

SUBMITTED BY

WA GAS NETWORKS PTY. LTD.

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FOR

WESTNET ENERGY

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Disclaimer

This document has been prepared by Matthew Lemke of Second Opinion Financial Advisory for Westnet Energy for the purpose of providing WestNet Energy with the estimated Debt Margin for the Rate of Return calculations to be submitted to the Economic Regulation Authority of Western Australia for the revised Gas Access Arrangement for the Mid-West and South-West Gas Distribution Systems for the 2010-2014 period.

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BIOGRAPHY – MATTHEW LEMKE

Matthew Lemke worked for the National Companies & Securities Commission (NCSC) in 1982-1984 in the prospectuses/ fundraising area. He then spent 23 years in investment banking working for JP Morgan (1984-1995) and Deutsche Bank (1995-2007) in their risk management/ derivatives and capital markets businesses. In this area he mainly dealt with Australian companies in their risk management and capital markets activities. His principal focus was on large strategic/ mergers and acquisitions risk management, especially interest rate and foreign exchange hedging. Matthew was a Director of both JP Morgan and Deutsche Bank. In his 23 years in investment banking Matthew worked in various locations, Melbourne, Sydney, New York, London, Hong Kong and Singapore. He did the Harvard mini-MBA course in New York in 1985. Matthew set up Second Opinion Financial Advisory in early 2009. He was involved with the Victorian DNSP's in their debt margin submissions to the Australian Energy Regulator for the Victorian advanced metering infrastructure ("AMI") review : 2009-11 AMI budget and charges applications. More recently this year Matthew was involved in the Victorian DNSP's debt margin submission for their Electricity Distribution Price Review 2010-2014. Matthew is a Fellow of the Finance & Treasury Association and was on the Association's Technical Committee for 7 years chairing it for 2 years. He is admitted as a Barrister and Solicitor of the Supreme Court Of Victoria. He has a LLB (Hons) and BCom from the University Of Melbourne.

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GLOSSARY OF TERMS

WAGN	WA Gas Networks Pty Ltd
WAN	WA Networks Holdings Pty Ltd
GDS	Mid-West and South-West Gas Distribution Systems
ERA	Economic Regulation Authority of Western Australia
AER	Australian Energy Regulator
NGL	National Gas Law
NGR	National Gas Rules

1 PURPOSE AND STRUCTURE OF THIS PAPER

This paper responds to a request from WestNet Energy, contained in Attachment 1.

Consistent with that request, the purpose of this paper is to provide a methodology and estimate the Debt Margin for the GDS for the indicative averaging period (being the 20 trading days prior to and including 13 November 2009). This debt margin will be used in the Rate of Return calculations for the revised Gas Access Arrangement for the GDS for 2010-2014. The actual averaging period for the debt margin will be a 20 trading day average near to the time when the ERA makes its final decision. The review is expected to be completed by 1 November 2010.

The debt margin is estimated in accordance with the NGR. It is assumed the NGR will be the operative regulative basis for the Rate of Return estimation under NGR 87 for the GDS. Previously the debt margin for gas access arrangements in Western Australia was determined under the National Third Party Access Code for Natural Gas Pipeline Systems.

This paper reviews the regulatory framework for the debt margin together with the major issues that have emerged in recent months in setting the debt margin with specific attention to curve extrapolation and credit-rating.

The paper proposes that the Bloomberg fair curve be the primary basis used to estimate the 10 year debt margin. A process is set out that provides safeguards to ensure yield outcomes have integrity.

This paper reviews and makes recommendations on the term structure of credit spreads and how the 10 year debt margin can be determined given the lack of bonds in the longer maturities. The method recommended is robust for the purposes of NGR 87. The methods set out in the ERA's recent decision for the South West Interconnected Network are discussed (Appendix 1 at p.77).

There is the need to ensure that the debt margin methodology is robust through different market phases. Even though the Global Financial Crisis has subsided, it could re-emerge, and indeed there are legacy issues (such as the reduction in maturity of the Bloomberg fair curves) that create issues if the fair curve method is to be used as the basis for the debt margin estimation. Much has been written in the past about the problems in determining a debt margin using the bona fide data services/ fair curves provided by Bloomberg and CBASpectrum in times of illiquidity and volatility in the fixed income market. The implications of these issues are discussed and addressed in this paper in the context of the GDS access arrangement.

The paper has an Executive Summary (Section 2), with Key Recommendations and Conclusions (Section 3).

2 EXECUTIVE SUMMARY – DEBT MARGIN

2.1 Context

This paper is an attachment to WAGN's submission to the ERA related to the revised access arrangement for the GDS, due 31 January 2010. The review is expected to be completed by 1 November 2010. The averaging period will be a 20 trading day period near to this date.

2.2 Rules

The access arrangement revisions are made pursuant to the National Gas Access (WA) Act 2009 that brings the NGL and NGR into effect for the first time in Western Australia. It is assumed in this paper that the ERA will assess the debt margin applicable to GDS according to the NGL and NGR. The NGL and NGR are relatively new, being brought into operation on 1 July 2008. Whilst the NGR have been interpreted and applied by the AER in gas access decisions such as the recent ActewAGL decision[1], the ERA has yet to apply them. The ERA will no doubt have strong regard to the AER's approach in its debt margin decisions for the gas utilities for which it acts as the economic regulator. The ERA must however formulate its own views and policy about the application of the NGL and NGR to businesses such as the GDS under its authority. In making decisions, the ERA is required under the NGL to exercise its discretions in a manner that will or is likely to contribute to the achievement of the national gas objective[2].

2.3 Curve Extrapolation

Curve extrapolation is a major contemporary issue in the determination of the debt margin.

- for the Bloomberg fair curves, extrapolation is an issue because in August 2009 Bloomberg decided to reduce their Australian A and BBB curves to 7 years. This means the method by which the 10 year BBB/BBB+ debt margin was derived on the basis of the sum of the 8 year Bloomberg BBB yield and an 10/8 year A spread "add-on" can no longer be employed. This issue was explicitly recognised and addressed by the ERA in its final decision for the South West Interconnected Network[3].

- for CBASpectrum, extrapolation is an issue because even though they publish a series of curves out to 10 years, the longest maturing underlying bonds are well short of this maturity. In the case of their BBB+ curve the longest bond is only 6 years. Nonetheless, the CBASpectrum BBB+ curve has been used in several recent AER decisions (ActewAGL[4], Country Energy Wagga Wagga[5], ETSA[6], and the Queensland DNSP's Energex and Ergon Energy[7]) to calculate the debt margin.

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[1] ActewAGL access arrangement proposal for the ACT, Queanbeyan and Palerang gas distribution network 1 July 2010 – 30 June 2015 (November 2009)
[2] NGL, s.28
[3] ERA Final Decision on Proposed Revisions to the Access Arrangement for the South West Interconnected Network, ERA, 4/12/2009 reprinted 17/12/2009, at
[4] AER Final Decision ActewAGL Access Arrangement proposal for the ACT, Queanbeyan and Palerang gas distribution network I July 2010 to 30 June 2015
5 Country Energy Wagga Wagga Natural Gas Distribution Network Access arrangement proposal (November 2009)
[6] South Australia, Draft distribution determination 2010-11 to 2014-15 (25 Nov 2009)
[7] Queensland, Draft distribution determination 2010-11 to 2014-15 (25 Nov 2009)

It is not known how CBASpectrum extrapolates its BBB+ curve. The nearby curves (BBB, A-, A) all have similar if not worse maturity limitations in their underlying bond data-set.

My research shows that CBASpectrum seems to apply a standardised function in their fair curves that imposes a declining rate of increase in the debt margin, and a margin between each of the curves through the term structure. This produces curve shapes across the credit-rating spectrum that all look the same and are spaced conveniently apart without cross-over[8].

Data and academic research support the view that there is no specific or normal shape for the term structure of credit curves or credit spreads. Whether the CBASpectrum curve shape properly describes a particular curve's term structure is happenchance, not necessarily factually based or intended; hence is not robust for the purpose of setting a debt margin for an access arrangement.

As both Bloomberg and CBASpectrum fair curves have 10 year extrapolation issues, consideration of the term structure of credit spreads becomes critically important[9] and how the 10 year debt margin can be mathematically determined in an open and testable way.

My analysis shows that the Bloomberg BBB curve, with linear extrapolation of the debt margin at its longest maturity point using the debt margin in the two years prior, provides the most robust 10 year BBB/BBB+ debt margin. The Bloomberg-based method is based on demonstrated, actual evidence of curvature in credit spreads in the directly preceding two years using the *same* curve. The assumption of linear extrapolation is substantiated by extrapolation tests of the Bloomberg curve when it published a 10 year BBB fair yield, and corroborated by academic research[10]. Linear extrapolation is the most conservative view of curve shape; linearity entails a lack of presumption of curve shape. My review shows that this overall approach is more robust than both:

- CBASpectrum's 10 year BBB+ yield given the standardised BBB+ curve form and unknown extrapolation methods and assumptions used to derive the 7-10 year part of the curve; and
- "Method 2" and "Method 3" in the ERA's recent final decision in South West Interconnected Network[11]. Both methods are discussed in Section 8.7 at pp. 49-51 and more fully in **Appendix 1** at pp.77-84.

[8] this paper analyses Bloomberg and CBASpectrum. Any mis-representation is entirely accidental and unintentional. The author does not believe either service is flawed in methodology. Both use algorithms and information to reflect estimates of yields and yield curves. In so doing they use expert judgment. Both services are to be commended on the provision of their expertise, technology and analytics to the market. The analysis in this paper is focused on the application of the fair curves to a very specific purpose, viz. the determination of a regulatory debt margin for a Rate of Return. Several of the issues that have been identified in this paper arise from the proprietary nature of Bloomberg and CBASpectrum's underlying analytics and also difficulties in collecting bond data

[9] assuming the current situation that no 10 year BBB/BBB+ corporate bond/s in the Bloomberg BBB curve by the actual averaging period used for the GDS.

[10] The research is predominately from the United States. The author is not aware of any independently accredited research dealing specifically with the term structure of credit spreads in Australia

[11] op cit., pp 231-233

2.4 Credit Rating Benchmark

My review shows that a BBB/BBB+ rating is appropriate for the GDS for the 2010-2014 period. The BBB+ rating given in the 2005 GDS access arrangement decision should be lowered by one degree.

Unfortunately it is not possible to directly observe the debt margin of the pure-play gas utility. No gas utility exists that exactly conforms with the NGR's credit metrics. Hence, a proxy approach is taken involving consideration of the debt margin of companies in the credit class that corresponds to the benchmark gas utility. It is possible that the pure-play 60%-geared gas utility would be *nominally* rated BBB+. However, my estimation is that Standard & Poor's would not rate this benchmark entity BBB+. Standard & Poor's rate companies in context. In current credit conditions, my review indicates that BBB/BBB+ would be the highest rating that would be given by Standard & Poor's to a gas utility unless it is well-diversified, very large or has high interest coverage ratios. None of these conditions are met by the Australian benchmark gas utility. Thus, *in context*, my estimated rating of the benchmark gas utility and hence the GDS is BBB/BBB+.

My review indicates that gas utilities in Australia should be given a lower rating than electricity utilities. Whilst the latter may objectively fit within a BBB+ rating, the former should be differentiated and given a one-degree lower rating.

My review shows that the rationale for a BBB/BBB+ rating is not due to the operation of cyclical factors - the factors set out (see Section 5.4) are structural and long-term. The BBB/BBB+ rating is a medium-term through-cycle credit rating appropriate to the rate of return estimations for the 2010-2014 gas access arrangement for the GDS under NGR 87.

2.5 Fair Curve Preference

Subject to the proviso about 'exclusions' below, the debt margin for a BBB/BBB+ rating is best achieved through using the Bloomberg composite BBB curve[12]. This is a generic curve comprised of the broad range of BBB credit-rated entities (Standard & Poor's BBB-BBB/BBB+ and Moody's Baa category). The curve is currently comprised of mainly Standard & Poor's BBB+ rated companies.

The CBASpectrum BBB+ fair curve is not recommended to determine the debt margin. The issues with CBASpectrum are its underlying bond data-set, its curve construction, and related thereto, the extrapolation process it systematically employs, discussed above. CBASpectrum is not robust for the purposes of setting the GDS's regulatory debt margin.

To enable the credit rating criteria to be determined for the GDS, all justifiable, available bonds need to be included in the Bloomberg BBB curve. If not, they need to be reinstated. Otherwise, two data/ sampling issues emerge:

1. To exclude bonds that appear to be trading too high in yield *on the basis that the market is pricing an effective credit-downgrade* is to introduce a dubious and subjective element into the process. The market can trade bonds at differentiated yields within the same credit-class for all sorts of reasons, not just that the market

[12] Bloomberg uses a 'composite' rating system which means that it generally takes the range of Standard & Poor's BBB-/BBB/BBB+ series and the counterpart Moody's Baa1/Baa2/Baa3 series, and then uses the lower rating if the two rating agencies have a split rating.

is pre-empting a rating change by the rating agency. It contradicts the Standard & Poor's definition of a credit-rating as *"a forward-looking opinion about the creditworthiness of an obligor with respect to a specific financial obligation*"[13]. The credit rating test under the NGR is an *actual* rating test not a *perceived* rating test.

2. If not reinstated, the Bloomberg BBB curve becomes a proxy for a BBB+ rating.

In the indicative averaging period, several bonds appear to have been unjustifiably excluded from the Bloomberg and CBASpectrum curves (see Table 16, p.64). Reinstatement may involve an adjustment to the fair yields. Although not done for the indicative averaging period, such adjustment is recommended for the *actual* averaging period.

The Bloomberg BBB fair curve is also favoured as it polls bonds from a wider group of banks. It is understood CBASpectrum only obtains yields from CBA[14]. Bloomberg has more depth and 'price discovery'. Given the recommended approach in this paper, the greater transparency and flexibility within the Bloomberg fair curve construction[15] (though still not ideal) is an advantage over CBASpectrum[16].

2.6 Recommended Process for Debt Margin Determination

The recommended overall debt margin determination process is to:

1. assess whether the fair yields being used to set the debt margin are representative benchmark yields using the five factors set out in this paper
2. make yield adjustments where reasonably warranted
3. if no 10 year bonds are in the data-set in the actual averaging period, to linearly extrapolate the debt margin using the yield of the longest maturity in the Bloomberg BBB curve represented by valid bonds in the underlying data-set (currently the 7 year point) by the per annum debt margin differential of the immediately-prior two years within the same curve
4. assess that yield in a broad context to ensure it represents a debt margin that allows the benchmark firm to recover costs over the access period and reflect prevailing financing costs in accordance with NGR 87. It is not possible for a 'closed model' such as Bloomberg or CBASpectrum to confirm itself. Confirmation must be external to the model being used.

2.7 Debt Margin - Indicative Averaging Period

In the indicative averaging period, the BBB/BBB+ debt margin for the GDS is derived from the Bloomberg BBB 7 year fair value linearly extrapolated to a 10 year maturity by the per annum differential in debt margins[17] derived from the 7/5 year Bloomberg BBB fair yield

[13] Standard & Poor's "Ratings Definitions - Issue Credit Rating Definitions" 23 November 2009

[14] the author's understanding; if correct, appropriate chinese walls and data integrity issues need to be checked and assessed

[15] e.g. Bloomberg's derivation of 'BGNs' and yield curves do contain proprietary systems but Bloomberg does allow us to see what bonds and yields are in their fair curves.

[16] The CBASpectrum website states that "*CBASpectrum applies a proprietary model to calculate fair-value curves for the Commonwealth Government Securities, semi-government, supranational and corporate markets*".

[17] debt margins are calculated by subtracting the interpolated CGS from the fair yields

spread.

This method produces a 10 year BBB/BBB+ debt margin estimate of 4.33% (semi-annual) which equates to 4.50% (annual basis) – refer Section 11.

This paper finds evidence that suggests, though does not definitively conclude[18], that in the indicative pricing period the above result under-estimates the true debt margin. Evidence of under-estimation is based on bond data external to the Bloomberg fair curve (see Table 1). The NGR do not limit the market evidence of the debt margin, to fixed rate bonds issued in Australia by Australian companies. In the recent Queensland electricity DNSP decision[19], the AER interpreted clause 6.5.2(e) of the National Electricity Rules to impose this restriction. This clause does not have a counterpart clause in the NGR and indeed NGR 87(1) requires a wide view of the available bond data.

TABLE 1 – EXTERNAL SOURCES OF DEBT MARGIN

Source	Maturity of Source	Actual Debt Margin	Derived 10 year Debt Margin[20]
Bloomberg 7 year extrapolated using recommended method			433 bp
Recent domestic bond issues by Australian non-bank companies (see p.70)	4.6 year average maturity…..	415 bp	496 bp
Company bank debt facility pricing (see p.71)	4-5 year maturity band……	435 bp	516 bp
Offshore bond issues by Australian non-bank companies (see p.72)	all maturities……		514 bp
	10 year maturity…….		520 bp
RBA's F3 table (see p.73)	1-5 year maturity……..	332 bp	461 bp

The table suggests the debt margin range is 4.33%-5.20%, with the 4.33% semi-annual debt margin calculated in this paper coming in at the lower-bound of that range. Hence it is conservative and may need to be upwardly-adjusted to properly reflect the debt margin for the GDS. This testing should be done for the *actual* averaging period for the GDS.

[18] robust conclusions can only be drawn on the basis of a thorough analysis of all relevant market evidence of the debt margin – the nature of the analysis is described in detail in Section 9. Thorough analysis will need to be done for the *actual* averaging period for the GDS.

[19] Op cit

[20] the calculations are based on using the Bloomberg curve spread as set out in Section 10 to take the margin at the Source's maturity to a 10 year margin

3 MAIN RECOMMENDATIONS AND CONCLUSIONS

The main recommendations and conclusions in this paper are as follows:

1. My estimation of the rating category for the GDS is BBB/BBB+.

2. To estimate the BBB/BBB+ debt margin, the Bloomberg BBB fair curve is preferred, with reinstatement and adjustment for bonds unjustifiably excluded.

3. The following process be used to estimate the debt margin:
   - assess whether the fair yields being used to set the debt margin are representative benchmark yields on the basis of five factors (below)
   - make yield adjustments where reasonably justified
   - if necessary[21], linearly extrapolate the debt margin derived using the yield of the longest maturity in the Bloomberg BBB curve which is represented by bonds in the underlying data-set (currently the 7 year point) by the per annum differential in debt margins[22] between the immediately-prior two years derived from the same Bloomberg BBB curve
   - assess that yield in a broad context to ensure it represents a debt margin that allows the efficient benchmark firm to recover costs over the access period.

5. Five factors be used to validate the Bloomberg BBB fair curve and bonds therein:
   - the contributory rates used to construct the fair curve are verified and have demonstrated credibility.
   - the contributory rates are actually used in the fair curve construction.
   - the fair curve reflects bonds in the credit category. The corollary of this element is that there are no bond exclusions unless completely warranted and justified. It is important the Bloomberg BBB curve does not become a proxy BBB+ curve.
   - the fair curves have sufficient bonds in the respective credit category to create the curve's term structure. If the fair curve needs to be extrapolated to the 10 year maturity, the fair curve needs to be supported by credible bonds in the period that is being used to extrapolate the curve. The extrapolation needs to be done in a reasonable manner.
   - the fair curves reflect other relevant indicators of corporate bond yields in the market during or proximate to the averaging period outside the fair curve.

[21] assuming that there are no 10 year BBB/BBB+ non-bank corporate bonds in the Bloomberg BBB curve in the GDS averaging period
[22] debt margins are calculated by subtracting the interpolated CGS from the fair yields

4 GUIDELINES AND RULES RELATED TO DETERMINING THE DEBT MARGIN

4.1 National Gas Access (WA) Act 2009

This legislation when fully in effect will introduce the NGL and NGR to Western Australia, with the ERA as the economic regulator. This paper assumes the ERA will be making its decision for the revised access arrangement for the GDS under the NGR.

The NGL sets out the functions and powers of the economic regulator, being the AER or ERA depending on their respective jurisdictions for regulation of covered natural gas distribution pipelines. The NGL states that when performing or exercising a regulatory function or power, the regulator must do so in a manner that will or is likely to contribute to the achievement of the national gas objective. The regulator is also required to take into account the revenue and pricing principles when exercising its discretion in approving or making those parts of an access arrangement relating to a reference tariff.

The NGR sets out the provisions the regulator must apply in exercising its functions and powers when making the access arrangement draft decision. This involves using a building block approach to determine total revenue for pipeline services, tariff setting for reference services and approving other terms and conditions of access for the pipeline.

4.2 NGR 72(1)(g)

This rule provides that the access arrangement information for a full access arrangement proposal must include the proposed rate of return, the assumptions on which the rate of return is calculated and a demonstration of how it is calculated.

4.3 NGR 87

This Rule sets out the principles for the Rate of Return.

(1) The rate of return on capital is to be commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services.

(2) In determining the rate of return on capital:

(a) it will be assumed that the service provider:

(i) meets benchmark efficient levels of efficiency; and

(ii)uses a financing structure that meets benchmark standards as to gearing and other financial parameters for a going concern and reflects in other respects best practice

(b) a well accepted approach that incorporates the cost of equity and debt, such as the Weighted Average Cost of Capital is to be used; and a well accepted financial model, such as the Capital Asset Pricing Model, is to be used.

4.4 Previous Rules on the Debt Margin

In decisions for gas utilities, the ERA has been applying the National Third Party Access Code for Natural Gas Pipeline Systems ("the Code"), which establishes a rate of return for determining the Reference Tariff under section 8 of the Code. Section 8 is similar to NGR 87. Under Section 8 of the Code, the rate of return is a return that reflects prevailing market conditions, based on a best practice industry standard financing structure. Under the Code, the ERA has applied a BBB+ credit rating standard to

utilities such as its 2009 decision for Goldfields Gas Pipeline[23] and its 2005 decision for the GDS[24].

For electricity network providers, the ERA has been applying its 2005 Determination[25] in decisions such as its recent South West Interconnected Network[26] decision.

> *"50. The benchmark margin has typically been based on observing recent BBB+ and BBB rated bond issues and CBASpectrum and Bloomberg estimates of corporate bond yields.*
>
> *52. The Authority therefore determines that its preferred methodology for estimating a debt premium is to base the estimate on market evidence of debt costs for businesses with a credit risk profile consistent with a BBB or BBB+ credit rating, immediately prior to the making of a decision under sections 4.12, 4.17, 4.21 or 4.24 of the Access Code, as the case may be. The Authority considers sources of relevant market evidence may include CBASpectrum and Bloomberg estimates of corporate bond yields.*
>
> *55. The Authority has determined that the appropriate methodology to utilise in providing for nominal risk free rates in the estimation of the rate of return is to use Commonwealth bond terms of 10 years and yields from a 20 trading day average taken at the final day of the month immediately before the Authority makes a decision."*

4.5 Current Status

With the enactment of the National Gas Access (WA) Act 2009, the AER's decisions regarding the debt margin are important in relation to the gas access arrangements. This is not to say that the ERA must wholly follow the AER's approach to the debt margin because the ERA has the overarching responsibility to set and administer the regulatory parameters for the regulated gas businesses in Western Australia.

The AER has considered the application of the NGR in setting debt margins for gas access arrangements, most recently in the ActewAGL gas access decision:

> *"The debt risk premium is the margin above the risk-free rate that investors in a benchmark efficient service provider are likely to demand as a result of issuing debt to fund the business operations."*[27]
>
> *"This includes the adoption of an averaging period that matches the risk-free rate, and that the benchmark business issues 10-year Australian corporate bonds with a BBB+ credit rating."*[28]

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[23] op cit

[24] Final Decision for the Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems, 12 July 2005

[25] "Determination of the preferred methodology for calculating the weighted average cost of capital for covered electricity networks" (25 February 2005)

[26] Final Decision on Proposed Revisions to the Access Arrangement for the South West Interconnected Network, ERA, 4/12/2009 reprinted 17/12/2009, at pp 231-233

[27] op cit. p.67

[28] ibid p.68

The AER's footnote to the above quote is to its "Review of the weighted average cost of capital (WACC) parameters" (May 2009) that specifically related to the electricity transmission and distribution network service providers:

> *"The AER's final decision on the cost of debt parameters will lead to the cost of debt for a particular determination being set as the prevailing yield on 10 year Australian corporate bonds with a credit rating of BBB+."*

Clause 6.5.2(e) of the National Electricity Rules states that the debt risk premium is:

> *"...the margin between the annualised nominal risk free rate and the observed annualised Australian benchmark corporate bond rate for corporate bonds which have a maturity equal to that used to derive the nominal risk free rate and a credit rating from a recognised credit agency."*

In its Queensland DNSP decision, the AER added 'definition' around the debt margin :

> *"Regarding 'observed', neither annualised bond rates for Australian corporate bonds of 10 years maturity with a BBB+ rating nor a 'benchmark bond rate' are directly observed in the market as suggested by CEG. For this reason, the AER considers that the meaning of 'observed' in this context is not intended to mean directly observed but logically also captures a process of analysis or estimation, as is required.*
>
> *Regarding 'benchmark', the AER considers that the 'benchmark corporate bond rate' connotes efficiency of performance and is not a bond rate that has 'typical' or 'usual' features. This interpretation accords with the use of the expression 'benchmark' as it appears elsewhere in Chapter 6 of the NER.*
>
> *The AER also considers the term 'Australian' as referring to corporate bonds issued in Australia by Australian privately owned businesses and not by government entities. This definition excludes bonds issued by Australian companies overseas and bonds issued by overseas companies in Australia. Further, the AER notes that to be consistent with risk-free rate, these Australian corporate bonds should be estimated using a fixed coupon bond."*[29]

In summary, the AER's approach to the calculation of the debt margin for electricity network distribution companies is as follows:

- yields must be observed
- for benchmark bonds
- issued in Australia
- by Australian companies
- having a BBB+ credit rating
- having a fixed coupon
- of 10 year maturity

There is no explicit mention of "*benchmark efficient*" in the criteria to be applied by the AER for electricity network companies, unlike the NGR for gas network companies.

[29] op cit, at pp 266-267

However, in the Queensland DNSP decision the AER interpreted "*benchmark corporate bond rate*" to connote "*efficiency of performance*". The debt margin criteria applied by the AER for electricity and gas network service providers now appear to be quite similar.

4.6 Application to gas access arrangements in Western Australia

It is still for the ERA to decide how to apply the NGL and NGR in relation to the debt margin for gas access arrangements in Western Australia.

My view is that GDS merits a BBB/BBB+ rating for the 2010-2014 access arrangement. Section 5 discusses credit-rating aspects, with application to the GDS.

The NGR does not limit evidence of the appropriate debt margin to fixed rate bonds issued in Australia by Australian companies as the AER commented in the Queensland electricity DNSP decision. Clause 6.5.2(e) of the National Electricity Rules, quoted above, which is the basis of the AER restriction, does not have a counterpart in the NGR. A wider view than Bloomberg and CBASpectrum is important given the local bond market's illiquidity and lack of depth, together with the lack of official reporting of secondary traded yields for corporate bonds (unlike the US which has TRACE[30]). In Australia, this lack of official reporting creates difficulties in ascertaining the proper market yield level for corporate bonds. Section 9 at pp. 69-73 reviews relevant bond yield evidence outside the generic fair yield curves of Bloomberg and CBASpectrum.

[30] Trade Reporting and Compliance Engine established by the National Association of Securities Dealers (NASD) which requires official end of day price/ yield reporting for eligible securities

5 CREDIT RATING BENCHMARK - APPLICATION TO GDS

5.1 Background

WA Gas Networks Pty Ltd. (WAGN) is a 100%-owned operating subsidiary of WA Networks Holdings Pty Ltd. (WAN) which in turn is owned by Babcock & Brown Infrastructure (74.1%) and DUET Group (25.9%).

WAN is rated 'BBB-/Stable' by Standard & Poor's, whilst Babcock & Brown Infrastructure is unrated and DUET Group is rated 'BBB-/Stable'. In its company rating report dated 28 July 2009, Standard & Poor's stated that "*a rating upgrade is unlikely given our expectations for WAN's financial profile over the medium term*." (**Attachment 3**)

WAN has a 'Baa2/Stable' rating from Moody's, but with an 'indicated Baa3' rating under a rating grid approach that references Moody's Key Rating Factors, as described in its report entitled "Regulated Electric and Gas Networks" issued August 2009.

5.2 Credit Rating for the GDS

My view is that the appropriate credit rating benchmark for the GDS is BBB/BBB+.

5.3 Use of Bloomberg BBB Fair Curve

This benchmark credit rating can be implemented in the determination of the debt margin by using the Bloomberg BBB fair curve. This curve contains yields based on bonds that are within Standard & Poor's broad BBB credit category and Moody's broad Baa credit category.

The Bloomberg BBB curve is a composite curve, mainly comprised of BBB+ credit-ratings as seen in Table 2. This supports the use of the Bloomberg BBB generic curve in setting a *benchmark efficient* rating that is:

- designed to allow the utility to recover costs incurred on the assumption the utility is operating efficiently by the standard of its peer group being pure-play regulated gas networks operating in Australia,
- not a benchmark that invokes a concept of a 'stretch target', imposed to prompt the company to operate beyond its design efficiency or any reasonably expected standard of efficiency,
- but equally, not a benchmark based on the lowest-rated entity within WAN's peer group.

The Bloomberg BBB curve comprises Standard & Poor's BBB-, BBB and BBB+ rated companies, and counterpart Moody's Baa1, Baa2, and Baa3. Bloomberg takes the lower rating if there is a dichotomy between Standard & Poor's and Moody's. For example, in the indicative averaging period, Citipower and Transurban both had split ratings (Baa1/ A-), and both were put into the Bloomberg BBB curve with a BBB+ composite rating.

The CBASpectrum BBB+ curve only has Standard & Poor's BBB+ rated entities.

The Bloomberg BBB curve is currently, and has tended to be over time, comprised mainly of Standard & Poor's BBB+ rated companies. Table 2 shows that, in the indicative averaging period, of the 26 member companies in the curve, 15 were BBB+, 9 were BBB and 2 were BBB-. The CBASpectrum BBB+ fair curve, during the indicative averaging period, only had 12 members, all rated BBB+.

TABLE 2 Members of the Bloomberg BBB curve in indicative averaging period

	Standard & Poor's BBB+ Rating
1	Dexus 4/2/10
2	Snowy Hydro 25/2/10
3	Citipower 28/2/10
4	Challenger 23/4/10
5	GPT 7/11/10
6	Bank of Qld 2/12/10
7	Dexus 28/2/11
8	Transurban 15/9/11
9	Origin Energy 6/10/11
10	Tabcorp 13/10/11
11	Wesfarmers 25/7/12
12	Snowy Hydro 25/2/13
13	GPT 22/8/13
14	Wesfarmers 11/9/14
15	Santos 23/9/15
	Standard & Poor's BBB Rating
16	Mirvac 15/3/10
17	Fosters 17/3/10
18	Brisbane Airports 30/6/10
19	Mirvac 15/9/10
20	Countrywide Property 6/5/11
21	Sydney Airports 21/11/11
22	Holcim 7/8/12
23	Leighton 28/7/14
24	New Terminal Financing 20/6/16
	Standard & Poor's BBB- Rating
25	Energy Partnership Gas 29/7/11
26	China Light & Power 16/11/12

Inclusion of bonds in the Bloomberg curve

To determine the debt margin for a BBB/BBB+ rating, all bonds in the Bloomberg composite BBB credit class should be included. 'Outliers' need to be reinstated absent manifest reason to exclude them. If not, the Bloomberg BBB curve becomes a proxy for a standalone BBB+ rating. Section 9 looks at the Bloomberg and CBASpectrum fair curves in the indicative averaging period. The BBB+ rated Santos 2015 bond is the 'anchor' point for the Bloomberg BBB and CBASpectrum BBB+ curves in the 6-7 year maturity; hence, not unsurprisingly, both curves produced almost identical 6-7 year fair yields in the indicative averaging period. However, several bonds (see Table 16, p.64) for which Bloomberg and CBASpectrum have yield data appear to have been unreasonably excluded from their respective curve constructions. Reinstatement and possible reinterpretation of the fair yield is necessary in the *actual* averaging period to ensure the Bloomberg BBB curve is truly representative of the Standard & Poor's BBB/BBB+ credit class.

5.4 Rationale for credit rating of BBB/BBB+

Unfortunately it is not possible to directly observe the debt margin of the pure-play gas utility. There is no gas utility that exactly conforms to the NGR's benchmark metrics. Under the NGR, the credit-rating is to apply to the *benchmark efficient* gas utility that is assumed to have *a financing structure that meets benchmark standards as to gearing and other*

financial parameters for a going concern and reflects in other respects best practice[31]. Hence, a proxy approach is taken involving consideration of the debt margin of companies in the credit class that corresponds to the benchmark gas utility.

The pure-play 60%-geared gas utility could nominally achieve a rating of BBB+. However, my estimation is that Standard & Poor's would not rate this entity BBB+. The reasons are discussed in Sections 5.4.2-5.4.3, being difficult credit conditions, together with the lack of diversification and the relative financial characteristics of the benchmark gas utility in Australia, combine to limit the rating to BBB/BBB+.

These factors are *contextual*; however, Standard & Poor's clearly rate companies in context. Table 3 shows the broad criteria that Standard & Poor's apply to form their credit-ratings. It is not just financial profile that is considered. Financial profile is assessed against business profile. Given the current credit conditions, the lack of diversification, and the relatively small size (in terms of revenues and funds from operations), my estimation is that the benchmark Australian gas utility has an 'Intermediate to Modest' Financial Risk profile and a 'Weak to Satisfactory Business Risk' profile. Hence, my estimation is that the benchmark firm would fall between Standard & Poor's BBB and BBB+ categories, hence my estimation of BBB/BBB+ as the reference rating for the GDS in respect of the 2010-2014 access arrangement.

TABLE 3 – Standard & Poor's "Ratings Definitions"

Business And Financial Risk Profile Matrix

Business Risk Profile		Financial Risk Profile					
		Minimal	Modest	Intermediate	Aggressive	Highly leveraged
	(AAA/AA)	(AAA/AA)	(A)	(BBB)	(BB)	(B)
Excellent	(AAA/AA)	AAA	AA	A	BBB	BB
Strong	(A)	AA	A	A-	BBB-	BB-
Satisfactory	(BBB)	A	BBB+	BBB	BB+	B+
Weak	(BB)	BBB	BBB-	BB+	BB-	B
Vulnerable	(B)	BB	B+	B+	B	B-

These rating outcomes are shown for guidance purposes only. Other qualitative and quantitative rating factors may override these measures.

My estimation is that the benchmark gas distributor would be rated slightly lower than the benchmark electricity distributor. Whilst the latter may qualify as a BBB+, the former should be differentiated and given a degree lower rating.

My review below indicates that the context for a BBB/BBB+ rating for the GDS's 2010-2014 access arrangement is not affected by cyclical factors. Hence, I do not believe the GDS should be prescribed a BBB+ rating on a 'look through the cycle' basis – the factors described below are structural and longterm.

[31] NGR 87 (2)(a)(i) and (ii)

5.4.1 Refer confidential report in Attachment 7

5.4.2 Comparator Analysis

1. Australian comparator analysis

Table 4 shows the universe of gas and electricity utilities in Australia that are rated by Standard & Poor's[32] (December 2009) and Moody's[33] (August 2009). To avoid double-counting, the summary table only counts a score of 1 if other group companies are rated.

TABLE 4 – Australian Gas Utilities – Summary of Ratings

Number in each credit category

Standard & Poor's	BBB-	BBB	BBB+	A-	A	AA	TOTAL
Gas	4	1	1	-	-	-	6
Electricity	2	3	2	5	1	1	14

Moody's	Baa3	Baa2	Baa1	A3	A2	A1	
Gas	-	5	-				5
Electricity	-	-	3	3		1	7

[32] data obtained from the RatingsDirect Global Credit Portal on 1 December 2009

[33] data obtained from "Regulated Electric and Gas Networks" report by Moody's Global Infrastructure Finance report August 2009, p.3

Australian Gas Utilities – Company Ratings

Australian Gas Utilities	Standard & Poor's Credit Rating	Standard & Poor's Outlook	Moody's Credit Rating	Moody's Outlook
Alinta Energy Holdings Pty Ltd	NR	NM		
APT Pipelines Ltd	BBB	Stable		
Dampier Bunbury NGP	BBB-	Stable	Baa2	Negative
Energy Partnership (Gas)	BBB-	Stable	Baa2	Negative
Envestra Ltd	BBB-	Stable	Baa2	Stable
Envestra Victoria Pty Ltd	NR	NR	Baa2	Negative
GasNet Australia (Operations)	NR	NM		
Origin Energy Ltd	BBB+	Positive		
WA Network Holdings Pty Ltd	BBB-	Stable	Baa2	Stable
Australian Electricity Utilities				
Jemena Ltd	A-	Stable		
AGL Hydro Partnership	BBB	Stable		
CitiPower	A-	Stable		
ElectraNet Pty Ltd	BBB+	Negative	Baa1	Stable
Ergon Energy Corp	AA	Stable		
ETSA Utilities Finance Pty Ltd	A-	Stable	A3	Stable
IPM Australia Ltd (Loy Yang B)	BBB	Negative		
Powercor Australia	A-	Stable	A3	Stable
Powerdirect Australia Pty Ltd	BBB	Stable		
Snowy Hydro Ltd	BBB+	Stable		
Spark Infrastructure			Baa1	Negative
SP AusNet Group	A-	Stable	A1	Stable
SPI (Australia) Assets Pty Ltd	A-	Stable	A3	Stable
SPI Electricity & Gas Australia	A-	Stable		
SPI PowerNet Pty Ltd	A-	Stable		
Synergy	A+	Stable		
TRUenergy Holdings Pty Ltd	BBB-	Stable		
TRUenergy Pty Ltd	BBB-	Stable		
United Energy Distribution	BBB	Stable	Baa1	Stable

The Table shows Standard & Poor's have rated significantly fewer gas utilities than electricity utilities, and that gas utilities have a weaker credit rating profile.

Standard & Poor's median rating for Australian gas utilities is BBB- (4 of the 6 companies at this rating). Moody's median and mean are one-notch stronger, being at Baa2 (Moody's has all five Australian gas utilities at this rating). This is broadly equivalent to Standard & Poor's BBB. The median *actual* rating therefore for gas utilities is BBB-/Baa2.

It should be noted that although Moody's rates all five gas utilities at Baa2, this is higher than the standalone credit metrics. The stronger rating is based on a high score for *'stability and predictability of regulatory regime'* (refer **Attachment 3**[34]).

Standard & Poor's have similarly stated that "*major global risk issues facing the utilities industry*" include at the top of the list "*increased volatility in the regulatory environment and competitive landscape leading to greater uncertainty regarding adequacy of pricing*

[34] "Appendix B" of the Moody's report entitled "Ratings Mapping", op cit.

and return on capital"[35].

Based on these comments, both ratings agencies would be likely to lower their ratings if the regulator prescribed a credit-rating that is too high. The relationship of the regulatory rating is inverse to the rating agencies' rating where the rating is disjointed.

For electricity companies, Standard & Poor's median credit rating is A- although 7 companies are in the broad A-AA category, the same number in the broad BBB category. 10 of the 14 companies fall into the BBB/BBB+/A band. The median Moody's rating for electricity companies is one-notch higher being evenly split between Baa1 and A3.

Relationship of credit rating of gas utilities to electricity utilities

A higher benchmark credit rating should not be chosen for the gas network companies to assimilate them with electricity companies on the basis they both come within the "energy" sector. The inherent risks of a gas network company are substantially different to an electricity company. A differentiated approach can be accommodated within the regulatory regime, and its determinations and administration. The evidence supports a differentiated approach going forward, in contrast to the standardised rating regime that is being applied nationally. The rationale for a common benchmark can only be that capital (debt and equity) providers do not differentiate between the two sectors in their capital allocation decisions. This is unlikely for both debt and equity providers, as discussed below.

For *debt* providers, the ratings differentials, assuming they closely mirror the bank's internal rating models, imply that the provision of debt and debt margins will be rationally less favourable to gas utilities than electricity utilities in Australia. There is a strong direct relationship between an entity's credit-rating and its ability to access debt markets. Evidence of this principle is seen in fair curves being at higher yields across the term structure as credit grade falls (see Graph 14, p.63). Debt margins charged by banks to corporate clients also increase the lower the credit-rating (see Table 20, p.71).

Equity providers are rationally likely to differentiate between gas and electricity network providers for two reasons:

(a) the ratings in Tables 4 and 5 are '*issuer* ratings' given to the whole company not just to its debt[36].

(b) the equity beta can be considered. Generally, gas companies have a higher equity beta than electricity companies. "Table 72" in the ERA's final decision for the South West Interconnected Network provides some evidence for this proposition[37]. In the Goldfields Gas Pipeline draft decision (October 2009), the ERA decided that the appropriate equity beta was 0.8-1.2 (60% debt to assets)[38]. In the South West Interconnected Network final decision (December 2009), the ERA decided the equity beta was lower at 0.5-0.8 (60% debt to assets)[39]. The ERA decided the Market Risk Premium for both utilities was the same, being a range of 5%-7%. "*The equity beta value is a scaling factor applied to the market risk premium to reflect the relative*

[35] "Key Credit Factors: Business And Financial Risks In The Investor-Owned Utilities Industry" 26 November 2008

[36] The ratings for their various elements of debt can be different depending on seniority/ subordination etc.

[37] op cit, p. 239; this table was provided by Allen Consulting Group

[38] op cit., p.83

[39] op cit., p.243

risk to equity funds in the particular firm or activity in question."[40] The beta coefficient is the sensitivity of the expected excess asset returns to the expected excess market returns. A higher beta implies greater sensitivity. On this basis, equity providers to gas utilities, having higher equity betas, will demand higher equity returns than counterpart electricity companies because there is higher risk (sensitivity of returns) that cannot be diversified away.

2. International comparator analysis

Table 5 shows ratings for the global electricity and gas utilities covered by Standard & Poor's[41]. As for Australia, the table shows far more electricity utilities globally than gas utilities. The most represented credit category is A- (24), with the next most populated being BBB+ (21). However, the broad BBB category has 48 gas utilities with only 37 in the broad A category (excluding AA entities[42]).

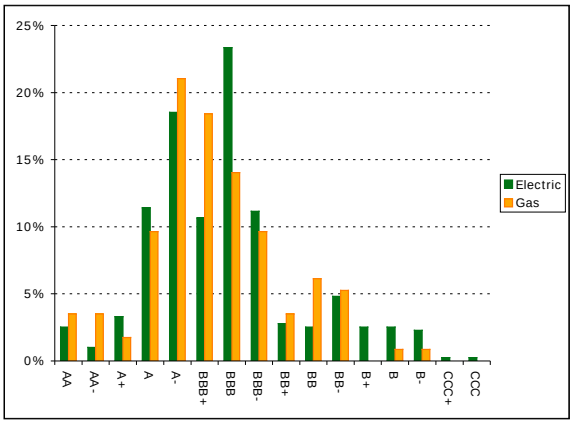
TABLE 5 International Electricity and Gas Utilities – Standard & Poor's[43]

Number of companies

	TOTAL	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	below BB-
Electricity	394	10	4	13	45	73	42	92	44	11	10	19	31
Gas	114	4	4	2	11	24	21	16	11	4	7	6	4

The percentage rating distribution of global electricity and gas utilities is shown in Graph 1.

GRAPH 1 – International Electricity and Gas Utilities – Standard & Poor's[44]



Electricity utilities internationally, as in Australia, are predominately by number, in the A- and BBB categories; on average, as in Australia, their rating is in the order of BBB+.

For gas utilities the global picture is different to Australia. Globally in percentage terms there are far more gas utilities rated BBB and above than Australia. Australian gas utilities are generally weaker credits than their international peers. It is however incorrect by itself

[40] ERA in South West Interconnected Network final decision (December 09), op cit., p.237
[41] as at 4 December 2009
[42] many gas utilities in the AA rating class are state-owned or supported
[43] data obtained from the RatingsDirect Global Credit Portal December 2009
[44] data obtained from the RatingsDirect Global Credit Portal December 2009

to attribute a BBB+ credit rating to Australian gas utilities on the basis that their international peers are rated on average at that level, or on the basis that Australian electricity companies are on average rated BBB+ like their international peers. Quite the contrary – my review suggests Standard & Poor's only rate gas utilities above BBB if they are well-diversified, large in terms of profitability, revenues and operating cash flows, or with high interest coverage ratios. None of these conditions is present in the context of the Australian gas network companies.

For example, Table 6 shows that three of the BBB- gas utilities in Australia are much smaller than the median BBB-, BBB, and BBB+ gas utility on a global basis, and also have much lower interest coverage ratios. The three Australian gas utilities are not 'benchmark gas companies' strictly defined, however they serve as a comparative basis for Australian gas utilities. My estimated rating for the benchmark gas network company in Australia therefore falls in between BBB and BBB+, viz. BBB/BBB+.

TABLE 6 – Australian gas utilities versus global peers

	Rating	Revenues (US$mn)	Funds From Operations (US$mn)	EBIDTA Interest Coverage (times)
Energy Partnership Gas	BBB-/ Stable	163	50	1.66
WA Networks	BBB-/ Stable	183	55	2.00
Envestra	BBB-/ Stable	298	75	1.65
Median global gas utility	BBB-	502	151	3.27
Median global gas utility	BBB	2086	528	4.72
Median global gas utility	BBB+	1560	148	4.27

5.4.3 Credit Rating and Outlook Changes

The global credit rating situation has deteriorated materially in the past 2 years. Many utilities are re-approaching their regulators in their periodic price reviews with a worse credit-rating and financial position than in their last review. Even though regulators look to the 'theoretical' 60%-geared pure-play gas utility in setting the debt margin, the downgrade in global corporate, and specifically gas utility, creditworthiness should produce a one-degree downward revision of the model gas utility rating from BBB+ to BBB/BBB+. The credit deterioration is across the system and not idiosyncratically focused to one sector. It is not predominately cyclical as there are profound and fundamental changes to the credit paradigm. A revision is important given that the rating is used to enable debt cost recovery and ongoing funding/ investment into the gas network business.

Standard & Poor's in their 2008 Annual Global Corporate Default Study And Rating Transitions (2 April 2009) report noted a strong deterioration internationally in 2008. A total of 125 issuers defaulted, the largest count since 2002 (**Appendix 2**). The incidence of credit downgrades was at its high-point also for some years (**Appendix 3**). Many other factors indicated a marked deterioration in global creditworthiness[45].

[45] •The rated debt volume affected by the 2008 defaults was US$429.6 billion, an all-time high in terms of face value.
•Of the 125 defaulters, 101 initially had a speculative-grade rating; 24 were initially investment grade.
•The single biggest defaulter by volume was Lehman Brothers, which defaulted on $144 billion of rated debt, setting a new historical record.
•Financial defaulters nearly doubled their share in 2008, accounting for nearly 20% of total defaults in 2008 versus 10.3% in the long term. Note that the share of financial defaulters was to some extent mitigated by extraordinary government intervention in the form of bailouts and forced consolidations.

Table 7 shows the credit deterioration recently and over a longer-term basis of the rated gas utilities in Australia. The top row for each company provides its current rating. The date of the rating/outlook action is shown. It is apparent that the creditworthiness of the gas sector has been progressively deteriorating, with several rating/outlook downgrades in the past 1-2 years to the point where 4 of the 5 rated names are now BBB-[46].

The latest credit reports for each rated entity, with the exception of Origin Energy, indicate that Standard & Poor's see no credit upgrades in sight for the sector given the generally thin credit metrics and ongoing refinancing and capital issues. This outlook is important in the context of the GDS debt margin that is being set for the 2010-2014 period. There is very little chance the gas sector, and WAN (in funding the GDS), can achieve a higher rating in the intermediate term to recoup debt costs if the credit-rating yardstick is set too high.

TABLE 7 – Standard & Poor's Credit Ratings and Outlooks Over Time

APT Pipeline	Energy Partnership (Gas)	Envestra	Dampier to Bunbury	GasNet	Origin Energy	WA Networks
BBB Stable 25-Jun-09	BBB- Stable 24-Sep-08	BBB- Stable 30-Mar-09	BBB- Stable 25-Mar-09	NR NR 21-Mar-09	BBB+ Positive 7-Sep-08	BBB- Stable 24-Sep-08
	BBB Negative 19-Dec-07	BBB- Negative 12-Aug-08	BBB- Negative 11-Feb-09	BBB Stable 10-Mar-08	BBB+ Stable 19-Feb-05	BBB Negative 19-Dec-07
	BBB Stable 11-Nov-04	BBB- Stable 29-Jul-06	BBB Negative 5-Jun-08	BBB Negative 24-Jul-07	A- Watch Neg 19-Jul-04	BBB Stable 11-Nov-04
	BBB Watch Neg 31-Aug-04	BBB Watch Neg 26-Mar-06		BBB Watch Neg 18-Jun-06	A- Stable 9-Dec-03	BBB Watch Neg 31-Aug-04
		BBB Stable 7-Sep-01		BBB Stable 10-Dec-01	BBB+ Stable 10-Jul-01	
				BBB+ Watch Neg 22-Oct-01		

On the basis of the above analysis, the benchmark credit-rating for application to the GDS in the 2010-2014 access review is estimated at BBB/BBB+.

- The average initial rating of last year's defaulters was 'B+', and the median rating was 'BB-'.
- The average rating one year prior to default among the defaulting cohort was 'B'; the median rating was 'B+'.
- more than half (58%) of all 2008 defaulters had either a negative outlook or ratings on CreditWatch with negative implications a year prior to default, 31% were listed with stable outlook, 8% with a positive outlook, and 2% developing.
- the average time to default from original rating for the global defaulting class of 2008 was 7.2 years, with an associated standard deviation of 7.4 years. This timing is longer than the historical average of 5.7 years observed for all 1,668 defaulters in our database.

[46] GasNet had its rating withdrawn in March 2009 after it repaid debt following the APA Group acquisition.

6 CURRENT ISSUES IN RELATION TO THE DEBT MARGIN

6.1 Data

The debt margin submissions to, and decisions of, the ERA and the AER in recent months highlight a number of bond data collection issues that emerged during and subsequent to the Global Financial Crisis (GFC). There is a very good discussion of these issues in the Victorian advanced metering infrastructure ("AMI") review (2009-11) which had a November-December 2008 averaging period that fell squarely into the worst part of the GFC crisis. Recent AER draft decisions in ActewAGL[47], Country Energy Wagga Wagga[48], ETSA[49], and the Queensland DNSP's (Energex and Ergon Energy)[50] also discuss the issues.

6.1.1 Inherent problem with fair curves

Importantly, fair curves produced by data service providers such as Bloomberg and CBASpectrum are not "built-for-purpose" in that they have not been constructed with the ERA's objectives or guidelines, or the specific circumstances of an access review, in mind. The fair curves are at their essence 'relative value' tools to enable fixed income and capital market participants to gauge 'relative value' across markets and curves. These relative value opportunities may suggest, for example, arbitrage opportunities. The curves are designed to allow a *comparison* of the performance of a specific corporate bond or sector against the subset of the "most liquid" bonds in the investment-grade market. The fair curves are not specifically designed to be used by banks/ investment banks to price new bond issues except in a very general way[51], nor used by fund managers to price or deal in bonds in the primary or secondary market. The fair curve models are not pricing tools and the platforms themselves do not enable bond executions to occur without other steps being initiated. The Bloomberg and CBASpectrum platforms are unlike, in this regard, the YieldBroker[52] platform where participants can view bond prices online, request two-way prices and execute bond transactions.

6.1.2 Implications

Recent experience has shown the importance of cross-checking fair curve results to ensure

[47] op cit
[48] op cit
[49] op cit
[50] op cit
[51] "*Bearing in mind that the curves are representative of secondary market prices and trading sizes, new issues have always been issued at a premium to this curve. In settled market conditions, the premium required to 'get away' a new issue might have been quite small. My experience has been that the premium has increased during this period of market turbulence as buyers have demanded a greater risk premium.*" Email from Robin Pickover of Bloomberg to Julie Williams of Powercor dated 17 May 2009, recorded in the public-record document (AER draft determination on 2009-2011 AMI budget and charges applications Joint submission by the Victorian DNSPs 11 September 2009).
[52] YieldBroker is a dealer-to-client market service provided by Yieldbroker's eleven participant banks to their institutional clients in the Australian and New Zealand debt markets. Yieldbroker gives investors the ability to view live indicative prices and request competitive two-way markets in over 700 debt securities. Security classes currently traded on Yieldbroker include Australian and New Zealand government securities, Australian Semi Government securities, AUD denominated fixed rate corporate securities, AUD denominated Floating Rate Notes, AUD denominated Supranational, Sovereign, Agency fixed rate securities.

the underlying data-sets and the fair yields along the curve are representative of debt costs and market levels for bonds of the requisite credit class.

My recommendation is to use five factors (Section 7) to ensure the Debt Margin is *commensurate with prevailing conditions in the market for funds and the risks involved* (NGR 87 (1)). The first three factors deal with the yield data going into the fair curves from the bank contributors, and the manner in which Bloomberg or CBASpectrum is using these rates to build their fair curves. It is possible to assess the first three factors in the context of Bloomberg, less so with CBASpectrum as it is understood their curve input rates are not disclosed, and further that CBASpectrum only receives input rates from CBA.

6.2 Lack of Longer-Term Bond Issuance in Australia

From October 2007 to April 2009 there were no bonds issued by Australian non-bank companies in Australia. The domestic capital market has gradually re-opened for some companies this year. Table 8 shows the bond issues by Australian non-bank companies in Australia this year up to the indicative averaging period. The maturity range for non-bank corporate bonds is 2-5 years, with an average maturity of 4 years. Several Australian companies have opted to issue their longer-term bonds into the US market. The lack of domestic issuance has meant the fair curves are still not well populated, especially in the 4-7 year maturity, with no bonds in the 8-10 year maturity.

TABLE 8 – Non-Bank Corporate Bond Issues in Australia in 2009 up to indicative averaging period

Company	Launch Date	Maturity	Standard & Poor's Rating	Type of Bond	Bloomberg	CBASpectrum
Downer EDI	21-Oct-09	29-Oct-13	-	Domestic fixed rate bonds	-	-
Wesfarmers	04-Sep-09	10-Sep-14	BBB+	Domestic fixed rate and floating rate bonds	in "BBB" curve	in BBB+ curve
Leighton Holdings	06-Aug-09	28-Jul-10	BBB	Domestic fixed rate notes (increase)	in BBB curve	-
Holcim Finance Australia	04-Aug-09	07-Aug-12	BBB	Domestic fixed rate notes	in "BBB" curve	-
Australian Prime Property Fund (APPF) Retail	21-Jul-09	20-Jul-12	A	Domestic fixed rate notes	-	-
Dexus Property Group	20-Jul-09	01-Jul-10	BBB+	Domestic floating rate notes	-	-
Leighton Holdings	20-Jul-09	28-Jul-14	BBB	Domestic fixed rate notes	in "BBB" curve	-
Volkswagen Financial Services Australia	19-Jun-09	24-Jun-11	A	Domestic fixed rate notes	-	-
Tabcorp	12-Jun-09	01-May-10	BBB+	Domestic floating rate notes	-	-
CFS Retail Property Trust	20-May-09	02-Sep-12	A	Domestic fixed rate notes increase	in "A" curve	in "A" curve

6.3 Extrapolation

6.3.1 Background

In August 2007, Bloomberg reduced the longest maturity in their Australian composite BBB (C356) fair curve from 10 years to 8 years. The A curve (C359) still extended to 10 years.

There were then several decisions by regulators in Australia in which the 10 year BBB+ debt margin was calculated by taking the Bloomberg 8 year BBB fair yield and extrapolating this yield to a 10 year BBB fair yield by adding the 10/8 year A differential[53].

Examples in 2009 included the ERA's draft decisions in Goldfields Gas Pipeline, South-West Interconnected Network[54], and the AER's decisions in Country Energy, EnergyAustralia, and

[53] there was no 9 year BBB fair yield

[54] Of course in its final decision for South-West Interconnected Network, the ERA explicitly recognised the extrapolation issues that had emerged since its draft decision, and decided on a different approach, discussed in Section 8.7, and more fully in Appendix 1.

Integral Energy, and its earlier decisions (in SP AusNet[55], Transgrid[56].

On 18 August 2009, Bloomberg reduced the A and BBB curves to 7 years. This has meant the 8 year "add on" method can no longer be used to derive a 10 year BBB yield.

6.3.2 Recent AER Decisions

In November 2009, the AER gave four draft decisions, ActewAGL (gas), Country Energy Wagga Wagga (gas), ETSA Utilities (electricity), and the Queensland DNSP's Energex and Ergon Energy (electricity). In each decision, the debt margin will be for a pricing period occuring after 18 August 2009[57]. In each decision, the AER decided the debt margin would be based on CBASpectrum's 10 year BBB+ fair yield.

6.3.3 Australian Competition Tribunal merits review hearing NSW and Tasmanian electricity network distributors

In the case of the ActewAGL and Country Energy Wagga Wagga gas access arrangements, the AER is yet to make its final decision. It is unclear whether the AER will confirm its earlier draft decision to use the extrapolated Bloomberg 8 year BBB method, or move to CBASpectrum. The Tribunal decided in November 2009 that the AER's original decision related to the debt margin for the NSW and Tasmanian electricity network distributors would stand, viz. the extrapolated Bloomberg 8 year BBB method described above[58]. The Tribunal's decision regarding the debt margin, however, was based on the consideration of whether the AER had followed due process. In my opinion the Tribunal's decision does not stand for any principle regarding the actual basis used in the debt margin determination.

6.3.4 Recent ERA final decision in South West Interconnected Network[59]

Recognising the extrapolation problems that have emerged since its draft decision, the ERA in its final decision in South West Interconnected Network published in December 2009, modified its earlier approach, and decided to use the Bloomberg BBB curve adjusted by a 2-step process involving two Bloomberg 10/7 year spreads - the 10/7 year AAA spread and the ratio of the 10/7 year A-AAA spread in an earlier period (1/8/2007-18/8/2009). These methods are discussed in Section 8.7 at pp 49-51 and more fully in **Appendix 1**.

6.4 Implications of current issues

The continuing and structural lack of corporate bond issuance in the 6-10 year segment of the Australian BBB/BBB+ yield curve has produced problems in determining bond fair values in the longer-end of the curve. Bloomberg have explicitly recognised the data problems by recently reducing their A and BBB curves to 7 years.

For the AER, it appears CBASpectrum is favoured at the moment, however it is hoped that CBASpectrum does not take on the mantle of 'curve of choice' or 'curve of convenience' merely because it *nominally* produces a 10 year fair yield.

In the indicative averaging period, in respect of its A- and BBB+ curves, CBASpectrum

[55] AER Final Decision, SP AusNet 2008-09 to 2013-14, pp 95-98
[56] AER Final decision TransGrid transmission determination 2009-10 to 2013-14, p.59-60
[57] all will have pricing periods confidentially set but close to the start of their 1/7/2010 to 30/6/2015 regulatory control periods
[58] The Tribunal also decided that the pricing period would one ending on 5 September 2008 as proposed by the businesses, not the pricing period in the February-March 2009 period as decided by the AER.
[59] Op cit. pp 232-233

extrapolates from the longest underlying bonds, being 6 years in both curves[60] to a 10 year fair yield. Furthermore, it is difficult to see how CBASpectrum accomplishes its BBB+ curve extrapolation to 10 years by cross-referencing, or computationally using, its other credit curves, when it is considered that in the indicative averaging period:

- apart from the Babcock 2016 bond, the longest bond in the CBASpectrum A- curve is PBL 2015 (6 years). CBASpectrum reports the Babcock bond as an A- rated bond in its downloadable data-set but it is unclear whether this bond was used in its A- fair curve[61]. It is noted the Babcock bond is rated BBB+/Stable by Standard & Poor's not A-. Hence, there also appear to be credit category issues with CBASpectrum.

- the longest bond in the CBASpectrum BBB+ curve is Santos 2015 (6 years)

- the longest bond in the CBASpectrum BBB curve is Coles 2012 (3 years)

Bloomberg appears to have a more complete data-set. In its composite BBB curve Bloomberg also receives bank contributory pricing for the New Terminal Financing 2016 bond (7 years). In its composite A curve, Bloomberg also receives bank contributory prices for the Telstra 2015, Melbourne Airports 2015, and Royal Women's Hospital 2017 bonds.

A problem for regulators and market participants trying to assess and legitimately backtest the fair curves, is that there is no public disclosure of how CBASpectrum extrapolates its 6 year fair yield to longer-term points. As discussed at p.46, it appears that CBASpectrum applies a standardised function to extrapolate its fair curves[62]. This may seem reasonable when the objective is to produce a spectrum of curves aesthetically having a common shape for market participants wanting relative value tools. However, it is not reasonable to rely on this process for the determination of a 10 year debt margin for the GDS.

For these reasons (more fully discussed in Section 8), it is more robust to explicitly extrapolate the Bloomberg 7 year BBB curve to a 10 year maturity than simply take the nominal CBASpectrum 10 year BBB+ fair yield. It is incorrect to conclude or infer that the curve extrapolation issues are resolved because there is a fair curve provider (CBASpectrum) that publishes a 10 year BBB+ fair yield.

The ERA noted specific problems with the longer end of the CBASpectrum curves in its 2005 decision for the Access Arrangements for the GDS[63]:

> *"ACG has evaluated AGN's further submissions including the NERA report and in light of that material has recommended that the Authority reconsider and increase the allowance for debt margin from that used in the Draft Decision. The basis for this advice is the acceptance by ACG, using its own independent research, of NERA's assessment that the methodology applied by CBASpectrum to predict fair yields is flawed with respect to long dated, low rated issues."*

[60] it appears likely that the Babcock (BBI (DBCT) Finance Pty Ltd) 2016 bond is not being used in the CBASpectrum curve – Bloomberg does not receive bank contributory pricing for this bond. The bond had a 16.5% yield according to CBASpectrum in the indicative averaging period
[61] the Babcock bond had an average 16.5% yield according to CBASpectrum
[62] based on analysis of the CBASpectrum curves during the indicative averaging period
[63] Final Decision on the Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems, Submitted by AlintaGas Networks Pty Ltd (12 July 2005) p.223

My review shows, likewise, that for the 2010–2014 access arrangement for the GDS, CBASpectrum may again have reliability issues in its longer term extrapolation. The appearance of the systematic application of a functional form to the curve shape at the longer end of its BBB+ and other credit curves suggests CBASpectrum's longer term fair yields do not meet the regulatory purposes of NGR 87(1).

6.5 Conclusion

Taking account of the lack of corporate bonds in the longer end of the curves in Australia, and the above issues, my overall conclusion is that the 10 year BBB/BBB+ debt margin is optimally determined for the GDS access arrangement review by:

- using the longest Bloomberg fair yield justified by underlying bonds – in the indicative averaging period, being the 7 year Bloomberg BBB/BBB+ fair yield

- extrapolating this result linearly to a 10 year by the per annum basis point spread between the 7/5 year Bloomberg BBB/BBB+ fair yields.

Section 7 below discusses the factors which allow for an objective assessment of whether a fair curve is a representative proxy for the corporate BBB/BBB+ bond rate – the 4th factor at p.34 deals with fair curve structure and, closely allied, curve extrapolation. This factor seeks to gauge if the curve has sufficient, verifiable and representative bond data points to construct the fair curve as published, and also to ensure that the extrapolation beyond the longest bond is fair and reasonable.

Section 8 discusses the term structure of credit spreads and extrapolation.

7 FACTORS TO BE CONSIDERED IN DETERMINING A REPRESENTATIVE FAIR CURVE

7.1 Factors

There are five inter-related factors that can be used by the ERA to objectively assess whether a fair curve is a representative proxy for the corporate BBB/BBB+ bond rate that:

- is inkeeping with NGR 87(1) which prescribes the *"rate of return on capital is to be commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services"*

- best reflects the "*benchmark efficient*" service provider (NGR 87(2)(a)(i))

These factors are not 'tests' by which a failure or questionable application of one of them means that the fair curve should be discarded. They need to be taken together, and compared to other 'external' debt margin indicators.

This is important in the context of the Australian corporate fixed income market where there is a lack of new issuance across the credit rating spectrum, especially beyond the 5 year maturity. It is unclear whether the fair curves will have 7-10 year bond issues within them by the time the ERA makes its draft or final decision for the GDS. Without underlying bonds, the observation/'price discovery' process in using a proxy benchmark such as the Bloomberg or CBASpectrum fair curves is dangerous. Qualitative (fair judgment) along with quantitative (bond rates and fair curves) factors are required to be used in setting the debt margin for the revised access arrangements.

1. The contributory rates used to construct the fair curve can be verified and have credibility.

Evidence of lack of verification is where the rates are not published or not otherwise available to check. Evidence of lack of credibility is where the rates contributed differ widely on the same day between banks/ market participants for the same bond, or where the rates contributed by a bank/ market participant do not change for a number of days.

To make this assessment for Bloomberg, given that it does not store the contributory rates, these rates need to be accessed each day during the relevant averaging period.

CBASpectrum allows users to access historic bond rates for bonds in their curves. However not disclosed by CBASpectrum is whether these rates are the actual rates used in the curve construction. A problem with CBASpectrum is that the only rates used in their curves are CBA-provided rates. This by itself is not fatal, provided the bond rates used for the CBASpectrum BBB+ curve can be independently checked against other bank rates. This process will involve looking at bank rate sheets, AFMA data sets, Bloomberg, or other data-providers such as Reuters.

2. The contributed rates are actually used in the fair curve construction.

Bloomberg has a system of assigning a "BGN" yield to a bond if there are 5 contributed prices on that date. The BGN is the average of the five banks' rates although it appears Bloomberg have an algorithm in determining a BGN beyond simple rates' averaging. Only bonds with a BGN for the day are meant to be used in the fair curve construction. However, if a BGN is not available, Bloomberg can "over-ride" the system and provide a rate for a bond – it is not known when or how Bloomberg exercises this discretion.

In relation to CBASpectrum, as mentioned above, it is not possible to confirm that the rates contributed by CBA are the actual rates used in their fair curve construction. It is therefore difficult to empirically test whether the CBASpectrum BBB+ fair curve is constructed from CBA-provided rates alone, or whether there are other "over-rides" or discretions being used by CBASpectrum analysts. There may also be curve functionality algorithms being used, either some of the time or all of the time. For example, it is understood that CBASpectrum use cross-credit functionality assumptions such as the assumption that a credit curve of a lower credit rating cannot cross-over a credit curve of a higher or lower credit rating. This might mean that CBASpectrum will ignore a high-yielding bond in a credit category if that bond would cause the curve to cross-over the higher credit curve.

The point is that both Bloomberg and CBASpectrum may be exercising discretions and algorithms that are not being disclosed; hence, if these fair curves are to be used in the context of a debt margin for an access arrangement, the data inputs and curve outputs needs to be assessed and corroborated against available market data.

3. The fair curves reflect bonds in the credit category for the fair curve. The corollary of this element is that there are no bond exclusions except in the limited case where the exclusion is completely warranted and justifiable.

The burden of proof should be squarely on the person seeking to exclude a bond from a fair curve – if a bond is rated in the credit category, especially if its "outlook" by the credit rating agency is unchanged during the pricing period and in a reasonable timeframe beforehand and afterwards (if the ERA's final decision for the GDS were to occur after the pricing period), it should be used in the fair curve unless there is some completely justifiable reason to exclude it. It should not matter that for some reason the market is trading the bond at a yield that seems too high or too low.

To embrace a process of discretionary exclusions is to introduce too much uncertainty into the debt margin determination. Indeed, to allow a system of exclusions introduces another element to the credit rating specification, in that the actual credit rating is effectively being *adjusted* based on the *forward-looking* credit rating assessment for the bond as indicated by the bond's traded yield. Only the credit rating agency is qualified to make the overall rating assessment, and the agencies are generally quite meticulous and timely in altering ratings or rating outlooks if and as circumstances warrant. Indeed, a process of trying to pre-empt a rating change conflicts with the role of the credit rating agencies given their credit ratings are *forward-looking* assessments[64], not backward-looking.

[64] "*A Standard & Poor's issue credit rating is a forward-looking opinion about the creditworthiness of an obligor with respect to a specific financial obligation, a specific class of financial obligations, or a specific financial program (including ratings on medium-term note programs and commercial paper programs*)." from "Standard & Poor's Ratings Definitions", 23 November 2009, op cit.

It is simply not possible to assume that a high-yield for a bond reflects either the market assessment, or the credit rating agency assessment, that the bond/ issuer is to be downgraded. My analysis of 'high-yield' bonds in the AMI[65] pricing period[66] shows the actual rating and rating outlooks prior to, and after, the pricing period invariably did not reflect the perceived rating progression implied by the market yields. The market yield for a bond can follow changes in the market's varying perception of its default risk, but this does not mean the credit rating should be managed or adjusted to some kind of measure of the market-implied default risk.

Default risk itself is only one element of the make-up of a bond's yield at any point in time, and its influence can change through time. Standard & Poor's in April 2009, looking back at the 2008 year, themselves state that their credit ratings do not match actual default experience (though there appears to be a reasonably good relationship), and that the relationship tends to worsen in turbulent markets especially for lesser credit grades, and the relationship can vary across different sectors. To this end, Standard & Poor's have been using a specific measure, called the "Gini ratio", to measure this relationship through time (since 1981)[67]:

> *"Meanwhile, the average Gini ratio—a measure of the relative ability of ratings to differentiate risk over the 1981-2008 period—dropped to 82% as a result of the sharp deterioration in 2008 to 65%. Extraordinary turbulence in the financial sector led the average Gini in that segment to drop to 78%; if only nonfinancials are included, the one- year average Gini ratio did not experience the same extent of deterioration with an average of 80%."*

4. The fair curves have sufficient bonds in the respective credit category to create the curve term structure. An important element of this element is that the fair curve is supported by credible bonds in the period that is being extrapolated.

This factor is important in Australia where there is a lack of corporate bond issuance, especially for longer maturities. There have been several domestic corporate bond issues in recent months as markets have re-opened post-GFC but the average maturity has only been around 4 years (see Table 8, p.28).

It is debatable whether there will be longdated issues over coming months given that risk-appetite is still low for longdated bonds by fund managers, credit-wraps are not as available nowadays as pre-GFC[68], and because a key benchmark for fixed income securities in Australia, and used by many Australian fund managers, the UBS Australian Composite Bond Index, typically has a duration of just over 3 years.

Care must be taken in accepting a fair curve yield that is not supported by underlying bonds and yields, or bond/ yields that cannot be verified or do not have credibility. Assumptions as to curve form, or bond yields from other credit categories, need to be investigated in terms of their influence on the extrapolation process.

To estimate the debt margin in the indicative averaging period, my recommendation is to

[65] Victorian advanced metering infrastructure (AMI) review 2009-2011
[66] 17/11/2008-5/12/2008 inclusive
[67] 2008 Annual Global Corporate Default Study And Rating Transitions (2 April 2009), p.1. The Gini methodology is described in detail in Appendix II of that report
[68] many of the longer-dated corporate bond issues were credit-wrapped pre-GFC

use the Bloomberg 7 year BBB fair yield, extrapolated to 10 years by the debt margin differential between the 5 year and 7 year fair yields (Sections 8.5-8.7 at pp. 44-51).

To substantiate this method for the indicative averaging period, it is necessary both to ensure that the 7 year fair yield on the Bloomberg BBB curve is acceptable, and that the 5-7 year part of the BBB fair curve is also acceptable (Section 8 examines this aspect in detail for the indicative averaging period, especially pp. 44-51).

This exercise involves a consideration of bonds that have been included in the Bloomberg but not in CBASpectrum, and vice versa. If Bloomberg is chosen then the fair curve should be supplemented with any bonds that are verifiably represented in CBASpectrum. Table 9 shows the bonds that have been used in the indicative averaging period in the Bloomberg BBB fair curve versus the CBASpectrum fair curves. There are several gaps.

TABLE 9 – Bonds In Bloomberg and CBASpectrum

Bonds included in Bloomberg BBB curve and in CBASpectrum	Which CBASpectrum curve
GPT 7/11/10	BBB+
Bank of Qld 2/12/10	BBB+
Transurban 15/9/11	BBB+
Tabcorp 13/10/11	BBB+
Snowy Hydro 25/2/13	BBB+
GPT 22/8/13	BBB+
Wesfarmers 11/9/14	BBB+
Santos 23/9/15	BBB+
Fosters 17/3/10	BBB
Mirvac 17/3/10	BBB
Mirvac 15/9/10	BBB
Energy Partnership Gas 29/7/11	BBB
China Light & Power 16/11/12	A-

Other bonds included in Bloomberg BBB curve but not in CBASpectrum	Bonds included in CBASpectrum BBB+ curve and not in Bloomberg curves
Dexus 4/2/10	Investa 15/6/11
Snowy Hydro 25/2/10	Investa 23/8/12
Citipower 28/2/10	
Challenger 23/4/10	
Brisbane Airports 30/6/10	
Dexus 28/2/11	**Bonds included in CBASpectrum BBB curve and not in Bloomberg curves**
Origin Energy 6/10/11	Coles 25/7/12
Wesfarmers 25/7/12	Fairfax 27/6/11
Countrywide Property 6/5/11	Southcorp 20/3/10
Sydney Airports 21/11/11	
Holcim 7/8/12	
Leighton 28/7/14	
New Terminal Financing 20/6/16	

5. The fair curves reflect other relevant 'external' indicators of corporate bond yields in the market during or proximate to the Pricing Period.

Bloomberg and CBASpectrum fair curves reflect a sub-set of bonds. The bonds are typically fixed rate bonds issued by Australian companies with yield levels reflecting secondary trading levels. The yields are not used to set primary issue levels. To the extent, of course, that there bonds are illiquid, or simply do not trade, the bond yields will not reflect "secondary trading" levels as much as bank estimates of the yield on the bond. The yield may then reflect the yield level for the bond as marked in the bank's inventory and may be in no way representative of the bond's true market yield or executable yield.

Other bonds are issued from time to time in Australia that do not, or have not yet, made their way into the Bloomberg and CBASpectrum fair curves at time of the pricing period, yet may be highly representative of the benchmark bond. Table 8 (last 2 columns) indicates the bonds that have been issued recently but do not yet appear in the fair curves.

Of these bonds, special consideration should be given to those bonds issued near the pricing period that are of sufficient size (A$100 million and above), at a publicly-disclosed market-clearing yield, set through a legitimate 'book-build' process.

New bond issues are an important source of yield information. The NGR do not restrict the evidence to secondary market bond yields. NGR 87 requires the rate of return on capital is to be *commensurate with prevailing conditions in the market for funds*, and to permit cost recovery on the basis of the utility operating at *benchmark efficient levels of efficiency….and uses a financing structure that meets benchmark standards as to gearing and other financial parameters for a going concern and reflects in other respects best practice*. Primary debt issuance provides evidence of *prevailing conditions* and refinancing is part of the management of a *going concern*. The NGR therefore set a positive requirement in determining the debt margin to look at financing costs for new debt.

Besides new issues, a number of other indicators help in the assessment of the Bloomberg fair curve to gauge if it is representative of the benchmark bond universe:

- Offshore bond issues by Australian companies
- Secondary market yields for offshore bonds issued by Australian companies, swapped back to Australian dollars, with the overall result expressed as a spread to the Commonwealth Bond rate
- iTraxx[69] credit default swap (5 year maturity) and corporate credit default swap trading levels (out to 10 years)[70]
- Domestic corporate floating rate notes – secondary pricing levels
- company bank debt facility pricing
- RBA's F3 table "Capital Market Yields and Spreads – Non-government Instruments"
- Bank rate sheets for bonds
- Bank fair curves such as the NABMarkets Credit Indices
- Fair curves in other markets, e.g. Bloomberg's US fair curves or other curves[71]

Care needs to be taken in using these indicators because there may be steps required to convert the rates/ yields to a spread to the Australian Commonwealth Bond rate. Nonetheless, they can be used as indicators of the benchmark company debt margin[72].

[69] iTraxx is a platform with bank/ market participant-contributed prices that provides a daily updated composite credit default swap level for approx. 25 investment-grade Australian companies

[70] Credit Default Swaps are 'unfunded' instruments - there is no amount invested in them like a bond. The difference in CDS spreads between points on the curve can serve as an indicator of the benchmark bond spread especially when the spread cannot be directly observed. An analysis of the Tabcorp CDS, used to corroborate the 5-10 year curve spread in the November/December 2008 pricing period, was provided in the 1 June 2009 Victorian advanced metering infrastructure ("AMI") review 2009-2011 submission by the Victorian electricity DNSP's at pp24-29

[71] e.g. the JPMorgan US Liquid Index (JULI), that provides performance comparisons and valuation metrics across a universe of investment grade corporate bonds, tracking individual issuers, sectors and sub-sectors by their various ratings and maturities. Corporate bonds rated Baa3/BBB- or higher by Moody's/Standard & Poor's, with issue sizes of at least $300mn qualify for inclusion in the index.

[72] They proved to be useful in assessing the debt margin in the 17/11/2008-5/12/2008 measurement period in the AMI review when issues with the generic pricing services emerged

8 TERM STRUCTURE OF CREDIT SPREADS

8.1 Background

Having considered the above five factors, and subject to the factors qualifying the use of the fair yields in the fair curve, it is still necessary to extrapolate the fair curve if the longest fair yield is less than 10 years.

It is important not to take at face value a fair curve, for example the BBB+ curve produced by CBASpectrum, that nominally extends to 10 years where the longest bond in the underlying data set is shorter, and where the 'nearby' credit curves also have the same if not worse maturity limitations (refer pp.58-62).

An extrapolation method needs to be used that estimates a valid 10 year point in accordance with NGR 87, recognizing that the underlying bonds in the Bloomberg and CBASpectrum data-sets only extend to the 6-7 year maturity point.

8.1 Extrapolation Calculation

A mathematical distinction is important given recent methods used by the ERA and AER, and the method recommended in this paper, to determine the 10 year debt margin.

1. Extrapolating a yield using data from another curve that pertains to the curve segment being being extrapolated.

Examples include decisions by :

a. the AER in Country Energy, EnergyAustralia, and Integral Energy, and its earlier decisions in SP AusNet[73], Transgrid[74] where the 10 year fair yield was determined by adding on to the 8 year Bloomberg fair yield the difference between the 10 year A and 8 year A *absolute* fair yield
b. the ERA in its final decision for the South West Interconnected Network where the 10/7 year AAA *absolute* yield spread was added to the 7 year BBB fair yield (of course a further adjustment was additionally made in "Method 3").

In both cases, the technique of using the *absolute* yields is mathematically sound. For example in a. above, the 8 year BBB yield is being extrapolated by a spread that embeds both the 10/8 year credit spread (debt margin) and the 10/8 year CGS spread. This method is adequate because it embeds the 10 year CGS into the calculation which is the required risk-free rate and does not leave the utility exposed to a CGS term spread.

2. Extrapolating a yield by the differential in yields in a *prior* period

For the GDS 2010-2014 access arrangement my conclusion is that the optimal method to determine the 10 year BBB/BBB+ debt margin is to extrapolate the Bloomberg 7 year BBB fair yield to a 10 year BBB maturity using the 7/5 year debt margin spread derived from the same Bloomberg BBB curve. In this method, it is not correct to extrapolate the 7 year fair yield by the differential in the *absolute* fair yields between the 5 year and the 7 year. The latter would mean that the 10 year debt margin is affected by any curvature in the

[73] AER Final Decision, SP AusNet 2008-09 to 2013-14, pp 95-98
[74] AER Final decision TransGrid transmission determination 2009-10 to 2013-14, p.59-60

underlying CGS between the 7-10 year maturity points relative to the curvature in the 5-7 year part of the CGS curve. This would expose the gas utility to CGS curve spread risk. The mathematically correct process is to extrapolate the 7 year *debt margin* to a 10 year debt margin using the 5-7 year debt margin differential. The 10 year CGS can then be added to this result to obtain the total debt cost.

As I use credit spreads to determine the debt margin for the GDS, it is necessary to examine the term structure of credit spreads.

8.2 Research on the term structure of credit spreads

There has been a lot of academic and professional research done over the last few years on the term structure of credit spreads. There are still many grey areas. Much of the research into credit spread determinants in recent years has been prompted by three related factors:

- the tightening of credit spreads across the G-20 countries up until 2007, then their 'blow out' with the onset of the GFC
- the 'search for yield' in a low risk-free rate environment which fanned the growth of the credit derivative market, and related markets like Collateralised Default Obligations (CDO's), and the plethora of other credit-related securities and derivatives
- the need for an estimation of fair market value for thinly traded or non-traded instruments containing credit risk, especially by banks/ financial institutions, as part of the International Accounting Standards (e.g. IAS 39 which, for example, requires that there be a high correlation between the value of the hedging instruments and the value of the instruments being hedged, even if these instruments are not traded in such a way that market prices are continuously observable). Similarly in the US, Financial Accounting Standard 157 sets out the hierarchy of rules on how "fair value" should be determined in markets of varying liquidity and transparency.

In October 2004, the European Central Bank did a study of the term structure of credit spreads[75]. Of course the ECB like several central banks and official institutions around the world were starting to become curious and increasingly concerned by the growth of credit derivatives, and the tightening of credit spreads, that were occurring in the market[76]. The reasons given by the ECB for the study were as follows:

> *"Over the last decade, the analysis of the determinants of credit spreads has gained more attention for several reasons. The Euro corporate bond market, which lags its US counterpart, has become broader and more liquid. The number and the market value of Euro corporate bonds have more than doubled over the last decade[77]."*

The ECB's findings, below, shows the sorts of factors that determine the term structure of credit spreads, and could also, it would seem, be applied to the Australian term structure (unfortunately there is no similar study that has been publicly released in Australia).

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[75] Working Paper Series No. 397 / October 2004 Determinants of Euro Term Structrure of Credit Spreads by Astrid Van Landschoot at http://www.ecb.int/pub/pdf/scpwps/ecbwp397.pdf

[76] although the onset and severity of the GFC seems to have surprised most central banks and official research institutions

[77] ibid p.5

"Our results indicate that changes in the level and the slope of the default-free term structure are two important determinants. An increase in the level and/or the slope significantly reduces credit spread changes. For the higher rating categories (AAA and AA), the effect of changes in the level and the slope depend on the maturity of the bonds, that is, the effect first increases and then slightly decreases with the time to maturity. We find a significant negative relation between the DJ Euro Stoxx returns and credit spread changes and a significant positive relation between increasing implied volatility of the DJ Euro Stoxx and credit spread changes. Although the effects are statistically significant, the economic importance is much smaller compared to the effect of changes in the default- free term structure. The effect of the market return strongly depends on the rating but not on the maturity of the bonds. Lower rated bonds are much more affected by the market return. We find evidence for the asymmetric influence of the implied volatility in credit spread changes, that is, only positive changes in the implied volatility have a significant impact. Furthermore, the effect of positive changes in the implied volatility becomes stronger for lower rated bonds but does not depend on the maturity of the bonds. Liquidity risk, measured as the bid-ask spread, significantly affects all rating categories and becomes more important for lower rating categories. For AAA and AA rated bonds, the effect increases with maturity. Finally, we find evidence for mean reversion of credit spreads for all ratings and maturities. The model explains on average 22% of the variation in credit spreads as measured by the adjusted R2 . This is comparable with the results for US corporate bonds.[78]"

Another research paper was given at an ECB conference in 2005 which looked at US Treasury yields and the term structure of corporate credit spreads[79].

"In general, we find that both yields and spreads are strongly correlated to real economic activity and financial conditions, and less so to inflation."[80]

Bedendo, Cathcart and El-Jahel [81] (2004) in their paper stated:

"Our main findings can be summarized as follows. As expected, the treasury yield curve is a crucial determinant of the credit spread curve, and periods of liquidity shortages are associated with high credit spread levels. More interestingly, both market and idiosyncratic equity variables generally play a significant role in explaining the level, slope and curvature of the credit spread term structure. This suggests that movements in these variables translate into non-parallel movements in the credit spread curve. More specifically, the idiosyncratic volatility displays a stronger impact on the entire credit spread curve than the volatility of the S&P 500 index. The findings are generally consistent across credit ratings and sectors, although the factor loadings of the individual variables vary significantly. In agreement with the yield curve literature, our results are stronger for the level and slope, and weaker for the curvature, which seems harder to capture and analyze. On the other hand equity market returns, idiosyncratic volatility, and interest rate

[78] ibid pp.5-6

[79] "Macro Factors in the Term Structure of Credit Spreads" by Jeffrey Amato, Bank for International Settlements, and Maurizio Luisi of ABN AMRO Bank at http://www.ecb.int/events/pdf/conferences/ECB-BIS_2005/credit-macro20.pdf

[80] ibid p.3

[81] "The Shape of the Term Structure of Credit Spreads: An Empirical Investigation", by Mascia Bedendo, Lara Cathcart, Lina El-Jahel a Tanaka, Business School, Imperial College London, p.3

variables are significant determinants of credit spread changes."

Jarrow, Li, Mesler, and van Deventer (2009) in their paper stated:

> *"Default probabilities and losses in the event of default are critical determinants of the fair market value for credit sensitive securities, but they are not the only such determinants. Risk aversion, differential information, market liquidity and market frictions (e.g. transaction costs and institutional constraints) are at least as important. Financial theory argues that it is the combination of all of these components that determines credit spreads, not just the default probabilities and recovery rates alone."*[82]

The authors built a statistical model, with attention to the functional form of the explanatory variables, to estimate credit risk spreads rather than an (equilibrium) economic model specifically due to problems inherent in credit spreads that the explanatory variables are too diffuse. The authors pointed out that: *"Linear regression analysis can be viewed as providing a linear approximation to a more complex, and non-linear, economic model"*[83].

However the authors found that:

> *"previous authors (see, for example, Campbell et al [2002], Collin-Dufresne et al [2000], Huang et al [2003], and Elton et al [2001]) fitting a statistical model to credit spreads typically use a linear function to link the credit spread to explanatory variables via ordinary least squares regression. Implicit in the linear regression structure, however, is the possibility that when the model is used in a predictive fashion, the statistical model may predict negative credit spreads. Negative credit spreads, of course, are inconsistent with any reasonable economic equilibrium."*[84]

The Federal Reserve of the United States has also done a lot of research around the issue of term premia, in their efforts to better understand the behaviour of markets, and to try to understand what markets might be predicting about the US economy. Federal Reserve Governor Kevin Warsh in a speech in 2007 looked at the question of whether excess liquidity was behind the reduction seen in risk premia.

> *"But, there are compelling reasons to suspect that level of liquidity is affecting the slope of the yield curve, and lessening its predictive power. The same factors that are contributing to liquidity--low uncertainty about inflation and output--are also driving down term premiums and, hence, long-term Treasury yields. Thus, to the extent that low long-term Treasury yields and the negative slope of the yield curve reflects a lower term premium, rather than a lower expected short rate, it is less likely to signal future economic weakness.*
>
> *High liquidity could also obscure some information we glean from corporate bond prices. What if the current level of liquidity caused lower risk premiums than could be justified by actual credit risks? Might a misallocation of resources result? Many*

[82] "The Determinants of Corporate Credit Spreads: An Update" by Robert Jarrow, Li Li, Mark Mesler, and Donald van Deventer of Kamakura Corporation, wrote a paper in September 2009 at http://kamakuraco.com/Company/ExecutiveProfiles/DonaldRvanDeventerPhD/KamakuraBlog/tabid/231/EntryId/129/The-Determinants-of-Corporate-Credit-Spreads-An-Update.aspx

[83] ibid
[84] ibid

> *commentators have pointed to the low spread of corporate yields relative to Treasuries as a sign of investors "reaching for yield" due to perceived excess liquidity. Risk spreads, however, appear less exceptional given the remarkable strength of the corporate sector. We can decompose risk spreads for corporate bonds into a series of forward spreads over a sequence of time periods. Forward spreads include compensation investors require for expected credit losses and a risk premium, and it would be reasonable to expect that investors would have a stronger conviction about expected credit losses in the near term than at future horizons".*[85]

The above statements are included to illustrate the complexity of modelling the term structure of credit spreads, and explaining their behaviour through time.

There is also research that examines the relationship between the behaviour of credit spreads and the company's credit rating.

Much of that research deals with the Robert Merton's seminal paper (1974)[86] in which he notes that low-rated bonds with high default risk tend to have 'humped' term credit spread structures as time allows the risk to improve.

Doubts have been cast on Merton's hypothesis in later research. Bedendo, Cathcart and El-Jahel [87] (2004) stated:

> *".In a recent study, Avramov et al. (2004) analyze credit spread changes for both investment-grade and low-grade bonds, and find significant discrepancies in their determinants. Whilst changes of investment-grade bonds are mainly driven by aggregate factors, speculative-grade bonds are more sensitive to firm- specific variables. The work of Campbell and Taksler (2003) on investment- grade bonds uncovers the effect of idiosyncratic equity volatility on the level of credit spreads. They find its impact to be much stronger than predicted by the standard structural model of Merton (1974). In a similar spirit, Cremers et al. (2004) show that implied volatility is a very significant determinant of the level of credit spreads for investment-grade bonds."*[88]

Helwege and Turner[89] found there is a downward bias in the term structure of credit spreads because it is only the higher-rated companies that can issue longer-dated bonds.

In their April 2009 report, Standard & Poor's find that default experience rises in a fairly progressive way through time, as their table (reprinted as Table 10) portrays across the credit spectrum[90].

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[85] At the Institute of International Bankers Annual Washington Conference, Washington, D.C. March 5, 2007, speech entitled "Market Liquidity: Definitions and Implications"
[86] "On the pricing of corporate debt: the risk structure of interest rates" Journal of Finance, American Finance Association, vol. 29(2), pages 449-70
[87] op cit
[88] ibid p.3
[89] "The Slope of the Credit Yield Curve for Speculative-Grade Issuers" by Jean Helwege and Christopher Turner, Journal of Finance Vol.29, pp 449-470
[90] 2008 Annual Global Corporate Default Study And Rating Transitions (2 April 2009). The Gini Methodology is described in detail in Appendix II of that report, p.26

TABLE 10 – Fastest Cumulative Defaulters Global Corporates (Standard & Poor's)

Fastest Cumulative Defaulters Among Global Corporates From Original Rating (1981-2008)

	AAA	AA	A	BBB	BB	B	CCC/C	Total
Number of issuers defaulting within:								
3 months				1		2	6	9
6 months				2		13	13	28
12 months				3	9	46	25	83
3 years			5	26	111	370	58	570
5 years		2	12	58	231	622	73	998
7 years	2	4	25	84	301	744	79	1,239
Total	5	24	75	152	431	897	84	1,668

However, default experience does not move over time step-by-step with credit rating. The Gini coefficient is a measure of the explanatory strength of credit ratings as a measure of default experience, and is one of Standard & Poor's important analytical measures.

"As expected, the Gini coefficients decline over time because longer time horizons allow greater opportunity for credit degradation among higher rated entities."[91]

8.3 Observations about the Term Structure of Credit Spreads

There is much research and debate about the term structure of credit spreads. It is not possible to make definitive conclusions about how the curve should be extrapolated, or what evidence that reflects *prevailing conditions in the market for funds and the risks involved* (NGR 87) might be used to achieve this.

It is *axiomatic* that the term structure of credit spreads is positive, rising through time, but this tendency may not be exhibited in all cases, and there seem to be differences between different credit categories which seem to be mainly driven by differentials in expected default risk (loan loss). The inference that there should be a positive margin along the credit curve is based on the reasonable view that bonds have more chance to default over time and therefore the credit spread needs to *deterministically* rise through time, all other things being equal, to compensate for potential expected and unexpected default losses prior to legal maturity of the bond.

It can be *inferred* from the Standard & Poor's research that credit spreads move in a broadly progressive/ linear way through the term structure, although this is only an inference, and may be violated in application to different credit curves at different points in time, under differing financial conditions.

8.4 Application to Australia

In Australia difficulties in forming a theory about the term structure of corporate credit spreads, and their behaviour, arise for a range of reasons, including:

8.4.1 Lack of corporate bonds across the term structure and across the credit-rating spectrum

This lack of overall depth limits market participation which in turn has meant that there is no interbank market, and the market that exists is really a 'broker' or 'best efforts' market – in these sorts of markets, bank trading desks often will hold inventory positions in particular bonds in case clients want to buy them. The overall effect of the lack of depth can be to create distortions in market/ 'observed' bond pricing and their credit spreads

[91] ibid p.36.

8.4.2 Liquidity preferences by funds/ institutional holders

Their preferences are generally for the short-term part of the curve (money market-type funds), or the mid-term part of the curve (bond/ fixed income funds) with portfolio duration/ interest rate shifts being managed through bond futures on the SFE or interest rate swaps transacted with banks.

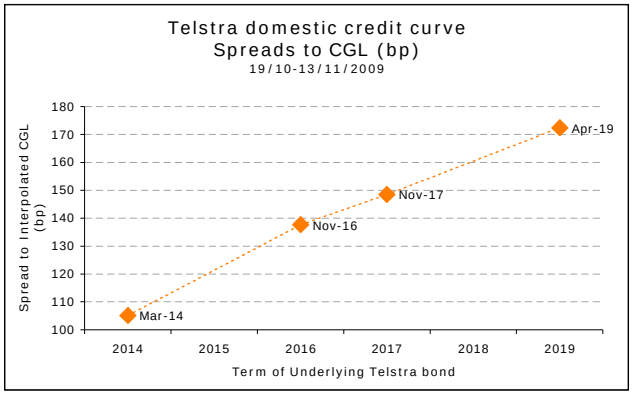
8.4.3 Performance benchmarks

Funds have different benchmarks for assessing performance of their bond/ fixed income portfolios, for example some measure performance against Swap whilst others measure performance against the CGS. This means the spread to CGS ("debt margin") may not be the spread being explicitly assessed and managed by various institutional funds and others. As the Australian bond market is dominated by funds/ institutional holders, without a significant retail component[92], it is often the funds' benchmarking criteria and processes that create the observable economic relationship between a bond's yield and the spreads that is trades at relative to various market yields.

This lack of a universal relationship between bond yields and their spread to CGS can have the unintended effect that the CGS spread may exhibit unusual or uneconomic behaviour from time to time that may not be quickly or readily priced out, for example, by arbitrage activity (by funds who are benchmarked by the CGS spread). In turn, this may mean that the CGS spread will not follow explanatory variables such as the expected default/ loss on the bonds themselves, or that significant deviations from CGS spreads may occur for long periods of time. It is difficult to develop a model that normalises CGS spreads.

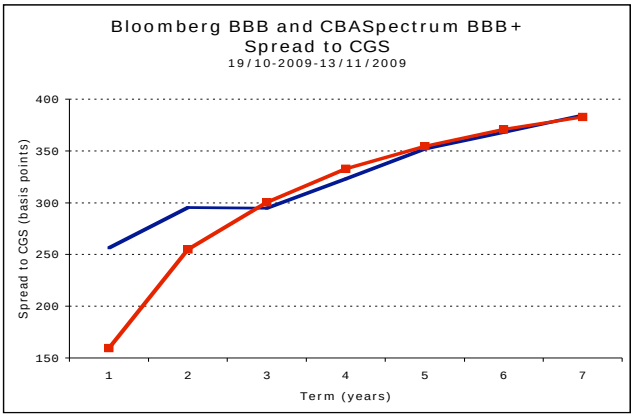
In Australia it is difficult to observe the term structure of credit spreads given the lack of non-bank corporate issuers with bonds across the curve. Nonetheless, the positive nature of the domestic term structure of credit spreads can be seen in the graphs below. Graph 2 shows the average CGS spread (debt margin) over the indicative averaging period for four domestic Telstra bonds. Telstra is the only non-bank company to have any sort of spread of domestic bond maturities. Graph 3 shows CGS spreads for the Bloomberg BBB fair curve and CBASpectrum 'BBB+' fair curve during the indicative averaging period. Both graphs are included to illustrate examples of the positive/ upward sloping term structure of credit spreads that generally applies to investment-grade companies.

GRAPH 2 – Telstra Domestic Bonds Implied Debt Margins



[92] minimum lot size for secondary bond transactions is often $500,000 which precludes a retail involvement in the Australian bond market. The need to achieve higher retail presence has been the subject of much recent commentary in Australia

GRAPH 3 – Bloomberg BBB and CBASpectrum BBB+ Implied Debt Margins



8.5 Rate of Change – Linearity

In looking at the extrapolation issue in the debt margin, of concern is the *rate of change* of the credit spread through time. This is important so that the longest observed maturity (where there are underlying bonds) can be properly extrapolated to the 10 year point.

It is unlikely the rate of change of the credit spread will be uniform through the term structure. Table 11 shows the per annum rate of change of the credit spread (debt margin) for Telstra's domestic bonds seen in Graph 2 above. The change is positive but clearly not uniform through the term structure.

TABLE 11 – Telstra's Domestic Bonds and Rate of Change of Debt Margin

Telstra Bond Maturities	Telstra yield in indicative average pricing period	Interpolated CGS in indicative average pricing period	Average Debt Margin (bp's)	Per annum rate of change of Debt Margin
Mar-10	4.90	3.85	105	
Nov-12	6.57	5.20	138	11.6%
Nov-13	6.82	5.33	149	7.8%
Apr-15	7.16	5.44	172	11.4%

Some research suggests credit spread curves exhibit polynomial progression (progressively less upwardly sloping). A visual inspection of the CBASpectrum curves indicates this functional assumption – see Graph 4 (p.46).

However, research by Helwege and Turner (1997) suggests credit spreads rise through time for the more risky bonds and that any downward bias in the term structure is due to a bias being that only the better credit-rated companies can issue longer-term bonds[93].

> "*Many theoretical bond pricing models predict that the credit yield curve facing risky bond issuers is downward-sloping. Previous empirical research (Sarig and Warga (1989) and Fons (1994)) supports these models. Our study examines sets of bonds issued by the same firm with equal priority in the liability*

[93] "The Slope of the Credit Yield Curve for Speculative-Grade Issuers" by Jean Helwege and Christopher M. Turner (November 1997)

structure, but with different maturities, thus holding credit quality constant. We find, counter to prior research, that risky bonds typically have upward-sloping credit yield curves. Moreover, when we combine our matched sets of bonds (no longer controlling credit quality), the estimated slope is negative, indicating a sample selection bias problem associated with maturity."

In the US context, Elton, Gruber, Agrawal and Mann (2001)[94] found a *linear* relationship for the AA, A and BBB credit categories between the mean credit spread and the default risk, and that risk factors bore a linear relationship to term. In this regard Table 12 reprints Elton et al's 'Table V1' that shows debt margins rising in a linear way through term[95]:

TABLE 12 – Elton et al Table VI

Panel (A) : Mean Spreads

years	1	2	3	4	5	6	7	8	9	10
AA	0	0.004	0.008	0.012	0.017	0.023	0.028	0.034	0.041	0.048
A	0.043	0.053	0.063	0.074	0.084	0.095	0.106	0.117	0.128	0.14
BBB	0.11	0.145	0.181	0.217	0.252	0.286	0.319	0.351	0.38	0.409

Panel (B) : Minimum Spreads

years	1	2	3	4	5	6	7	8	9	10
AA	0	0.003	0.007	0.011	0.015	0.02	0.025	0.031	0.038	0.044
A	0.038	0.046	0.055	0.063	0.073	0.083	0.093	0.104	0.116	0.128
BBB	0.101	0.132	0.164	0.197	0.229	0.262	0.294	0.326	0.356	0.385

Panel (C) : Maximum Spreads

years	1	2	3	4	5	6	7	8	9	10
AA	0	0.004	0.009	0.014	0.019	0.025	0.031	0.038	0.044	0.051
A	0.047	0.059	0.071	0.083	0.094	0.106	0.117	0.129	0.14	0.151
BBB	0.118	0.156	0.196	0.235	0.273	0.309	0.342	0.374	0.403	0.431

The year to year change in the Mean Spreads in Panel (A) mean spreads is shown in Table 13. This indicates strong linearity in the term structure of credit spreads.

TABLE 13 – Yearly Change in Panel (A) Mean Spreads

years	2	3	4	5	6	7	8	9	10
yearly change	0.035	0.036	0.036	0.035	0.034	0.033	0.032	0.029	0.029

Elton et al found that :

"We find that the risk premium is a large part of the spread. We show that corporate bonds require a risk premium because spreads and returns vary systematically with the same factors as common stock returns. If investors in common stocks require compensation for this risk so should investors in corporate bonds."[96]

[94] "Explaining the Rate Spread on Corporate Bonds" by Edwin J. Elton,* Martin J. Gruber,* Deepak Agrawal** and Christopher Mann, revised September 24, 1999

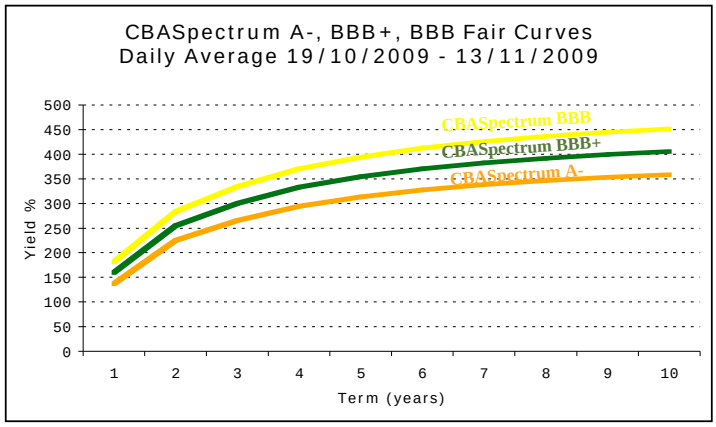
[95] Table VI "Mean, Minimum and Maximum Spreads assuming Risk Neutrality". This table shows the spread of corporate spot rates over government spot rates when taxes are assumed to be zero, but default rates and recovery rates are taken into account. The corporate forward rates are computed using equation (6). These forward rates are converted to spot rates, which are then used to compute the spreads below.

[96] ibid p.4

> *"The difference in spreads across rating categories has to be due to the presence of a risk premium. Also, to explain empirical spreads, the compensation the investor requires for risk must be higher for lower rated debt and for longer maturity bonds."*[97] (underlining added)

Graph 4 shows the spread to CGS (debt margin) for the CBASpectrum curves in the indicative averaging period.

GRAPH 4 – CBASpectrum Implied Debt Margin



Remarkable is the uniformity of the progression of the debt margin through the term structure for the CBASpectrum fair curves, as seen in the above Graph and Table 14. The percentages in the table are the per annum rate of change of the debt margin (spread to CGL) from the immediately prior year. It is unlikely that debt margins for each credit category move in such a uniform manner as this table implies. There appears to be a standardised functionality imposed on the CBASpectrum curves related to the term structure of credit spreads.

TABLE 14 – % Change in CBASpectrum Implied Debt Margin through term structure
rates of change are on prior year of term structure

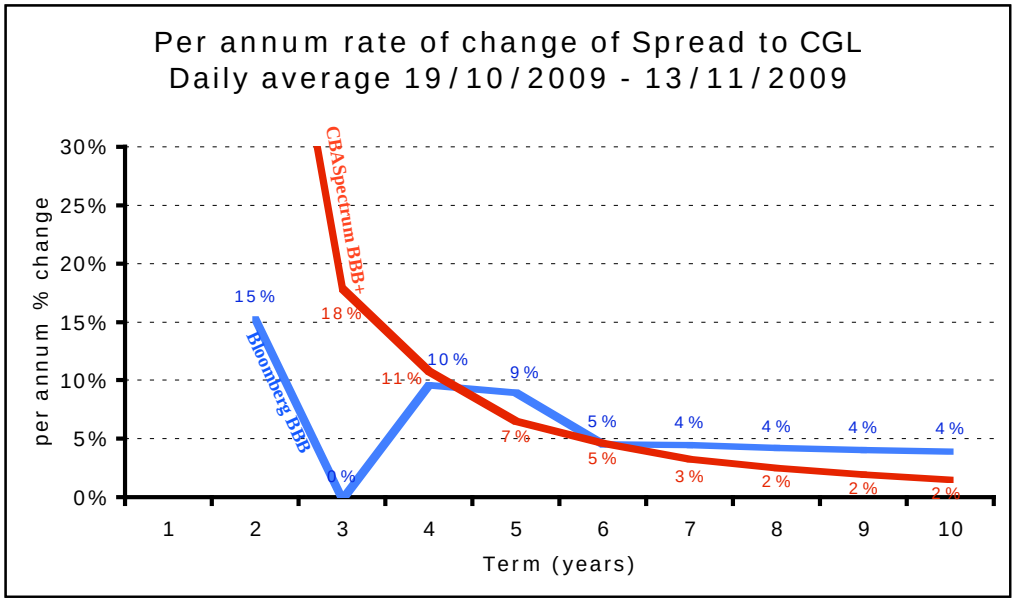
Term	CBASpectrum A-	CBASpectrum BBB+	CBASpectrum BBB
2nd year	64%	60%	56%
3rd year	18%	18%	18%
4th year	11%	11%	11%
5th year	6%	7%	7%
6th year	5%	5%	5%
7th year	3%	3%	3%
8th year	2%	2%	2%
9th year	2%	2%	2%
10th year	2%	2%	2%

Graph 5 shows the percent change from the immediately prior year in the debt margin for the Bloomberg BBB and CBASpectrum BBB+ fair curves. The former is extrapolated linearly by the 5-7 year curve. The recommended extrapolated Bloomberg curve appears

[97] ibid p.6

reasonable in the 7-10 year period, rising at only 4% p.a; importantly it is based on a concrete variable being the average per annum rate of change in the immediately preceding 2 year period.

GRAPH 5 – Change in CBASpectrum BBB+ and Bloomberg BBB Implied Debt Margin (% change through the term structure)



In Australia, it is likely that the lack of non-bank corporate bond issuance beyond the 5 year maturity suggests investor sensitivity to term – this suggests credit spreads would rise faster as term increases. There is still a pronounced lack of 'risk appetite' amongst investors[98] for longer term corporate bonds in Australia due to perceived default risk. Research noted above shows default risk is a major component of the term structure of credit spreads. This implies a progressively rising term structure in Australian credit spreads, especially for credit rating categories below A where the research suggests credit spreads rise more through term due to the greater influence of 'idiosyncratic' factors.

8.6 Bloomberg Extrapolation Tests

Table 15 shows the results of the tests performed on the Bloomberg 5-10 year BBB curve in the periods when Bloomberg published a 10 year BBB fair yield to determine if the 10 year BBB debt margin calculated (extrapolated) using an earlier part of the BBB curve matched the actual 10 year BBB debt margin.

[98] as Malcolm Edey, Assistant Governor (Financial System) Reserve Bank of Australia, said in his 19 August 2009 speech, op cit., "This last point prompts me to make a more general observation – that financial cycles, with their tendency to generate overstretch and then retreat from risk-taking, have been around for as long as financial activity itself. The common features of these cycles are well recognised. They include, in the up-phase, a general sense of optimism and heightened appetite for financial risk, rising asset values, and increasing leverage as both the demand for credit, and the supply of credit, increase. All of these features were present in global markets in the lead-up to the current crisis period, and they set the stage for the severe correction that followed." p.2

Bloomberg published a daily 10 year BBB fair yield in three periods in recent years in Australia (a total of 1,295 daily occurrences):

- 4/12/2001-14/3/2002
- 11/6/2003-20/10/2004
- 10/11/2005-9/10/2007

TABLE 15 - Bloomberg 10 year extrapolation test results

		Differential (bp's) between *extrapolated* 10 year BBB debt margin and *actual* 10 year debt margin		
	Period	Using 3-7 year BBB debt margins for the extrapolation	Using 4-7 year BBB debt margins for the extrapolation	Using 5-7 year BBB debt margins for the extrapolation
Mean	**3 periods combined**	**13.1**	**12.6**	**15.3**
	4/12/2001-14/3/2002	7.8	9.6	23.4
	11/6/2003-20/10/2004	17.3	21.4	28.9
	10/11/2005-9/10/2007	10.8	6.7	4.5
Median	**3 periods combined**	**10.3**	**9.3**	**16.2**
	4/12/2001-14/3/2002	9.6	11.9	27.0
	11/6/2003-20/10/2004	17.3	20.7	29.6
	10/11/2005-9/10/2007	9.6	6.0	3.0

The results show that the difference is generally positive meaning that the extrapolated method produced a higher 10 year yield than the actual 10 year yield. However this is qualified in two respects:

- research by Helwege and Turner (1997) (p.44) indicates a downward bias in the longer part of the credit curve
- the mean spread is only 12.6-15.3bp, and the median spread is 9.3-16.2bp over the combined three periods when Bloomberg published a 10 year BBB fair yield), which is statistically insignificant relative to the fair yield
- in the most recent 2005-2007 period, the mean spread is only 4.5-10.8bp, and the median spread 3.0-9.6bp; this provides evidence that in the most recent period, extrapolation produced a very good fit to the actual 10 year BBB yield.

Conclusions from extrapolation test

- using the 3-7 year, 4-7 year or 5-7 year part of the BBB curve to extrapolate to a 10 year BBB debt margin produces non-statistically significant differences – of the 1,295 daily occurrences over the three periods, extrapolation produced a 10 year BBB debt margin that was a robust, good fit to the actual 10 year BBB debt margin
- extrapolation has in the past generally produced a higher-than-actual debt margin; however, the differential is statistically immaterial relative to the total fair yield itself (the mean differential is only 2.2% of the mean fair yield over the combined three periods)
- for ease of calculation, and noting the last period 10/11/2005-9/10/2007 (mean differential 4.5bp, median 3.0bp) when Bloomberg published a 10 year BBB fair yield, it is recommended the differential between the 5-7 year debt margins be

used to perform the extrapolation being the closest, and therefore the most relevant yield points, to the 7 year yield itself.

8.7 ERA's Methods in the Final Decision in Western Power for the South West Interconnected Network[99]

Appendix 1 (p.77) fully discusses Methods 2 and 3 decided upon by the ERA. The averaging period used in this decision was the 20 business days prior to 30 October 2009, and so is quite similar to the indicative averaging period for the GDS.

8.7.1 "Method 2" in South West Interconnected Network final decision

Emperically, the Bloomberg 10/ 7 year AAA spread was a reasonable proxy for the 10/7 year BBB spread in the last two periods when Bloomberg published a 10 year BBB fair yield[100]. In addition, it is useful that Bloomberg still publish a 10 year AAA fair yield. However, I have several reservations in using the 10/7 year AAA spread to extrapolate the 7 year BBB/BBB+ yield:

- It is not robust to use a spread calculated from one credit class, especially a credit class (AAA) that is materially higher and far-removed, to extrapolate another credit class (BBB/BBB+)

- The credit curve used in the debt margin calculation should be independent of the risk-free curve. The AAA curve used has the same rating as the risk-free

- The absence of corporate bonds within the Bloomberg AAA curve renders it unrepresentative of the class of bonds that should be used in the rate of return calculation for the benchmark gas network company in accordance with NGR 87. The vast majority of the bonds in the AAA curve are bank-issued, with most issued by domestic banks supported by the Australian Government guarantee[101].

- Although the Bloomberg AAA curve extends to a 15 year fair yield, there are only two bonds beyond 2014, being the 2015 and 2020 bonds issued by a special-purpose collateralised entity, Virtue Trust, which is a highly-structured non-corporate AAA-rated[102] trust entity. Hence, the longer end of the AAA curve suffers significant sampling/ population issues in the context of a debt margin determination pursuant to NGR 87. In effect the longer end of the BBB/BBB+ curve is currently being drawn through only two bond data points, the Santos 2015 bond (corporate BBB+) and the Virtue Trust 2020 bond (non-corporate AAA, unverified) (further adjusted by Method 3 discussed below).

- In the averaging period, the 10/7yr AAA curve add-on, calculated to be 55bp is similar to the add-on which results from the use of my recommended 7/5 year BBB/BBB+ debt margin spread to extrapolate the 7 year BBB/BBB+ yield (49bp).

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[99] Final Decision on Proposed Revisions to the Access Arrangement for the South West Interconnected Network, ERA, 4/12/2009 reprinted 17/12/2009, at pp 231-233

[100] The two periods are 11/6/03-20/10/04 and 10/11/04-9/10/07

[101] there are doubts about the ongoing status of this guarantee

[102] a search of Standard & Poor's RatingsDirect creditportal failed to find any mention of the bonds issued by Virtue Trust, nor help understand the composite AAA rating within Bloomberg. CBASpectrum also has no mention of the bonds in its online data base

However, the coincidence of this result may not reflect a fundamental, reliable relationship. My concern is heightened by the fact that the 10/7 year AAA spread is currently large, and it is unknown whether it will 'mean revert', or if the move to 50bp reflects a structural break in the AAA curve, or a structural issue within the underlying bonds (possibly the Virtue Trust bonds).

Conclusion

Despite historical association with the 10/7 year BBB spread, my overall view is that the 10/7 year AAA spread is unreliable as an ongoing input to the calculation of the debt margin, for example the actual averaging period for the GDS that will occur some time in 2010. The lack of bonds in the AAA curve beyond 2014 and the Virtue Trust non-corporate bond, mean the extrapolation issue still exists and is not dealt with by using the AAA curve. The past empirical association with the 10/7 year BBB spread is insufficient. It is unwise to embed in the debt margin calculations for the GDS access arrangement a variable that is incomplete, unstable and exhibiting a current strong move that may not mean revert. I do not believe these issues are reliably cured by Method 3, discussed below.

8.7.2 "Method 3" in South West Interconnected Network final decision

Appendix 1 fully discusses this method. Method 3 seeks to scale the result from Method 2 by the ratio between the 10/7 year A spread and the 10/7 year AAA spread in the period 1 August 2007 to 18 August 2009. The scaling is due to the 10/7 year AAA spread used in Method 2 moving significantly higher relative to the counterpart A spread since September 2008. The scaling is to bring the AAA spread back to a more normalised spread.

My reservations are set out in Appendix 1. In summary, my reservations are as follows:

- The data indicates that in both periods in which Bloomberg published a 10 year BBB fair yield indicate that the 10/7 year AAA spread was a good estimator of the 10/7 year BBB/BBB+ spread, and this feature in my view continued through 2009. It seems equally if not more appropriate to accept the current 10/7 year AAA spread as normal than to try to normalise it using a past period A/AAA spread ratio. It is unclear that the prior period is normal and the recent move out in the 10/7 year AAA spread is not conclusive evidence that that spread is abnormal.

- It is not robust to try to correct a possible structural issue with a ratio of a curve spread based on that same credit class (AAA) and another credit class (A) both of which do not bear any explicit or fundamental relationship to the curve being measured and adjusted (BBB/BBB+). The AAA/A credit curves can operate totally independently of each other and relative to the BBB/BBB+ curve. I have reservations about embedding into the future debt margin calculations for an access arrangement a calculation that requires an adjustment that tries to cure a problem the cause of which is presently unknown by a proxy adjustment that may bear no fundamental relationship to the BBB/BBB+ curve.

- the period used in Method 3 to scale-down the 10/7yr AAA spread is somewhat arbitrary, and is characterised by negative debt margin spreads in the 10/7 year AAA and A curves. In other words, the 10/7 year debt margin spread for both curves went negative, at times substantially, which is a counterintuitive result[103]. It

[103] the expectation would be for the debt margin to increase between the 7 and 10 year maturity points

means the ratio was in part derived from the division of two negative numbers. This suggests lack of robustness and reliability for the purposes of NGR 87.

- Method 2 assumes the 7-10 year A curve is a good proxy for the 7-10 year BBB curve. The data shows that there was a reasonably good nexus in the two periods when Bloomberg published both curves out to 10 years. However, consistent with my review of the AAA curve, it is not robust to use one credit curve (A) to make assumptions about the behaviour of another credit curve (BBB/BBB+). The overall dynamics including the underlying bonds are quite different between credit classes

- In the recent pricing period, the Bloomberg composite A curve had 28 bonds, with the longest bond being 2005 (6 years), with only 2 bonds in this maturity, 2 in the 2014 maturity (5 years), and 2 in the 2013 maturity (4 years). Furthermore, one bond in each of these maturities was not used in the actual curve construction. In other words, the curve beyond 5 years was constructed on the basis of only 1 bond in each of the 2014 and 2015 maturities. It is unknown how Bloomberg constructed the curve to the 10 year maturity point.
    - to use the 7-10 year part of the A curve in a ratio test for the period 1/8/07-18/8/09 is not robust unless it is demonstrated that this curve was well-populated with corporate bonds in this maturity band to ensure the assessed debt margin corresponds to the benchmark corporate utility inkeeping with NGR 87. To date, it appears this test has not been satisfied
    - as both the AAA and A curves have typically had problems with their longer term curve construction given the lack of underlying bonds beyond 5 years, it is not known if the spreads reflect the true credit spread for either credit-class.

8.8 Conclusion and Recommended Extrapolation Approach

My research suggests neither the approach used in the recent South West Interconnected Network final decision nor CBASpectrum is sufficiently robust to determine the 10 year BBB/BBB+ debt margin for the rate of return in the GDS's 2010-2014 access arrangement pursuant to NGR 87.

The approach which is inkeeping with NGR 87, practical, conservative, and with research support, is to extrapolate the 7 year debt margin to a 10 year point of the Bloomberg composite BBB curve in a linear manner using the 5-7 year segment of that *same* BBB curve. This is a robust process because the nearby part of the same credit curve in which there are underlying bonds is being used; therefore it utilises a market-driven, observed basis for the expression of the longer curvature in the same credit class.

8.9 Practical application to the indicative averaging period

The following process should be followed in extrapolating the term structure of the Bloomberg BBB curve to a 10 year point:

- the starting point should be a independently verifiable yield point – as discussed in Section 9 for the indicative averaging period, the 7 year Bloomberg composite BBB fair yield is a sufficiently robust starting point[104]
- the starting point fair yield should be extrapolated by a debt margin taken from the

[104] the fair yield needs to be adjusted for any 'outlier' bonds to ensure the yield reflects the entire BBB range, not just Standard & Poor's 'BBB+' rated bonds

same curve provided it is based on a part of the curve for which there are verifiable bonds –the 5-7 year part of the Bloomberg BBB curve satisfies this criterion in the indicative averaging period.

- the extrapolation should be based on a period that is near to, but not too far removed from, the starting point fair yield – for the indicative averaging period the 5-7 year period meets this criterion.
- the extrapolation should not for too long – for the indicative averaging period, extrapolating the 7 year Bloomberg BBB fair yield by 3 years to a 10 year yield is satisfactory and does not lose relevance
- the extrapolation is done in a linear manner so that further assumptions and methodology around curvature, such as polynomial functions, are ignored. Linear extrapolation implies no assumption as to curvature and is conservative
- legal or institutional factors now, or that come into play in the future, that specifically affect 7-10 year corporate debt margins should be taken into account[105]
- the 10 year debt margin result should be cross-checked against other 'external' indicators of corporate credit spreads such as Australian corporate CDS levels, and bonds issued by Australian companies in other markets

[105] there appear to be no pension/ superannuation, tax, legal or institutional factors that specifically affect the 7-10 year part of the Australian credit spread curve. However, in the future there could be.

9 DEBT MARGIN IN THE INDICATIVE AVERAGING PERIOD

9.1 Background

The indicative averaging period is the 20 trading days prior to 13 November 2009, i.e. 19 October – 13 November 2009.

9.2 Factors

There are five inter-related factors (discussed in Section 7) that provide the ERA with the ability to objective assess, inkeeping with NGR 87, if the fair curve provides:

- a *"rate of return on capital is to be commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services"* NGR 87(1)

- best reflects the "*benchmark efficient*" service provider (NGR 87(2)(a)(i))

The factors are not tests by which a failure or questionable application of one of them means that the fair curve should be discarded. They need to be taken together, and compared to other 'external' debt margin indicators as considered appropriate.

1. The contributory rates used to construct the fair curve can be verified and have credibility.

2. The contributory rates are actually used in the fair curve construction.

3. The fair curves reflect bonds in the credit category for the fair curve. The corollary of this element is that there are no bond exclusions except in the limited case where the exclusion is completely warranted and justifiable.

4. The fair curves have sufficient bonds in the respective credit category to create the curve term structure. If the fair curve needs to be extrapolated to the 10 year maturity, the fair curve needs to be supported by credible bonds in the period that is being used to extrapolate the curve and the extrapolation needs to be done in a reasonable manner.

5. The fair curves reflect other relevant 'external' indicators of corporate bond yields in the market during or proximate to the averaging period.

9.3 Application of Factors in Indicative Averaging Period

The application of the five factors to the indicative averaging period provides an example of how the factors work in actual practice, and can then be better understood and utilised in the actual averaging period in 2010.

1. The contributory rates used to construct the fair curve can be verified and have credibility

I did not look at this factor in detail for the indicative averaging period. However, it is recommended that the data be collected for the *actual* pricing period in 2010.

In relation to Bloomberg, the bank feeds into the fair curves for each bond were not collected on a daily basis during the indicative averaging period. This data is not stored by Bloomberg for later public access, and must be done each day, on the day. The Bloomberg bank feeds should also be compared against other bank data such as the data-sets collated by the Australian Financial Markets Association (AFMA) data[106].

In relation to CBASpectrum, it is difficult to satisfy the first test given that CBASpectrum does not disclose data on what bonds and yields are used in their fair curves, and also my understanding that only yields from CBA are used. It is therefore not possible to properly back-test the CBASpectrum fair curves for this factor.

2. The contributory rates are actually used in the fair curve construction

In relation to Bloomberg, the BGN's for each bond were not collected on a daily basis during the indicative averaging period. As with 1., this data is not stored by Bloomberg for later public access, and must be done each day on the day.

In relation to CBASpectrum it is not possible to ascertain whether the bank feeds are used to construct their fair curves. CBASpectrum does not disclose data on what bond and yields are used in their fair curves. It is therefore not possible to properly back-test the CBASpectrum fair curves for this factor. This factor also causes me to lean toward Bloomberg all other things being equal.

3. The fair curves reflect bonds in the credit category for the fair curve. The corollary of this element is that there are no bond exclusions except in the limited case where the exclusion is completely warranted and justifiable

It is necessary to examine whether the fair curves are representative of bonds in the respective credit class, and whether any bonds are being excluded in an unwarranted way.

'Structural Break'

It is not robust to exclude a bond on the basis of the 'structural break' test[107] that the AER used in the final determination for the Victorian advanced metering in infrastructure (AMI) review[108]. A structural break in the yield of a bond can be for a variety of reasons, none of which might, on closer examination, exclude that bond from the class of bonds deemed benchmark representative. It is not robust to use the Chow test to determine if the behaviour of the yield of a bond suggests a divergence between the market perceived credit rating and the bond's actual rating such that the bond should be excluded from the data-set. In any event, it is generally dangerous to qualify the benchmark credit-rating test on the basis of a *market perceived* credit rating. Such an approach creates too much subjectivity around the credit-rating parameter and is not inkeeping with NGR 87. To use the Chow test/ structural break method would involve research that clearly shows that the Chow test predicts credit-rating downgrades by the rating agencies. Such research would help to show that the structural break is for credit reasons only. This proof might be difficult given there are lots of factors affecting bond yields including liquidity

[106] AFMA collects yields a range of bonds from a number of banks on a daily basis. AFMA however does not generate fair curves.

[107] the AER used the statistical 'Chow test' method to determine if a structural break had occured

[108] at p.131

considerations (illiquidity can exacerbate price/ yield movements). I am not aware of any research on this point regarding the Chow test.

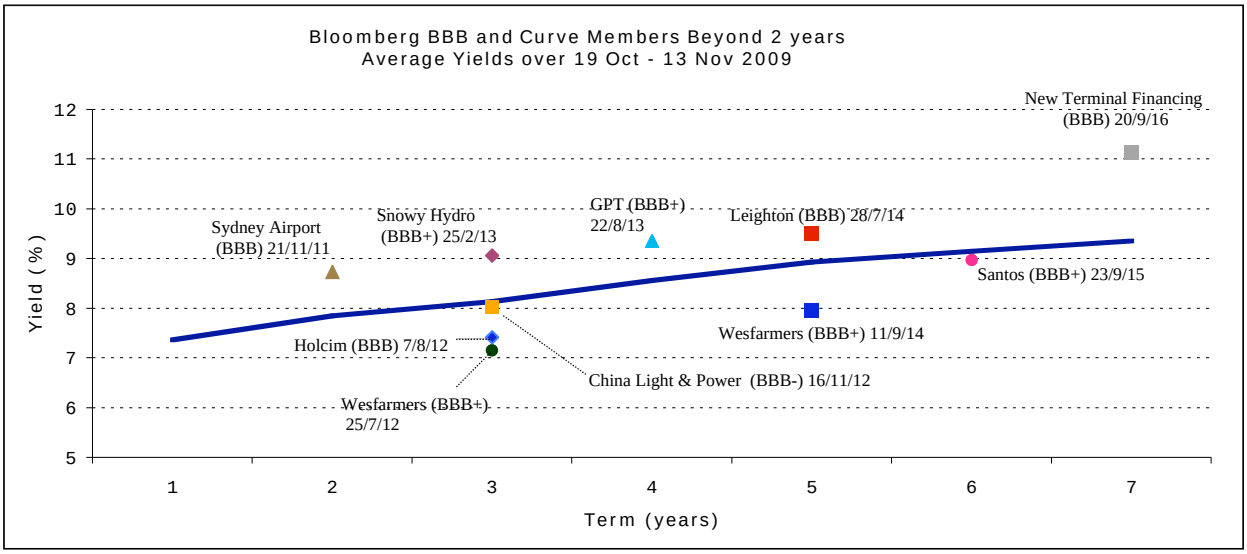
If a bond is rated in the benchmark class, then it should be included unless there are clear and demonstrable reasons for its exclusion (such as a downgrade during the averaging period or very soon thereafter), especially as the test is for the broad range of BBB/BBB+.

Analysis
All data below is related to the indicative averaging period. For the reasons stated in Factors 1 and 2, it is not possible to categorically state that bonds shown in the graphs were used either by Bloomberg and CBASpectrum in their fair curve generation[109].

BLOOMBERG FAIR CURVES[110]

i. **Bloomberg BBB curve**

GRAPH 6 – Bloomberg BBB Curve and Members



Observations on Bloomberg BBB curve

1. The Santos 2015 bond 'anchors' the curve at the 6 year maturity.

2. The 6-7 year part of the curve seems to have been constructed without the New Terminal Financing 2016 bond. Whether this bond was included depends on whether there were BGN's for it, and if so, whether Bloomberg used its discretion to exclude it. [111]The bond has a 'credit-wrap' from MBIA Insurance which was downgraded on 28/9/09 from BBB to 'BB+/Negative Watch'. However, the New

[109] this can be remedied in the case of Bloomberg by obtaining the BGN's each day during the actual averaging period used for the GDS access arrangement – the BGN's are not stored by Bloomberg and were not obtained for the indicative period

[110] bonds shown in the graphs are only bonds of greater than 2 year maturity.

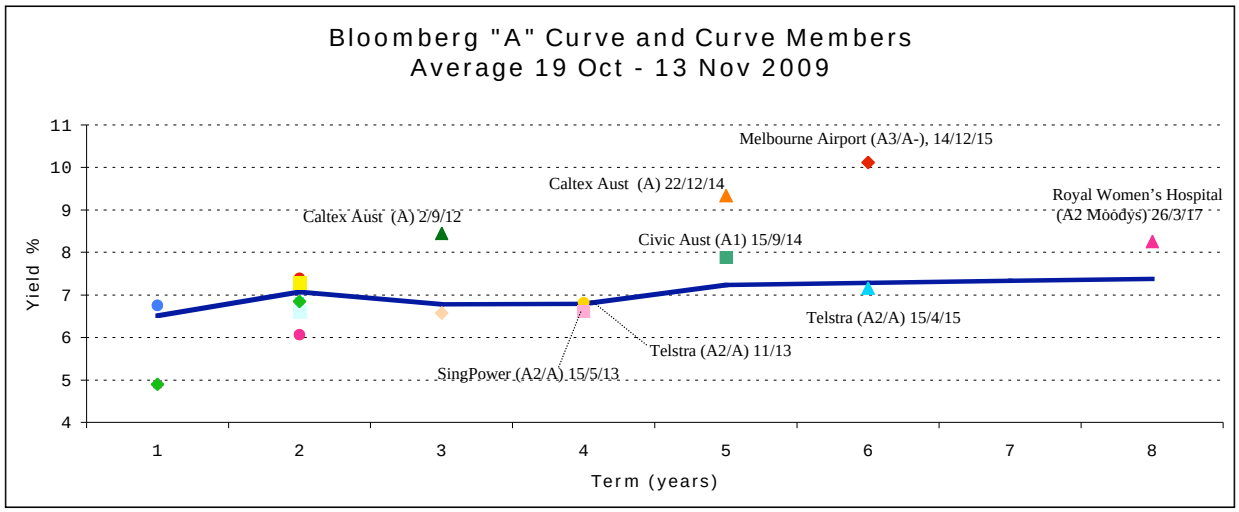
[111] even if there are BGN's for a particular bond, Bloomberg retains discretion to exclude that bond from the curve construction.

Terminal Financing 2016 bond is rated BBB by Standard & Poor's on an "*unenhanced*" (standalone) basis[112] meaning its BBB rating is completely independent of the MBIA wrap. As the New Terminal Financing bond falls into the Bloomberg BBB curve credit-category, it should be included (provided there are BGN's or verifiable bank pricing for it in the averaging period).

3. The Leighton 2014 bond seems to be "offset" on a delta basis by the Wesfarmers 2014 bond, but the combination with the GPT 2013 bond suggests the BBB curve is plotting towards the Santos 2015 yield.

ii. Bloomberg A curve

GRAPH 7 – Bloomberg A Curve and Members



Observations on Bloomberg A curve

1. The A curve follows the yields of the 'low yielders' being the Telstra 2013 and 2015 bonds and the Singapore Power 2013. From a visual inspection of the data in the graph, there appear to be significant exclusions in the A curve – most notably, Caltex 2014, Civic Australia 2014, Melbourne Airports 2015, and Royal Women's Hospital 2017.
2. Like New Terminal Financing 2016 in the Bloomberg BBB curve, Melbourne Airports 2015 has a credit-wrap from MBIA; this entity was downgraded on 28/9/09 from BBB to rated 'BB+/Negative Watch'. However, Melbourne Airports is still rated A- by Standard & Poor's on an "unenhanced" (standalone) basis. On this basis, this bond should be included in the Bloomberg A curve (provided there are BGN's or verifiable

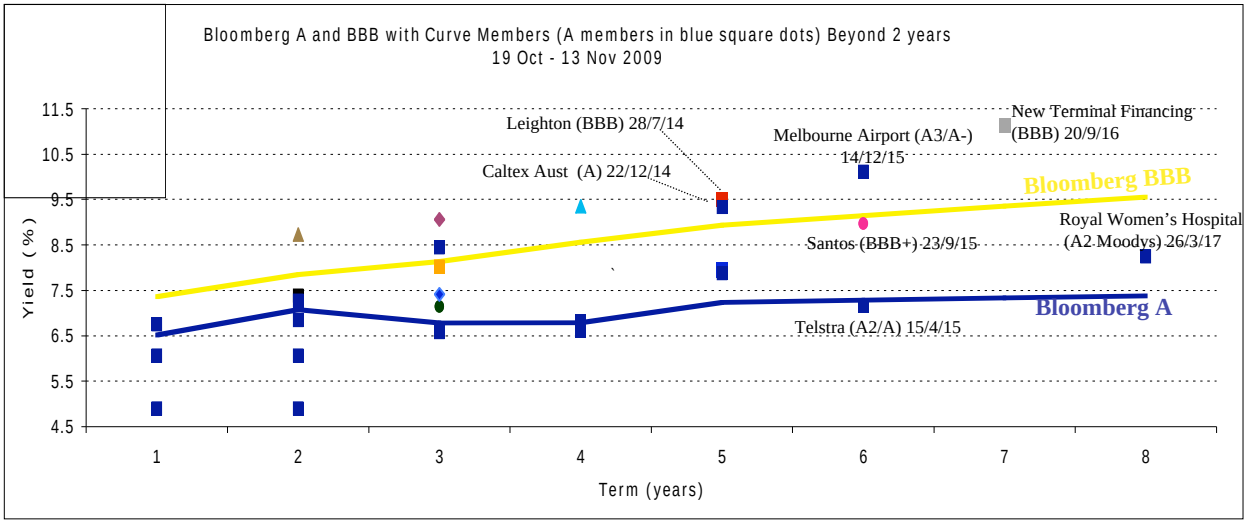
[112] "SPUR (Standard & Poor's Underlying Rating) : this is a rating of a stand-alone capacity of an issue to pay debt service on a credit-enhanced debt issue, without giving effect to the enhancement that applies to it. These ratings are published only at the request of the debt issuer/obligor with the designation SPUR to distinguish them from the credit-enhanced rating that applies to the debt issue. Standard & Poor's maintains surveillance of an issue with a published SPUR." (reprinted from Standard & Poor's "Standard & Poor's Ratings Definitions", 23 November 2009

bank pricing for it in the averaging period).

iii. Bloomberg A and BBB curves

Graph 8 shows the combined Bloomberg A and BBB curves, with the blue square dots being the A curve bonds

GRAPH 8 – Bloomberg A and BBB Curve and Members



Observations on Bloomberg combined curves

1. The Graph shows that the A curve bonds that can reasonably justify a higher 're-interpretation' of the BBB curve are Melbourne Airports 2015 and Caltex Australia 2014 (especially in combination with Leighton 2014 which sits in the BBB curve).

2. New Terminal Financing 2016 and Melbourne Airports 2015 have credit-wraps from MBIA (downgraded on 28/9/09 from BBB to rated BB+/Negative Watch'). However, the ratings for both bonds are the *same* on an 'unenhanced' (standalone) basis[113]. Therefore they should be included in the fair curve construction (provided there are BGN's or other verifiable bank-contributory pricing for them).

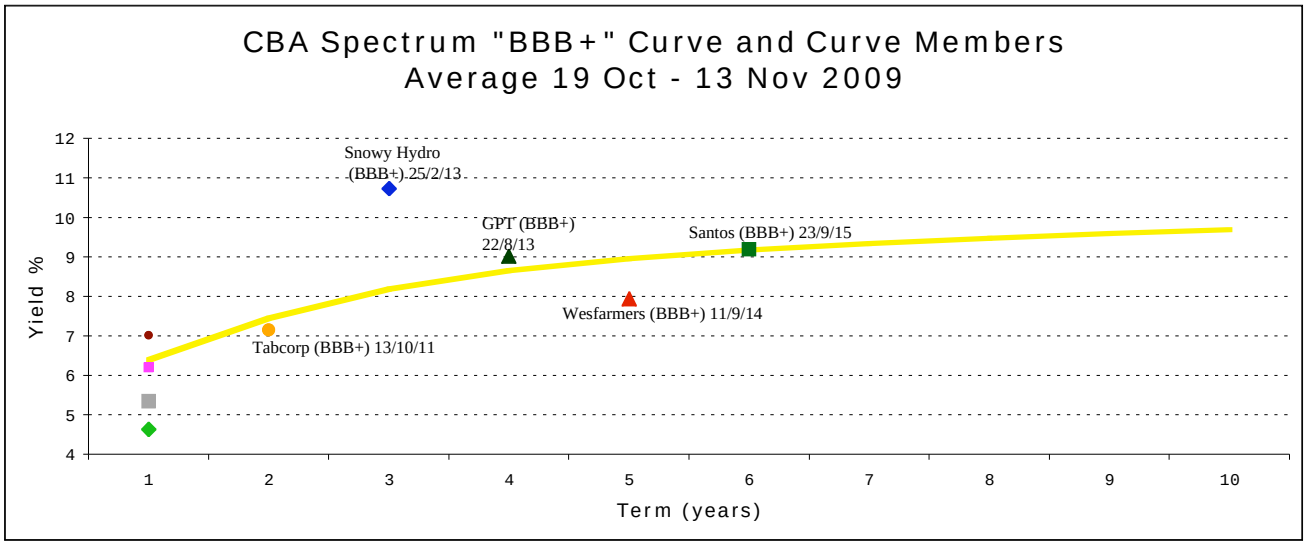
3. This assessment suggests strongly that the Bloomberg BBB curve in the indicative averaging period is under-estimating the fair yields especially in the 5-7 year maturity.

[113] op cit, Standard & Poor's Ratings Definitions

CBA SPECTRUM FAIR CURVES[114]

iv. CBASpectrum BBB+ curve

GRAPH 9 – CBASpectrum 'BBB+' Curve and Members



Observations on CBA Spectrum 'BBB+' curve

1. As per the Bloomberg BBB curve, the Santos 2015 bond "anchors" the CBASpectrum BBB+ curve

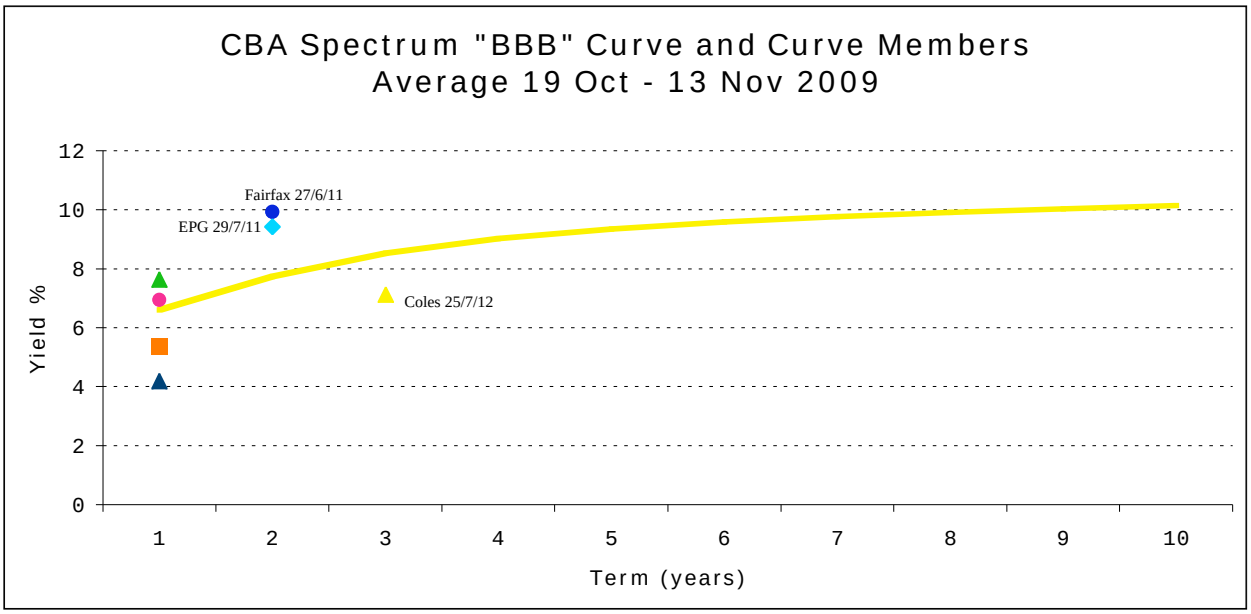
2. The Snowy Hydro 2013 bond appears to be excluded, but the CBASpectrum average yield for this bond in the indicative averaging period is 10.74% whereas for Bloomberg the average yield for this bond is only 9.06% – this is a major discrepancy and highlights the importance of the 1st and 2nd factors being examined.

3. There are no bonds in CBASpectrum BBB+ curve beyond Santos 2015, but the curve still extends to 10 years.

[114] Bonds shown in these graphs are only bonds of greater than 2 year maturity.

v. CBASpectrum BBB curve

GRAPH 10 – CBASpectrum BBB Curve and Members



Observations on CBA Spectrum BBB curve

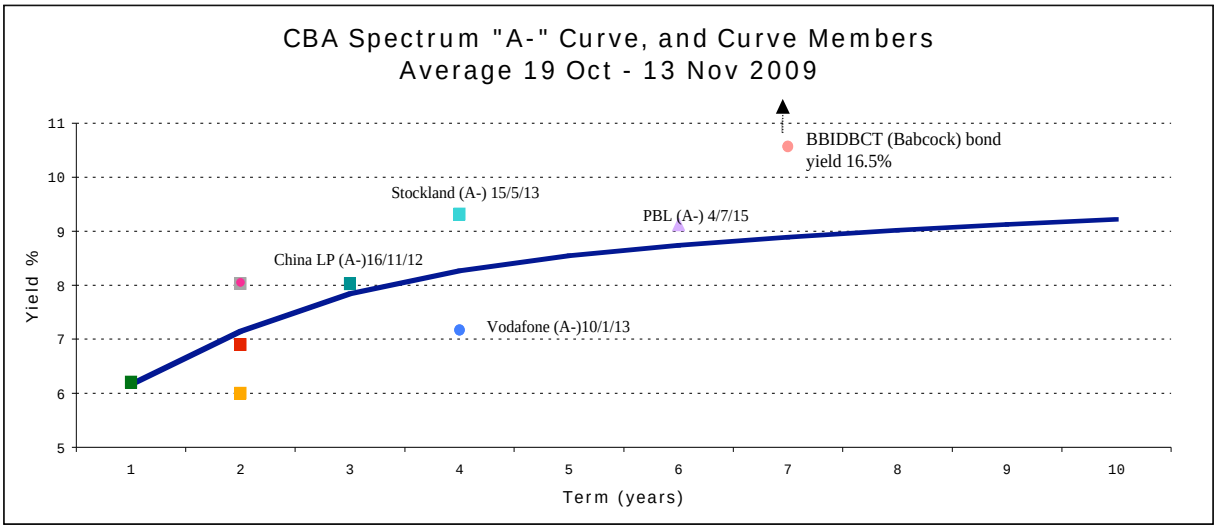
1. The CBASpectrum BBB curve only has 7 members out to 2012.

2. The curve appears to ignore the higher-yielding EPG 2011 and Fairfax 2011 bonds, but their effects may be muted by the lower-yielding Coles 2012.

3. There are no bonds in the CBASpectrum BBB+ curve beyond the Coles 2012 bond, but the curve still extends to 10 years.

vi. CBASpectrum A- curve

GRAPH 11 – CBASpectrum A- Curve and Members



Observations on CBA Spectrum A- curve

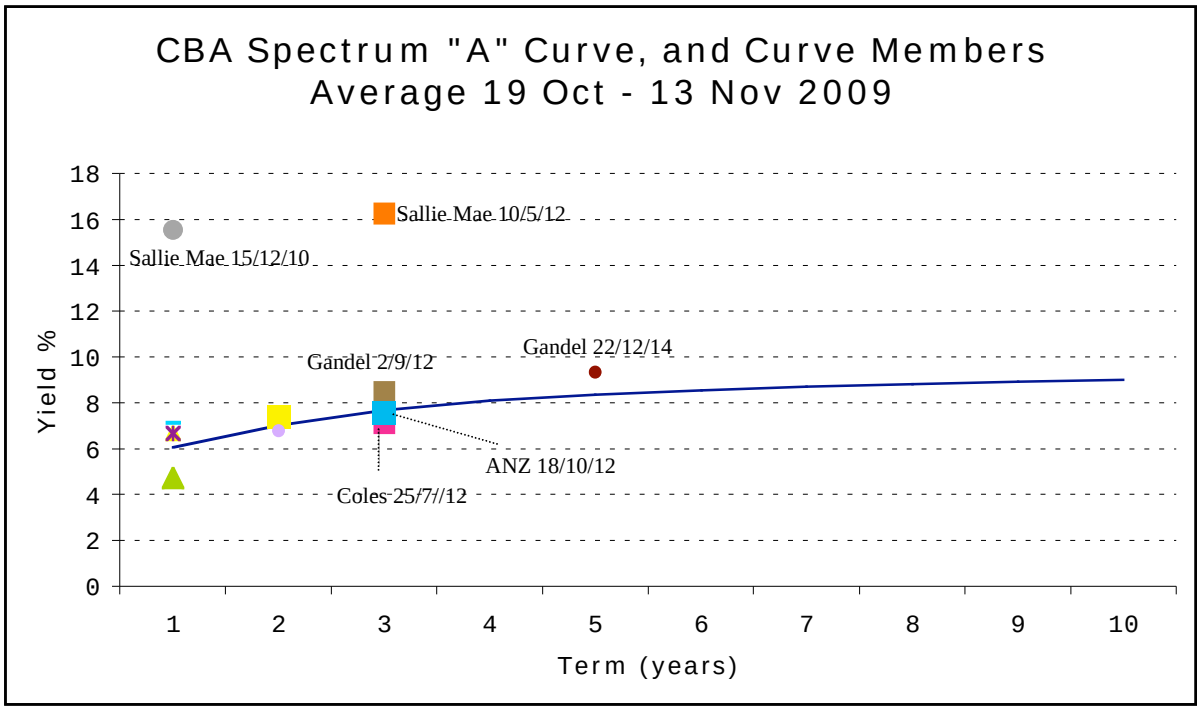
1. The PBL 2015 bond "anchors" and provides the definition to the longer end of the A- curve, interestingly at the same level as Santos 2015 in the BBB+ curve.

2. The BBI (DBCT) Finance Pty Ltd (Babcock & Brown Infrastructure) 2016 bond traded, according to CBASpectrum during the indicative averaging period, at a 16.5% yield – more investigation is needed to see if other banks can provide pricing for it to check the CBASpectrum levels. This effort needs to be made because the Standard & Poor's rating for the bond is still 'BBB+/Stable'. If the pricing cannot be verified by another 2-3 banks then there is a reasonable case for this bond to be excluded.

3. The longest bond in this curve is PBL 2015 (or Babcock & Brown Infrastructure 2016 if included), but the curve still extends to 10 years

vii. CBASpectrum A curve

GRAPH 12 – CBASpectrum A Curve and Members



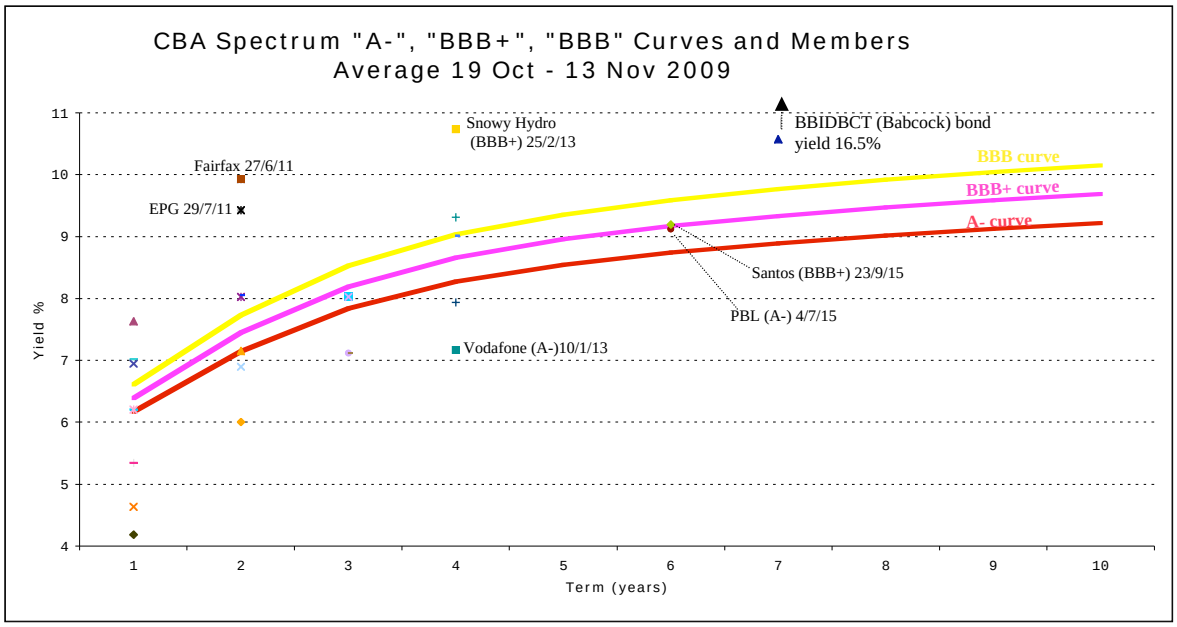
Observations on CBA Spectrum A curve

1. Both Sallie Mae bonds are included in the CBASpectrum A curve data-set but do not, on visual inspection, appear to be used in A curve construction. There is a justifiable argument that they should be excluded being bonds issued in Australia by a foreign non-corporate entity.

2. The longest bond in this curve is the Gandel 2014, but the fair curve still extends to 10 years.

viii. CBASpectrum A-, BBB+ and BBB curves

GRAPH 13 – CBASpectrum A-, BBB+ and BBB Curve and Members



Observations on combined CBASpectrum curves

1. The Graph shows that CBASpectrum has 10 year nominal curves but no bonds beyond Santos (BBB+) and PBL (A-) 2015[115].

2. The Snowy 2013 bond may give scope to re-interpret the BBB+ curve upwardly but as noted there is a major discrepancy with Bloomberg's yield for this bond. This discrepancy requires further investigation, primarily rate checks from other banks to gauge which yield best reflects the broader market.

3. Also requiring further investigation is the BBI (DBCT) Finance Pty Ltd (Babcock & Brown Infrastructure) 2016 bond. This bond appears to be a true outlier given its yield within the CBASpectrum data-set and that it does not appear in the Bloomberg curves.

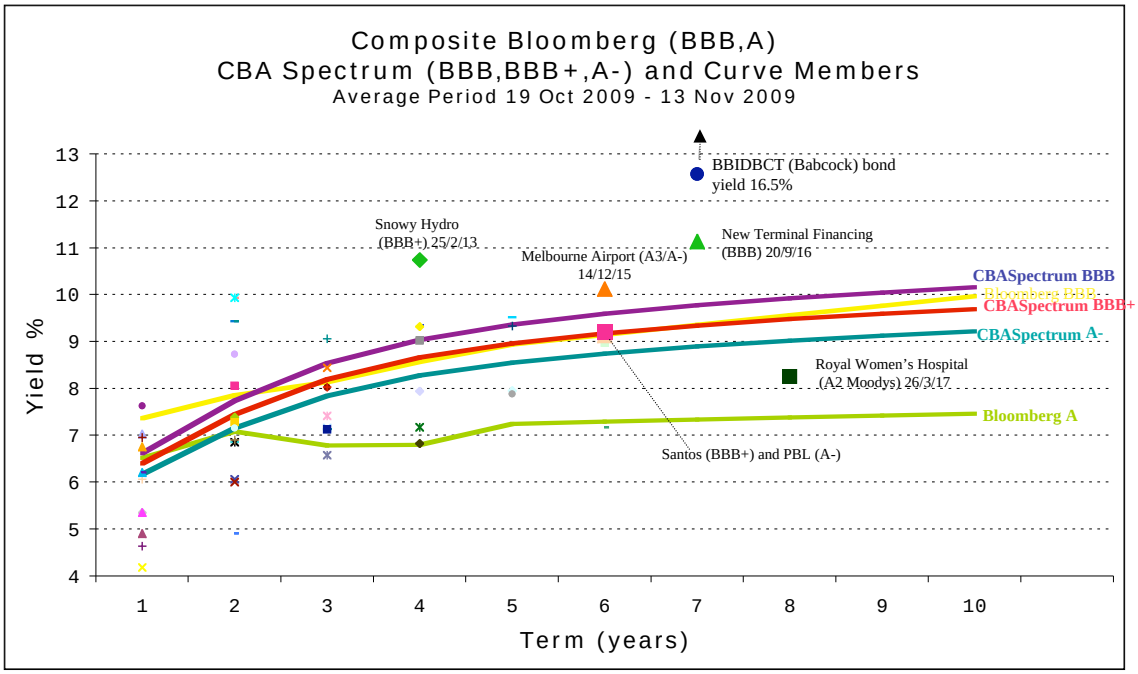
4. CBASpectrum's graphs for each credit category are remarkably "uniform" and seem to be primarily concerned with imposing a uniform curve shape.

[115] on the reasonable assumption that the Babcock bond has been excluded

Combined Bloomberg and CBASpectrum curves

ix. Bloomberg A and BBB curves, together with CBASpectrum A-, BBB+ and BBB curves

GRAPH 14 – Composite of Bloomberg and CBASpectrum curves and members



The above graph extrapolates the Bloomberg curves to 10 years using the recommended basis as set out in Section 8.8 at p.51.

Observations on combined Bloomberg and CBASpectrum curves

1. The 'anchor' for the 5-7 year part of the Bloomberg BBB and CBASpectrum BBB+ curves is the Santos (BBB+) 2015 bond.

2. PBL (A-) 2015 bond anchors the CBASpectrum A- curve at the same yield as Santos.

Bonds potentially providing scope to re-interpret Bloomberg BBB curve higher

Table 16 shows the bonds that provide a reasonable basis, individually and collectively for re-interpreting the Bloomberg BBB curve higher, particularly in the 4-7 year maturity.

TABLE 16 Debt Margin for Selected Bonds Compared to Implied Debt Margin

Yields are during the indicative averaging period, interpolated as necessary

	Yield (%)	Actual Debt Margin (bp)	Debt Margin using Fair Yield Curve (bp)	Debt Margin Differential to Fair Curve (bp)	Debt Margin Differential to Fair Curve (bp)
Bloomberg BBB					
Snowy Hydro 2013	9.0655	384	303	81	+81
Leighton 2014	9.513	412	381	32	+32
New Terminal Financing 2016	11.13291	563	445	117	+117
Bloomberg A					
Melbourne Airports 2015	10.133	466	197	269	+269
Caltex 2014	9.333	391	193	199	+199
CBASpectrum BBB+					
Snowy Hydro 2013	10.737	551	400	150	+150
CBASpectrum A-					
Babcock & Brown Infrastructure	16.57	1108	379	730	+730

Snowy Hydro 2013 requires further investigation given the material yield disparity between Bloomberg and CBASpectrum as seen in Table 16. Although it is only a 4 year bond at present it could have some delta influence on the 5-7 year part of the Bloomberg BBB curve as it is only 2 years short of the Santos 2015 bond which gives the curve its anchor point in that part of the curve.

The Bloomberg A and BBB curves in aggregate only have bonds to 2016 (7 years), but the CBASpectrum curves all extend to 10 years but only have bonds to 2015 (or 2016 if the Babcock bond is included in their A- curve).

Conclusions regarding the 3rd factor

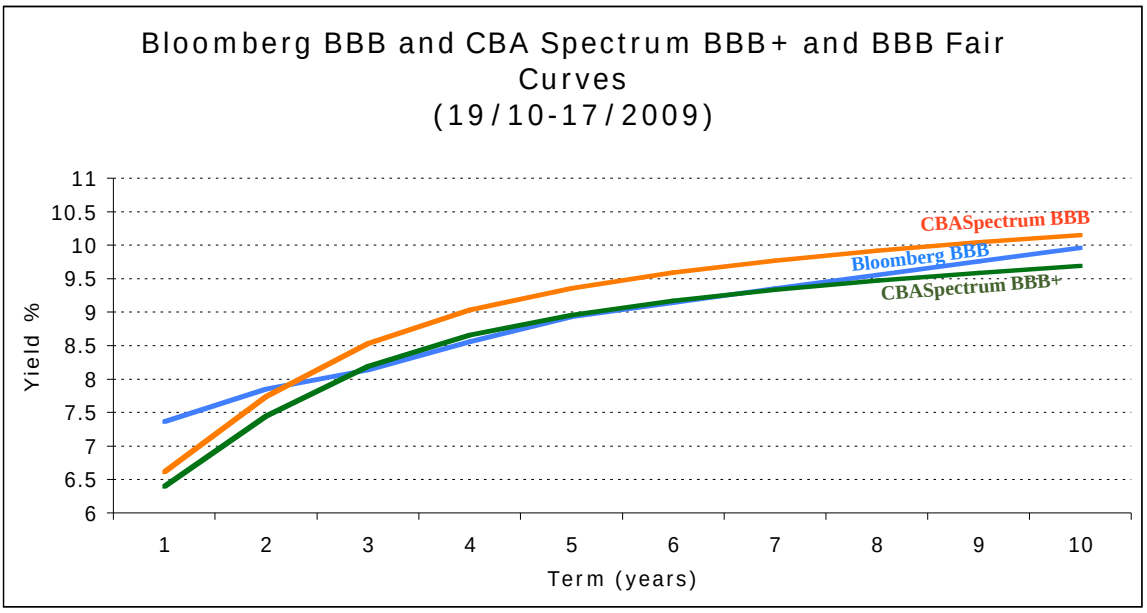
The above analysis indicates that the Bloomberg BBB curve during the indicative averaging under-estimates the debt margin due to the exclusion of bonds.[116] For Bloomberg's BBB fair curve not to become a proxy for the Standard & Poor's BBB+ credit category it is necessary to restrict exclusions and ensure the Bloomberg BBB curve properly reflects the entire Standard & Poor's BBB range (BBB-/BBB/BBB+) to meet the recommended benchmark credit rating for the GDS. This process will need to be done for the actual averaging period.

[116] This argument can only be substantiated with further analysis, as indicated above. A complete analysis will need to be done for the actual averaging period for the GDS. The above commentary is given principally to afford an opportunity to show the process that this paper recommends the ERA follow in future debt margin determinations.

4. The fair curves have sufficient bonds in the respective credit category to create the curve term structure. If the fair curve needs to be extrapolated to the 10 year maturity, the fair curve needs to be supported by credible bonds in the period that is being used to extrapolate the curve and the extrapolation needs to be done in a reasonable manner

Graph 15 shows the Bloomberg BBB curve together with the CBASpectrum BBB and BBB+ curves. The Bloomberg BBB curve has been extrapolated beyond 7 years using the recommended method in this paper.

GRAPH 15 – Bloomberg and CBASpectrum Fair Curves



The Bloomberg BBB curve provides the better debt margin estimate because it combines Standard & Poor's BBB+ and BBB rated bonds and thus provides the best "*benchmark efficient*"[117] estimate for the gas access arrangement for the GDS. In effect, if we ignore issues mentioned previously with specific bonds, and the fact that the curves do not contain the same universe of bonds, the Bloomberg BBB curve approximately combines the CBASpectrum BBB and BBB+ curves.

Table 17 shows the bonds in the Bloomberg BBB and CBASpectrum BBB and BBB+ credit categories. It should be noted that Bloomberg uses a 'composite' rating system which means that it generally takes the range of Standard & Poor's BBB-/BBB/BBB+ series and the counterpart Moody's ratings, and then uses the lower rating if the two rating agencies have a split rating.

[117] NGR 87 (2)(a)(i)

TABLE 17 – Bonds in Bloomberg BBB and CBASpectrum 'BBB+' and BBB Curves

	Bloomberg BBB Curve Members in Pricing Period	CBA Spectrum BBB+ Curve Members in Pricing Period	CBA Spectrum BBB Curve Members in Pricing Period
	BBB+ Standard & Poor's Rating	**BBB+**	**BBB**
1	Dexus 4/2/10		
2	Snowy Hydro 25/2/10		
3	Citipower 28/2/10		
4	Challenger 23/4/10		
5	GPT 7/11/10	GPT 7/11/10	
6	Bank of Qld 2/12/10	Bank of Qld 2/12/10	
7	Dexus 28/2/11		
8	Transurban 15/9/11	Transurban 15/9/11	
9	Origin Energy 6/10/11		
10	Tabcorp 13/10/11	Tabcorp 13/10/11	
11	Wesfarmers 25/7/12		
12	Snowy Hydro 25/2/13	Snowy Hydro 25/2/13	
13	GPT 22/8/13	GPT 22/8/13	
14	Wesfarmers 11/9/14	Wesfarmers 11/9/14	
15	Santos 23/9/15	Santos 23/9/15	
	BBB Standard & Poor's Rating		
16	Mirvac 15/3/10		Mirvac 15/3/10
17	Fosters 17/3/10		Fosters 17/3/10
18	Brisbane Airports 30/6/10		
19	Mirvac 15/9/10		Mirvac 15/9/10
20	Countrywide Property 6/5/11		
21	Sydney Airports 21/11/11		
22	Holcim 7/8/12		
23	Leighton 28/7/14		
24	New Terminal Financing 20/6/16		
	BBB- Standard & Poor's Rating		
25	Energy Partnership Gas 29/7/11		Energy Partnership Gas 29/7/11
26	China Light & Power 16/11/12		
		Investa 15/6/11	Coles 25/7/12
		Investa 23/8/11	Fairfax 27/6/11
			Southcorp 20/3/10
TOTAL	**26**	**10**	**7**

In the indicative averaging period, Bloomberg had 26 members (15 members were BBB+). CBASpectrum BBB+ only had 10 members whilst their BBB curve had 7 members. Common members are shown. The Bloomberg BBB curve has far greater depth/ observations than the CBASpectrum BBB+ curve, and even the combination of the CBASpectrum BBB+ and BBB curves.

Consideration of Bonds in 5-7 year Segment of the Fair Curves

My recommendation in the indicative averaging period is to extrapolate the 7 year Bloomberg fair yield by the debt margin in the 5-7 year part of the Bloomberg BBB curve.

Bonds in the 5-7 year part of Bloomberg BBB curve
Wesfarmers 2014, Leighton 2014, Santos 2015, New Terminal Financing 2016

Bonds in the 5-7 year part of CBASpectrum BBB+ curve
Wesfarmers 2014, Santos 2015

Bonds in the 5-7 year part of CBASpectrum BBB curve
nil

Observations

1. Both Bloomberg and CBASpectrum are not ideal for an extrapolation based on

the 5-7 year part of the curve given the overall lack of bonds.

2. Bloomberg has more bonds in the 5-7 year category than CBASpectrum, so there is more bond yield evidence on which to rely on the Bloomberg 5-7 year extrapolation method recommended in this paper than to simply use the CBASpectrum 10 year fair yields which are determined on an unknown curve functionality assumptions.

3. Santos 2015 is the longest bond in CBASpectrum BBB+ curve. Bloomberg also has this bond but also has New Terminal Financing 2016.

4. Bloomberg receives bond quotes from a wide cross-section of banks, so has far more opportunity to populate their curves with relevant "market" yields on bonds trading in the secondary market than CBASpectrum which it is understood only receives bond yields from CBA

The 5, 7 and 10 year debt margins for each curve are shown below in Table 18.

TABLE 18 – Debt Margins in Indicative Averaging Period

Fair Curve	7 year Debt Margin	5 year Debt Margin	***Extrapolated*** 10 year Debt Margin[118]	***Actual*** 10 year Debt Margin
Bloomberg BBB	384.5 bp	352.1 bp	433 bp	
CBASpectrum BBB+	382.9 bp	354.6 bp	425 bp	406 bp
CBASpectrum BBB	426.2 bp	394.7 bp	473 bp	452 bp

All rates are based on daily average over the indicative averaging period and expressed as a spread to the interpolated CGS

Conclusions regarding the 4th factor

1. ignoring differences in their bond data-sets, and possible bond yield interpretations as noted in the previous section, the fair yields in the indicative averaging period for the CBASpectrum BBB+ derived debt margins and the Bloomberg BBB derived debt margins at the 5 and 7 year points are almost identical (Table 18). This is not surprising as the "anchor" at this maturity point for both curves is the Santos 2015 bond.

2. as seen in Graph 5 (p.47) and discussed in that section, all CBASpectrum curves have a uniform functional shape for their curves (especially where there are no underlying bonds), which creates doubts as to the veracity of the fair yields in the period beyond the longest bond represented in the respective curves. This point is crucial because the debt margin for the GDS is being determined at the longest maturity point, viz. 10 years.

3. the CBASpectrum BBB+ curve appears to be under-estimating the 10 year fair yield based on the rate of change of the debt margin in the 5-7 part of the curve. It is more appropriate to use a known, verifiable debt margin differential (optimally being the 7/5 year debt margin differential) to deterministically interpret the 7-10 year curvature in a linear way, and not use a generalised assumption that credit spreads rise progressively less rapidly through time.

[118] extrapolated using the method recommended in this paper

4. The Bloomberg BBB curve appears to contain, in the indicative averaging period, the better representation of the 7 year fair yield and also the 5-7 year segment of the curve being the recommended extrapolation segment.

5. The Bloomberg BBB curve "polls" market rates, and "pools" bonds that fall into the recommended BBB/BBB+ credit-category for the GDS more robustly than the CBASpectrum BBB+ curve[119].

6. Bloomberg polls corporate bond yields from a wider group of banks (it is understood CBASpectrum only polls CBA's bond yields[120]) and therefore has more depth/ 'price discovery'; Bloomberg's fair curves are therefore more robust as to market evidence of yields for relevant bonds.

7. Given the process to determine the debt margin recommended in this paper, which may involve 're-interpretation' of the curve based on an analysis of bonds in the BBB/BBB+ credit-rating category, the greater transparency of Bloomberg makes it preferred over CBASpectrum.

8. To develop a more credit-rating benchmark representative CBASpectrum curve it would be necessary to combine their BBB and BBB+ curves. This adds significantly to the overall complexity and is not necessary given that the Bloomberg BBB achieves this result.

9. It is important that unwarranted bond exclusions (e.g. 'outliers') are reinstated by adjustment to the Bloomberg BBB fair yields so that that curve does not become a proxy for the Standard & Poor's BBB+ credit category. The fair yield used must properly reflect the entire Standard & Poor's BBB credit range to meet the recommended BBB/BBB+ benchmark credit rating for the GDS. This process will need to be done for the *actual* averaging period.

[119] this is based on my understanding of CBASpectrum's internal processes for bond selection and the bond yields used by CBASpectrum

[120] appropriate chinese walls and data integrity issues need to be checked and assessed

5. The fair curves reflect other relevant 'external' indicators of corporate bond yields in the market during or proximate to the averaging period

Several 'external' indicators can be used to check the fair curve results:

i. recent domestic bond issues by Australian non-bank companies

ii. offshore bond issues by Australian companies

iii. secondary market yields for offshore bonds issued by Australian companies, swapped back to Australian dollars, with the overall result expressed as a spread to the Commonwealth Bond rate

iv. iTraxx credit default swap (5 year maturity) and corporate credit default swap trading levels (out to 10 years)

v. domestic corporate floating rate notes – secondary pricing levels

vi. company bank debt facility pricing

vii. RBA's F3 table "Capital Market Yields and Spreads – Non-government Instruments"

viii. bank rate sheets for bonds

ix. bank fair curves such as the NABMarkets Credit Indices

x. fair curves in other markets, e.g. Bloomberg's US fair curves or curves assembled by banks in the US

The NGR does not limit debt margin observations to only secondary trading levels (which is the basis of the fair curves) for fixed rate bonds issued in Australia by Australian companies, as the AER has so restricted itself in the Queensland DNSP's decision on its interpretation of clause 6.5.2(e) of the National Electricity Rules. The NGR does not have an equivalent to clause 6.5.2(e). Indeed the NGR requires as part of the rate of return calculation that the debt margin *be commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services.* (NGR 87 (1)). Hence my view is that the NGR require more than secondary bonds to be taken into consideration, and that the NGR positively means that other relevant and available bond yield data, such as indicated above, need to be included to ensure the proxy-test through the use of a fair curve is at the very least corroborated.

This analysis clearly becomes more important when markets have become illiquid or other factors render the fair curve data and results contentious or incomplete.

This paper does not exhaustively analyse all above sources in the indicative averaging period. However, four results are shown below. Overall, the bond related data considered outside Bloomberg and CBASpectrum's fair curves suggest the advised debt margin in the indicative averaging period (Section 11) under-estimates the 10 year debt margin for the GDS in that period.

1. **Recent domestic bond issues by Australian non-bank companies**

Table 19 provides a summary the bond issues by Australian companies in the period to the indicative averaging period.

TABLE 19 – Australian Non-Bank Corporate Bonds in 2009 until the start of the indicative averaging period

Company	Launch Date	Maturity	Standard & Poor's Rating	Type of Bond	Bloomberg	CBASpectrum
Downer EDI	21-Oct-09	29-Oct-13	-	fixed rate bonds	-	-
Wesfarmers	04-Sep-09	10-Sep-14	BBB+	Domestic fixed rate and floating rate bonds	in "BBB" curve	in BBB+ curve
Leighton Holdings	06-Aug-09	28-Jul-10	BBB	Domestic fixed rate notes (increase)	in BBB curve	-
Holcim Finance Australia	04-Aug-09	07-Aug-12	BBB	Domestic fixed rate notes	in "BBB" curve	-
Australian Prime Property Fund (APPF) Retail	21-Jul-09	20-Jul-12	A	Domestic fixed rate notes	-	-
Dexus Property Group	20-Jul-09	01-Jul-10	BBB+	Domestic floating rate notes	-	-
Leighton Holdings	20-Jul-09	28-Jul-14	BBB	Domestic fixed rate notes	in "BBB" curve	-
Volkswagen Financial Services Australia	19-Jun-09	24-Jun-11	A	Domestic fixed rate notes	-	-
Tabcorp	12-Jun-09	01-May-10	BBB+	Domestic floating rate notes	-	-
CFS Retail Property Trust	20-May-09	02-Sep-12	A	Domestic fixed rate notes increase	in "A" curve	in "A" curve

Observations
Not all bonds issued have found their way into the Bloomberg and/ or CBASpectrum fair curves.

The average issuance term for the BBB/BBB+ rated companies has been 4.6 years and the average debt margin (expressed as spread to the CGL at announcement date) is 415bp.

The 5 year average debt margin using the Bloomberg BBB curve is 352bp (semi annual). The equivalent 10 year Bloomberg BBB/BBB+ debt margin as calculated using the extrapolation method recommended in this paper is 433bp (semi-annual). This produces a 10/5 year BBB corporate credit spread of 81bp.

If we assume the new bonds had a 5 year (rounded up) life, then adding the 10/5 year Bloomberg BBB/BBB+ curve spread produces a 10 year debt margin of **496bp** (415bp + 81bp).

This data suggest that the 10 year debt margin of 433bp (semi-annual) calculated using the recommended approach in this paper under-estimates the debt margin by 63bp.

2. Company bank debt facility pricing

Table 20 shows the bank debt facility pricing in terms of all-in margins to BBSY swap for Australian companies in 2009 (to the indicative averaging period). There are a number of assumptions made in determining the all-in margins[121]. Upfront fees paid to banks are re-cast as an amortised fee and added to the funding margin to obtain the all-in margin.

TABLE 20 – Australian Corporate Bank Loans in 2009 until the start of the indicative averaging period

	BBB			A			OVERALL AVERAGE		
AVERAGES	Margin	Margin with Fees	Amortised Upfront Fee b.p.p.a. over Loan Term Weighted by Bank Allocations	Margin	Margin with Fees	Amortised Upfront Fee b.p.p.a. over Loan Term Weighted by Bank Allocations	Margin	Margin with Fees	Amortised Upfront Fee b.p.p.a. over Loan Term Weighted by Bank Allocations
1-2 years	305	370	65	240	266	26	283	335	52
3 years	314	356	43	202	225	23	283	320	37
4-5 years	355	394	39	200	214	14	324	358	34
OVERALL AVERAGE	**324**	369	**45**	**209**	**231**	**22**	**294**	**333**	**39**

Appendix 4 provides the corporate bank deals upon which the above table is comprised.

The average all-in margin to BBSW Swap of 394bp for 4-5 year bank loans for the BBB category equotes to a CGL debt margin of **430-440bp (midpoint 435bp)**[122].

The 5 year debt margin derived from the Bloomberg BBB fair yield is 352bp (semi-annual). The equivalent 10 year Bloomberg 10 year debt margin as calculated using the extrapolation method recommended in this paper is 433bp (semi-annual). This implies a BBB corporate 5-10 year debt margin spread of 81bp. Extrapolating the bank loan average margin for 4-5 year corporate loans to 10 years by the Bloomberg-derived 5-10 year debt margin spread of 81bp produces a 10 year debt margin of **511-521bp (midpoint 516bp)**. This data indicates the 10 year debt margin of 433bp semi-annual in the indicative averaging period (Section 11) under-estimates the debt margin by 78-88bp.

[121] The table shows the summary loan fee and margin information on the following basis:
- information was obtained from the Basis Point journal and LoanConnector
- only credit-rated Australian non-bank/finance company loans from banks
- loan information obtained from "Basis Point" and supplemented by information from "Loan Connector"
- loans are only included in the data-set if well advanced although in some cases not yet finalised. Rumoured loans are not included. Loans that were committed by banks though not yet drawn (because for example the financing related to a future refinancing/ commitment) are included
- the upfront fee is calculated using fee allocations to the banks according to their participations and disclosed fee splits between leads, managers etc. In this way, the analysis attempts to 'volume-weight' the fee split to derive an overall upfront fee. Where data is not available on fee splits, then an even-split is assumed
- upfront fees are amortised on simple basis over the loan term

[122] this calculation is based on a conservative estimation of the Swap/CGL spread of approx. 30-40bp

3. Offshore bond issues by Australian non-bank companies

Appendix 5 contains a table summarising bonds issued offshore (all into the United States) by Australian non-bank corporates in 2009 up until the indicative averaging period.

Observations

1. The table shows that the average debt margin is **520bp** for the 10 year maturity and **514bp** across all maturities for Australian non-bank companies issuing into the US market this year. Note that the Australian companies in this table have credit ratings across the A to BBB credit categories (or their equivalent if not rated by Standard & Poor's).

2. The average spreads to CGL[123] (debt margin) above for each maturity category are higher than the 10 year debt margin determined in accordance with the method proposed in this submission for the indicative averaging period (433bp semi-annual).

3. This analysis suggests the recommended debt margin approach under-estimates the debt margin being paid on bonds issued by investment grade Australian non-bank companies this year, at least in relation to their US bond issuance.

[123] the spreads to CGL have been calculated on the basis of standard cross-currency swaps using Bloomberg data to swap the US bond's coupon at the time of the bond's announcement to an Australian dollar equivalent spread to CGL

4. RBA's F3 table "Capital Market Yields and Spreads – Non-government Instruments"

The RBA's F3 tables for October and November 2009 are attached (**Attachments 5 and 6** respectively).

The daily average in the indicative averaging period for the RBA's "1-5 year" BBB corporate bond debt margin is 332bp.

The RBA average is higher than the average debt margin of 304bp derived from the Bloomberg 1-5 year BBB curve in the same period of 304bp, as seen in Table 21.

TABLE 21 Bloomberg BBB Derived Debt Margins

Maturity	Bloomberg BBB Derived Debt Margins[124] (bp)
1 year	256
2 years	295
3 years	295
4 years	323
5 years	352
1-5 year Average	**304**

The 10 year Bloomberg BBB/BBB+ debt margin as calculated using the method recommended in this paper is 433bp (semi-annual). Therefore the average 1-5 year to 10 year BBB/BBB+ corporate credit spread is 129bp (433bp – 304bp).

Using this spread to extrapolate the RBA F3 average of 332bp produces an extrapolated 10 year debt margin of **461bp** (332bp + 129bp).

Therefore, the RBA's F3 table indicates that the recommended debt margin approach in this paper understates the 10 year BBB/BBB+ debt margin for the GDS by 28bp.

[124] the debt margin is calculated by the difference between the fair yield and the interpolated CGS in the indicative averaging period

10 PROCESS IF FACTORS INDICATE FAIR YIELD NOT REPRESENTATIVE

It is difficult to prescribe a clear-cut 'one size fits all' method by which the debt margin may be determined where any of the five above factors suggest the fair curve is not representative.

The methodology proposed in this paper is to determine the 10 year BBB/BBB+ debt margin in the indicative averaging period by taking the Bloomberg BBB 7 year fair value (being the longest maturity fair value point that is capable of being justified by the underlying bond data-set) and extrapolating that yield to a 10 year maturity in a linear way by the per annum 7/5 year BBB/BBB+ debt margin differential (being the period nearest to the 7 year fair point and justified by underlying bonds in the data-set).

It is therefore crucial to the proposed methodology that the longest available fair value yield, together with the fair yields for the two prior years, are justified by underlying bonds in the data-set, and further that unwarranted bond exclusions (e.g. 'outliers') are included.

This paper notes in Section 9 and Table 16 (p.64) the potential for a degree of re-interpretation of these fair yields (being the 5 and 7 year Bloomberg BBB fair yields) in the indicative averaging period, but does not proceed to draw a definitive conclusion on this point as only 4 external factors were reviewed. This task should be done, and appropriate adjustments made, for the *actual* averaging period for the GDS.

The re-interpretation process involves an analysis of how the Bloomberg BBB/BBB+ curve should be adjusted. One approach is to take the debt margin differential of each bond to the derived fair yield debt margin, as shown in last column of Table 16 (p.64), and do a weighted sum of squared errors test or other acceptable statistical method to adjust the curve outcomes. This process may involve the derivation of a new curve, which can be achieved using common statistical methods. However, it is emphasised that the method put forward in this paper is more concerned with the proper estimation of the longest available and justified yield point, and the two prior years for the extrapolation. The focus should be on using bonds that are benchmark representative in this period to determine the yields to be used in the estimation of the 10 year debt margin in accordance with NGR 87.

Exclusion of bonds in the fair curves, or derivation of fair curves based on unjustified or uncorroborated bond yield data, can be 'internal' sources of material error that require careful consideration and possible adjustment to the fair yield to determine the debt margin outcome. Any conflict between fair yields and 'external' data requires further qualitative and quantitative assessment.

The recommended overall debt margin process which accords with NGR 87 is to:

1. assess whether the fair yields being used to set the debt margin are representative benchmark yields on the basis of five factors set out in this paper

2. make yield adjustments where reasonably warranted

3. linearly extrapolate the debt margin derived using the yield of the longest maturity in the Bloomberg BBB curve which is represented by bonds in the underlying data-set by the debt margin spread of the immediately-prior two years of the same Bloomberg BBB curve

4. assess that yield in a broad context to ensure it represents a debt margin that allows the benchmark firm to recover costs over the access period.

Average of the two curves – AMI final decision

It is not recommended that the issues surrounding Bloomberg and CBASpectrum be dealt with by taking the simple arithmetic average of both as decided by the AER in the Victorian advanced metering infrastructure ("AMI") (30 October 2009).

In this decision, the AER used a weighted sum of squared errors test on certain bonds. The simple average of Bloomberg BBB and CBASpectrum BBB+ curves was found to have the lowest weighted sum of squared errors than either curve alone.

In my view, it is clearer and less confused to adjust the Bloomberg curve for any bond data deficiencies and not use the average of two unassociated fair curves to derive a best-fit result. It is not robust to average the two curves as it combines two potentially incorrect curves that have possibly different computational and curve compositions. The other reasons given in Section 8 also mean it is more robust to adjust the Bloomberg 7 year yield by a spread from within the same curve to derive an extrapolated result, corroborated by external data.

11 ESTIMATED DEBT MARGIN IN INDICATIVE AVERAGING PERIOD

My assessment is that for the indicative averaging period, the 10 year BBB/BBB+ debt margin for application to the GDS be determined in the following manner:

- verify the longest maturity represented by bonds in the Bloomberg BBB fair curve being the 7 year maturity
- determine the 7 year debt margin[125]
- linearly extrapolate the 7 year debt margin to a 10 year debt margin by adding on the per annum debt margin differential between the 5 year and 7 year Bloomberg BBB curve fair yields[126]

The results are in Table 22 (**Appendix 6** provides the underlying data**)**. The net result is a 10 year BBB/BBB+ debt margin of 4.33% semi-annual (4.50% annualised[127]).

TABLE 22 - CGS and Debt Margins in Indicative Averaging Period

10 year Debt Margin	4.3318%	semi annual
Interpolated 10 year CGS	5.6324%	semi annual
10 year Total Debt Cost	9.9642%	semi annual
10 year Total Debt Cost	10.2124%	annual
Interpolated 10 year CGS	5.7117%	annual
10 year Debt Margin	4.5007%	annual

It is noted that these results are contingently qualified by the analysis in Section 9 that indicates some under-estimation in the above debt margin based on the 4 external tests performed in this paper. It was not necessary to conclude that analysis for the indicative averaging period, however the analysis should be done in the *actual* averaging period for the GDS.

[125] the debt margin is calculated by the difference between the fair yield and the interpolated CGS in the indicative averaging period
[126] this is achieved by dividing the 5-7 year debt margin spread by 2, and then multiplying by 3
[127] it is correct to determine the debt margin on a p.a. annual basis by subtracting the annualised CGS from the annualised total debt cost. It is not correct to determine the debt margin on a p.a. annual basis by directly annualising the semi-annual debt margin.

APPENDIX 1 ERA's extrapolation methods in the Final Decision for Western Power in respect of the South West Interconnected Network[128]

The averaging period used was the 20 business days prior to 30 October 2009 (not unlike the indicative averaging period for the GDS). The ERA considered three methods to extrapolate to a 10 year debt margin:

- *estimates directly from CBASpectrum for 10-year BBB+ rated bonds (**Method 1**);*
- *using Bloomberg information only, taking the estimate for 7-year BBB/BBB+ rated bonds and adding a margin calculated as the spread between 7-year and 10-year AAA rated bonds as a proxy for the spread between the (unavailable) 7-year and 10-year BBB/BBB+ rated bonds (**Method 2**); and*
- *using Bloomberg information only, the estimate obtained using Method 2 is adjusted by multiplying that estimate by the ratio of the spread between 10-year and 7-year A rated bonds and the spread between 10-year and 7-year AAA rated bonds for the period 1 August 2007 to 18 August 2009 (**Method 3**)[129]*

The ERA decided upon method 3, which is method 2 adjusted by the ratio set out in Method 3.

1. Discussion of "Method 2" in ERA's Final Decision

1.1 Calculations

Table 1 provides my calculations for the debt margin in the South West Interconnected Network pricing period (taken to be 5/10/2009-30/10/2009) using Bloomberg data.

TABLE 1 – ERA's Method 2 in the South West Interconnected Network Final Decision

		Rate (% p.a.)
Bloomberg 7 year BBB fair yield		9.3988
Bloomberg 7 year AAA fair yield	6.6927	
Bloomberg 10 year AAA fair yield	7.2453	
10/7 year AAA Spread		0.5526
Derived10 year BBB fair yield		9.9514
10 year CGS[130]		5.4659
Derived 10 year BBB debt margin		**4.4855**[131]

1.2 Benefits of using the 10/7 year AAA spread to extrapolate the 7 year

1.2.1 the 7-10 year AAA fair yields are currently being published and allow the 7 year composite BBB yield to be extrapolated to a 10 year maturity point

1.2.2 emperically, in the last two periods when Bloomberg published a 10 year BBB fair yield[132], the 10 year/ 7 year AAA spread was a reasonable proxy for the 10

[128] Final Decision on Proposed Revisions to the Access Arrangement for the South West Interconnected Network, ERA, 4/12/2009 reprinted 17/12/2009, at pp 231-233

[129] op cit, pp 232-233

[130] using the generic Commonweath bond yields in Bloomberg ("GACGB" series)

[131] I have not been able to match the 4.44% debt margin calculated by the ERA. However, my results are similar. Hopefully the difference is immaterial to the discussion in this section.

[132] The two periods are 11/6/03-20/10/04 and 10/11/04-9/10/07

year/7 year BBB spread as seen in Graph 1 (which shows the differential between the two fair yields), and Table 2 (which sets out the sets out the means and medians for this differential).

GRAPH 1 10/7 year BBB and 10/7 year AAA Yield Differential

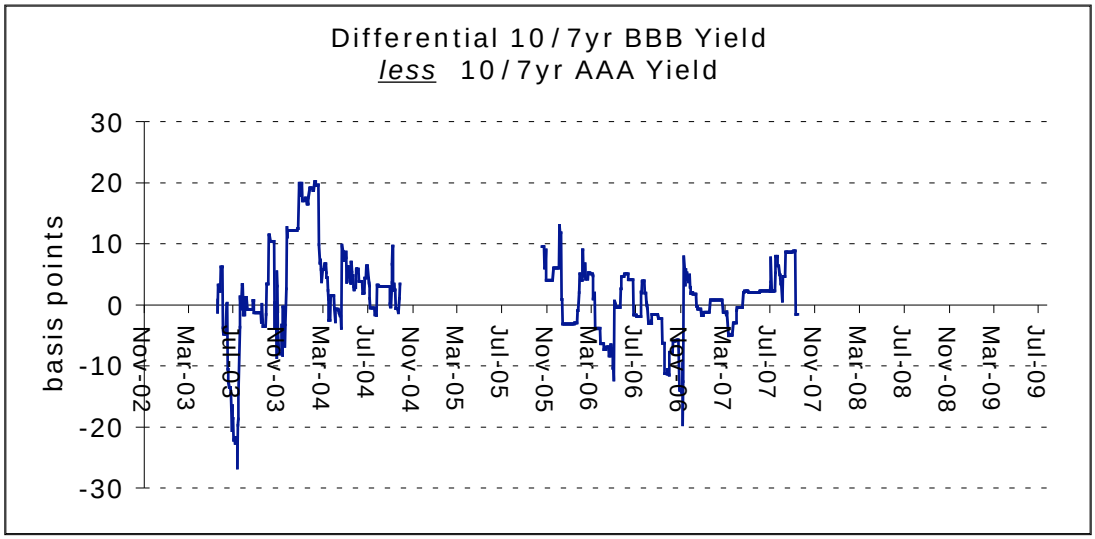


TABLE 2 10/7 year BBB and 10/7 year AAA Yield Differential

	Period	Differential (bp's)
Mean	11/6/03-20/10/04	3.02
Median		3.00
Mean	10/11/04-9/10/07	0.27
Median		0.79

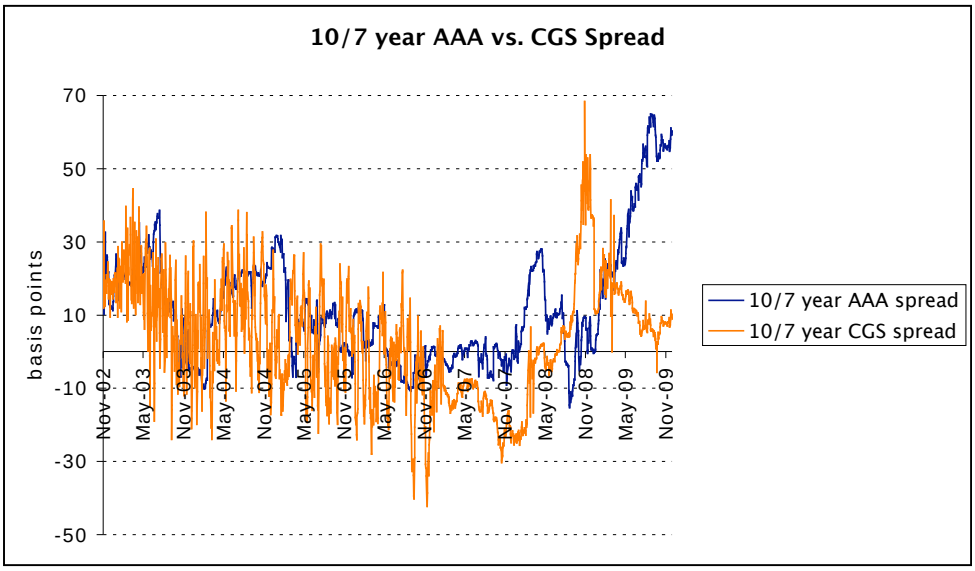
1.3 Reservations about using the 10/7 year composite AAA spread to extrapolate the 7 year composite BBB yield

1.3.1 It is generally not robust to extrapolate a yield in one credit class with the spread calculated from another credit class especially a credit class (AAA) that is materially higher and far-removed from the rating class being extrapolated (BBB/BBB+). There may be all sorts of dynamics occurring in, and along, the AAA curve that bear no relationship to the BBB/BBB+ curve; hence, the estimation of a 10 year debt margin may be compromised by influences (that cannot be normalised, for example, per method 3)

1.3.2 It is not robust to use the AAA curve as a proxy credit curve because it has the same rating as the risk-free (Australian Commonwealth) bond. In theory the two curves should follow each other with the curve structure dictated by usual factors affecting the risk-free curve's term structure (e.g. inflation expectations, Treasury bond supply and liquidity preferences). In practice as seen in Graph 2, there has been an historic differential between the two curves that appears to be volatile. It is difficult to see how this spread reflects a normal "credit spread" given the joint rating even taking into account that the Bloomberg curve is a composite curve. The spread between

the two curves moreover might be reflecting some kind of *structural* issue, for example, a liquidity preference for Commonwealth bonds versus bonds in the Bloomberg AAA curve, or more recently, the market's assessment of the Government guarantee for the bonds in the Bloomberg AAA curve that have this support or the market's assessment of possible changes to the liquidity rules imposed on banks by the Australian Prudential Regulation Authority (APRA) affecting the sorts of bonds in a bank's portfolio that can be counted to its liquidity position. Thus, my view is that the credit test (BBB/BBB+) used in the GDS debt margin determination should be independent of the risk-free test.

GRAPH 2 10/7 year Bloomberg AAA and CGS Spreads



1.3.3 The Bloomberg AAA fair curve is not representative of domestic *corporate* bonds and hence is not inkeeping with the criteria for the calculation of the rate of return for the benchmark efficient gas network company under NGR 87

- the AAA curve is currently[133] comprised of 28 bonds, 24 of which have been by banks, 2 have been issued by Australian Government guaranteed entities (EFIC and Air Services), with the remaining 2 bonds issued by Virtue Trust which is a special-purpose securitised project-finance entity set-up in 2000 to finance the purchase of new rolling stock for the State of Victoria's Bayside and Swanston railway networks[134]

[133] my data test was on 20/12/2009 subsequent to the release of the ERA's final decision in South West Interconnected Network

[134] a search of Standard & Poor's RatingsDirect creditportal failed to find any mention of the bonds issued by Virtue Trust, nor help understand the composite AAA rating within Bloomberg. CBASpectrum also has no mention of the bonds in its online data base

- 8 bonds are issued by foreign-owned financial institutions
- 16 bonds are issued by domestic banks with all these bonds guaranteed by the Australian Government[135]

1.3.4 There are significant issues with the method by which the 7-10 year part of the AAA curve is currently being constructed, such as to materially question its relevance to extrapolating a 7 year BBB/BBB+ fair yield inkeeping with NGR 87:

- the Bloomberg AAA curve extends to a 15 year fair yield. However, it only has 2 bonds beyond 2014, being the 2015 and 2020 bonds, both of which are issued by a special-purpose collateralised entity (Virtue Trust).
- it is not known if either or both Virtue Trust bonds were used in the curve construction, or how they were used:
  - the 2015 bond was not used in the AAA curve construction as there was no pricing for this bond suggesting a lack of liquidity/ pricing for the bond in the market. If not used, then the longer end of the AAA curve is only constructed on the basis of the Virtue Trust 2020 bond which appears likely given that this bond had a yield of 7.28% recorded in Bloomberg, which is near to the 10 year AAA fair yield (7.347%)[136].
  - Virtue Trust is a highly-structured non-corporate AAA-rated (unverified) trust entity, and so is not reflective of BBB/BBB+ corporate credit spreads

1.3.5 In the averaging period (5/10/2009-30/10/2009), the 10/7yr AAA curve add-on, calculated to be 55bp (refer Table 1), is similar to the add-on which results from the use of my recommended 7/5 year BBB/BBB+ debt margin spread to extrapolate the 7 year yield (49bp). However, the coincidence of this result is somewhat arbitrary and not reliable for two reasons:

- the 10/7 year AAA debt margin spread[137] is well above historic norms as seen in Table 3
- as Graph 3 shows, the 10/7 year AAA debt margin spread has recently moved out to 50bp's and above. This is against measures of central tendency on a historic basis - from 1/1/2003-1/9/2009 the spread only exceeded 50bp on 1 day out of 1,639 business days (0.06% of occurrences) and 36 days greater than 40bp (2.2%). Hence, the spread is currently unusually high. It is unknown whether the spread will 'mean revert', or if the move to 50bp reflects a structural break of some kind in the AAA curve, or some kind of

[135] Unfortunately I only have data for 22/12/2009 as Bloomberg do not store this data, but I suspect the AAA curve composition has not changed materially in recent months

[136] these were the yields on 20/12/2009. In effect, the South West Interconnected Network debt margin is being determined through the use of only two bonds, the Santos 2015 bond (BBB+) and the Virtue Trust 2020 bond (AAA) further adjusted by Method 3

[137] the analysis here concerns the debt margin spread so as to explicitly remove the 10/7 year CGS spread movement and hence focus on the credit margin within the 10/7 year AAA spread

structural issue with the underlying bonds used in that curve's construction (possibly a structural break in the Virtue Trust bonds). I cannot determine the cause of the move to 50bp.

GRAPH 3 10 year/ 7 year Bloomberg AAA debt margin differential

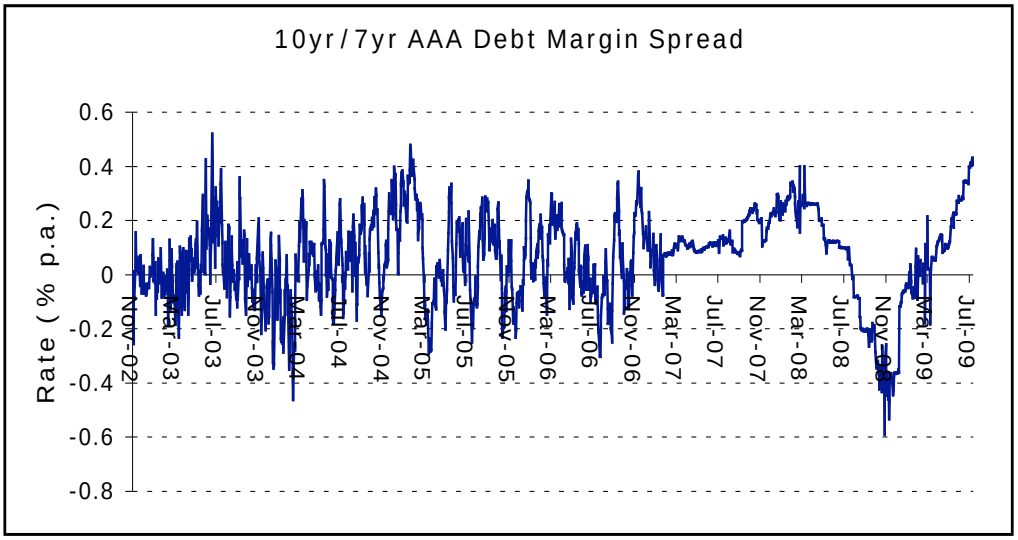


Table 3 shows the mean average spreads of the 10/7 year[138] AAA debt margin differential since 2003, including the mean for the entire period.

TABLE 3 Mean 10 year/ 7 year AAA debt margin differential

Period	Mean 10yr/7yr AAA Debt Margin Spread
5/10/09-30/10/09[139] (pricing period)	55.2
1/1/03-18/8/09 (entire period)	5.5
Calendar Year 2003	3.1
Calendar Year 2004	4.3
Calendar Year 2005	7.2
Calendar Year 2006	6.6
Calendar Year 2007	12.2
Calendar Year 2008	2.7
1/1/09-30/10/09	9.1
1/8/07-18/8/09[140] (related to Method 3)	8.6

[138] the 7 year Commonwealth bond rate was unavailable in the period 4/4/07-14/3/08, and was estimated using the interpolated 5 year and 10 year Commonwealth bond rates in this period.

[139] being the pricing period in South West Interconnected Network final decision

[140] being the period used in Method 3 by the ERA

1.4 Conclusion

Despite historical association with the 10/7 year BBB spread, my overall view is that the 10/7 year AAA spread is unreliable as an ongoing input to the calculation of the debt margin, for example the actual averaging period for the GDS that will occur some time in 2010. The lack of bonds in the AAA curve beyond 2014 and the Virtue Trust non-corporate bond, mean the extrapolation issue still exists and is not dealt with by using the AAA curve. The past empirical association with the 10/7 year BBB spread is insufficient. It is unwise to embed in the debt margin calculations for the GDS access arrangement a variable that is incomplete, unstable and exhibiting a current strong move that may not mean revert. I do not believe these issues are reliably cured by Method 3, discussed below.

2. Discussion of "Method 3" in ERA's Final Decision

2.1 Method 3 summary

Calculation Method 3 seeks to scale the result from Method 2 by the ratio between the 10/7 year A spread and the 10/7 year AAA spread for the period 1 August 2007 to 18 August 2009. The scaling is due to the 10/7 year AAA spread used in the Method 2 moving significantly higher relative to the counterpart A spread since September 2008. The scaling is to bring the AAA spread back to a more normalised spread.

2.2 Calculations

TABLE 4 ERA's Method 3 in the South West Interconnected Network Final Decision

	Period	Rate (% p.a.)	Rate (% p.a.)
Bloomberg 10 year A fair yield	1/8/07-18/8/09	8.0250	
Bloomberg 7 year A fair yield	1/8/07-18/8/09	7.9440	
10/7 year A spread			0.0810
Bloomberg 10 year AAA fair yield	1/8/07-18/8/09	7.2847	
Bloomberg 7 year AAA fair yield	1/8/07-18/8/09	7.1632	
10/7 year AAA spread			0.1214
Ratio between A and AAA spreads			**66.7%**
10/7 year AAA Spread	5/10/09-30/10/09		0.5526
Adjusted 10/7 year AAA Spread	5/10/09-30/10/09		0.3686
Bloomberg 7 year BBB fair yield	5/10/09-30/10/09		9.3988
Derived 10 year BBB fair yield	**5/10/09-30/10/09**		**9.7674**
10 year CGS	5/10/09-30/10/09		5.4659
Derived 10 year BBB debt margin	**5/10/09-30/10/09**		**4.3015**

This result in Table 4 does not match the 4.19% debt margin calculated by the ERA for Method 3. Using *debt margins* in the 10/7 year spread calculation, rather than absolute fair yields, produces results that are similar to the ERA, however this approach does not seem to match the wording in the ERA's final decision for Method 3. This inconsistency is not material to the discussion below.

2.3 Benefits of Method 3

2.3.1 Method 3 attempts to normalise the unusual rise in the 10/7 year AAA spread in the South West Interconnected Network pricing period (October 2009), which persisted through the remainder of 2009, by applying a ratio that appears to be 'normal' in a nearby prior period

2.3.2 The method produces a measurable/ observable ratio that can be applied to the AAA spread in the pricing period

2.3.3 The 10/7 year A spread has been a reasonable approximation of the 10/7 year BBB spread in the most recent two periods when Bloomberg published a 10 year BBB fair yield – see Graph 5 and Table 5 below.

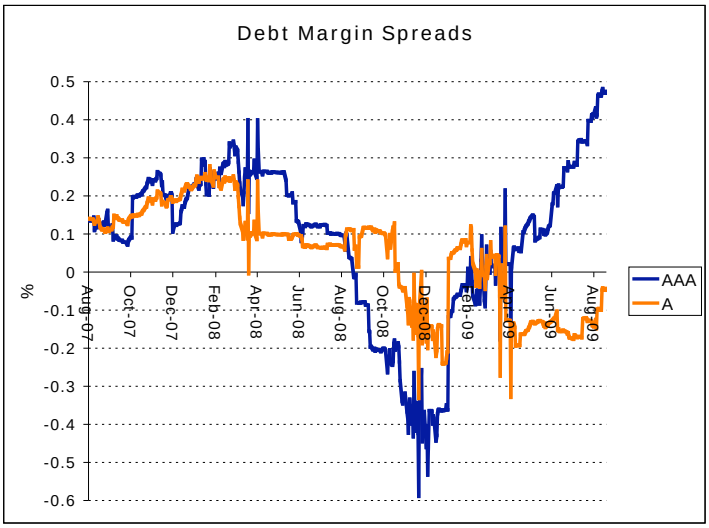
2.4 Reservations in scaling the 10/7 year AAA spread by the 10/7 year A/AAA ratio

2.4.1 As seen in Table 2 the mean and median differentials in both recent periods in which Bloomberg published a 10 year BBB fair yield indicate that the 10/7 year AAA spread was a good estimator of the 10/7 year BBB/BBB+ spread, and this feature in my view continued throughout 2009. It seems equally if not more appropriate to accept the current 10/7 year AAA spread as normal than to try to normalise it using a past period A/AAA spread ratio. It is unclear that the prior period is normal. The recent move out in the 10/7 year AAA spread is not conclusive evidence that that spread is now abnormal absent further evidence.

2.4.2 It is not robust to try to correct a possible structural issue with a ratio of a curve spread based on that same credit class (AAA) and another credit class (A) both of which do not bear any explicit or fundamental relationship to the curve being measured and adjusted (BBB/BBB+). The AAA/A credit curves can operate totally independently of each other and relative to the BBB/BBB+ curve. I have reservations about embedding into the future debt margin calculations for an access arrangement a calculation that requires an adjustment that tries to cure a problem the cause of which is presently unknown by a proxy adjustment that may bear no fundamental relationship to the BBB/BBB+ curve.

2.4.3 As seen in Graph 4 the period used in Method 3 to scale-down the 10/7yr AAA spread is somewhat arbitrary, and is characterised by negative debt margin spreads in the 10/7 year AAA and A curves. In other words, the 10/7 year debt margin spread for both curves went negative, at times substantially, which is a counterintuitive result[141]. It means the ratio was in part derived from the division of two negative numbers which creates significant efficacy issues. This suggests lack of robustness and reliability for the purposes of NGR 87.

GRAPH 4 10/7 year Debt Margin spreads for A and AAA Boomberg fair curves



2.4.4 Method 2 assumes the 7-10 year A curve is a good proxy for the 7-10 year BBB curve. Graph 5 shows there was a reasonably good nexus in the two periods when Bloomberg published both curves out to 10 years. Table 5 gives the means and medians for the spread. However, consistent with my review of the AAA curve, it is not robust to use one credit curve (A) to make assumptions about the behaviour of another credit curve (BBB/BBB+). The overall dynamics including the underlying bonds are quite different between credit classes.

2.4.5 On 22/12/2009[142] the Bloomberg composite A curve had 28 bonds, with the longest bond being 2005 (6 years), with only 2 bonds in this maturity, 2 in the 2014 maturity (5 years), and 2 in the 2013 maturity (4 years). Furthermore, one bond in each of these maturities was not used in the actual curve construction. In other words, the curve beyond 5 years was constructed on the basis of only 1 bond in each of the 2014 and 2015 maturities. It is unknown how Bloomberg constructed the curve to the 10 year maturity point.

- to use the 7-10 year part of the A curve in a ratio test for the period 1/8/07-18/8/09 is not robust unless it is demonstrated that this curve was well-populated with corporate bonds in this maturity band to ensure the assessed debt margin corresponds to the benchmark corporate utility inkeeping with NGR 87. To date, it appears this test has not been satisfied
- as both the AAA and A curves have typically had problems with their longer term curve construction given the lack of underlying bonds beyond 5 years, it is not known if the spreads reflected in Table 5 reflect the true credit spread for either credit-class.

GRAPH 5 Spread between 10 year BBB fair yield and 10 year A fair yield

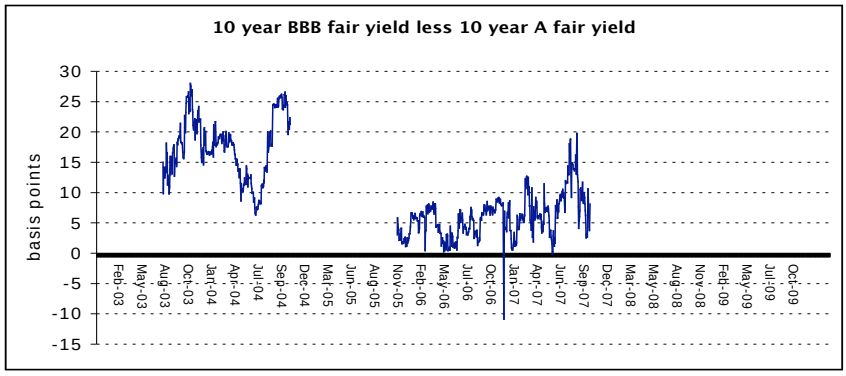


TABLE 5 Spread between 10 year BBB fair yield and 10 year A fair yield

	Period	Spread (bp's)
Mean	18/7/03-20/10/04	17.5
Median		17.8
Mean	10/11/05-8/10/07	6.0
Median		5.9

[141] the expectation would be for the debt margin to increase between the 7 and 10 year maturity points

[142] It is not possible to review the A curve constituent bonds in the two time periods noted in Table 5 as this data is not stored/available through Bloomberg.

APPENDIX 2 Global Corporate Default Summary

Reprinted from 2008 Annual Global Corporate Default Study And Rating Transitions (2 April 2009) report by Standard & Poor's

Table 4
Global Corporate Default Summary

Year	Total defaults*	Investment-grade defaults	Speculative-grade defaults	Default rate (%)	Investment-grade default rate (%)	Speculative-grade default rate (%)	Total debt defaulting (Bil. $)
1981	2	0	2	0.14	0	0.62	0.06
1982	18	2	15	1.19	0.18	4.41	0.9
1983	12	1	10	0.76	0.09	2.93	0.37
1984	14	2	12	0.91	0.17	3.26	0.36
1985	19	0	18	1.1	0	4.31	0.31
1986	34	2	30	1.72	0.15	5.66	0.46
1987	19	0	19	0.95	0	2.79	1.6
1988	32	0	29	1.38	0	3.83	3.3
1989	42	2	34	1.69	0.14	4.52	7.28
1990	69	2	56	2.74	0.14	8.08	21.15
1991	93	2	65	3.26	0.14	11.02	23.65
1992	39	0	32	1.49	0	6.07	5.4
1993	26	0	14	0.6	0	2.49	2.38
1994	20	1	15	0.62	0.05	2.1	2.3
1995	35	1	29	1.04	0.05	3.52	8.97
1996	20	0	16	0.51	0	1.8	2.65
1997	23	2	20	0.62	0.08	1.98	4.93
1998	58	4	49	1.28	0.14	3.7	11.27
1999	108	5	91	2.1	0.17	5.46	39.38
2000	136	7	108	2.42	0.24	6.06	43.28
2001	229	8	173	3.74	0.26	9.66	118.79
2002	225	13	158	3.51	0.41	9.22	190.92
2003	121	3	89	1.88	0.1	4.91	62.89
2004	56	1	39	0.78	0.03	2.02	20.66
2005	39	1	30	0.57	0.03	1.42	42
2006	30	0	26	0.46	0	1.14	7.13
2007	24	0	21	0.36	0	0.87	8.15
2008	125	14	87	1.69	0.41	3.43	429.63

APPENDIX 3 Global Corporate Summary – Annual Corporate Ratings Changes

Reprinted from 2008 Annual Global Corporate Default Study And Rating Transitions (2 April 2009) report by Standard & Poor's

Table 6
Summary Of Annual Corporate Rating Changes* (%)

Year	Issuers as of Jan. 1	Upgrades	Downgrades∂	Defaults	Withdrawn ratings	Changed ratings	Unchanged ratings	Downgrade/upgrade ratio
1981	1386	9.81	13.28	0.14	2.02	25.25	74.75	1.35
1982	1434	5.86	12.69	1.19	5.3	25.03	74.97	2.17
1983	1456	7.07	11.81	0.76	5.22	24.86	75.14	1.67
1984	1543	11.15	10.05	0.91	2.85	24.95	75.05	0.9
1985	1630	7.85	13.74	1.1	4.05	26.75	73.25	1.75
1986	1859	7.21	15.87	1.72	6.89	31.68	68.32	2.2
1987	2007	7.17	11.86	0.95	9.27	29.25	70.75	1.65
1988	2095	8.88	11.84	1.38	8.21	30.31	69.69	1.33
1989	2134	9.65	11.01	1.69	8.06	30.41	69.59	1.14
1990	2120	6.23	15.33	2.74	6.6	30.9	69.1	2.46
1991	2057	6.08	14.29	3.26	3.55	27.18	72.82	2.35
1992	2146	9.37	11.46	1.49	4.01	26.33	73.67	1.22
1993	2333	8.4	9.34	0.6	8.4	26.75	73.25	1.11
1994	2570	7.04	9.3	0.62	4.63	21.6	78.4	1.32
1995	2892	8.75	9.37	1.04	4.5	23.65	76.35	1.07
1996	3163	9.42	7.56	0.51	6.99	24.47	75.53	0.8
1997	3531	8.98	7.84	0.62	7.34	24.78	75.22	0.87
1998	4127	7.27	11.39	1.28	8.14	28.08	71.92	1.57
1999	4570	5.6	11.51	2.1	8.71	27.92	72.08	2.05
2000	4752	6.82	11.89	2.42	7.01	28.14	71.86	1.74
2001	4837	5.66	15.92	3.74	7.34	32.66	67.34	2.81
2002	4876	5.27	19.03	3.51	6.97	34.78	65.22	3.61
2003	4898	6.49	14.45	1.88	7.29	30.11	69.89	2.23
2004	5131	8.81	7.44	0.78	7.17	24.21	75.79	0.85
2005	5428	12.6	9.12	0.57	8.35	30.64	69.36	0.72
2006	5602	12.03	8.62	0.46	8.35	29.47	70.53	0.72
2007	5825	13.37	9.1	0.36	10.11	32.94	67.06	0.68
2008	5966	7.73	15.82	1.69	7.38	32.62	67.38	2.05
Weighted average		8.42	11.74	1.47	7.16	28.78	71.22	1.58
Median		7.79	11.66	1.14	7.09	28	72	1.46
Standard deviation		2.15	2.94	0.97	2.04	3.34	3.34	0.72
Minimum		5.27	7.44	0.14	2.02	21.6	65.22	0.68
Maximum		13.37	19.03	3.74	10.11	34.78	78.4	3.61

APPENDIX 4 Corporate bank deals in 2009 up to the indicative averaging period

Company	Facility Type	Purpose of Loan	Loan Status	Loan Size	S&P Rating	Term (years)	BBSY Margin
Westfield	Syndicated Revolving Credit	Forward start - 18 month extension of existing facility that matures 1/2011	completed August	US$1.25bn	A-	1.5	240
APA Group	Syndicated Revolving Credit	part refinance an A$900m 3-year tranche, which was part of a larger A$1.8bn loan established in June 2007	syndication completed in August and signed in September	A$800mn	BBB	2	280
BlueScope Steel	Syndicated Revolving Credit	refinance and extend debt maturity profile	signed in July	A$1.275bn	BBB+	2	330
TRUenergy	Syndicated Revolving Credit	part-refinancing of $650mn loan	syndication in process - responses due mid-September	A$350mn	BBB-	3	340
Westralia Airports	Syndicated Loan	$405mn refinancing and $335mn capex loan for airport expansion	in documentation August	A$740mn	BBB-	3	300
Dampier to Bunbury National Gas	Term Loan (club basis)	refinance an existing deal, which matures in October 2009, for a Stage 5A development of the Dampier to Bunbury Natural Gas Pipeline (DBP) in WA	signed in May	A$480mn	BBB-	3	325
Goodman Fielder	Revolving Credit	refinance part of a A$1.4bn 3-tranche syndicated loan	syndication launched in August	A$500mn	BBB	3	340
Amcor	Acquisition loan	to fund acquisition of purchase of Alcan Packaging from Rio Tinto)	signed May and loan drawn in August	US$1.25bn	BBB	3	300
AGL Energy	Syndicated Loan	refinancing	signed and loan drawn in May	A$800mn	BBB	3	280
Fosters	Syndicated Term Loan and Revolver	general corporate purposes	completed in July	US$500mn	BBB	3	275
BlueScope Steel	as above			A$1.275bn	BBB+	3	350
Woolworths	Revolving Credit	general corporate purposes	signed in May	US$700mn	A-	3	220
Woodside	Syndicated Loan	general corporate purposes	signed in May	US$1.1bn	A-	3	225
Telstra	Syndicated Loan	general corporate purposes	signed in May	A$450mn	A	3	160
APA Group	as above			A$800mn	BBB	4	320
Westralia Airports	as above			A$740mn	BBB-	5	350
Dampier to Bunbury National Gas	as above			A$480mn	BBB-	5	375
Amcor	as above			US$1.25bn	BBB	5	375
Telstra	as above			A$220mn	A	5	200

APPENDIX 5 Australian Corporate Bonds Issued Offshore

Company	Launch/ Announcement Date	Bond's Maturity at Launch (years)	Spread over US Treasury at Issue (bp)	Effective Spread over Aust CGL at Issue (bp)
5-year				
QBE Insurance	30-Dec-08	5	770	804
Woodside	24-Feb-09	5	625	615
Brambles	15-Mar-09	5	550	556
BHP Billiton	18-Mar-09	5	400	400
Rio Tinto	14-Apr-09	5	752	794
Caltex Aust	14-Apr-09	5	615	649
Westfield	27-May-09	5	548.9	564
Foxtel	24-Aug-09	5	250	264
Murray Goulburn	28-Sep-09	5	250	305
Dexus Property	28-Sep-09	5	487.5	562
		AVERAGE	525	551
6-7 year				
Brambles	15-Mar-09	7	550	586
Caltex Australia	14-Apr-09	7	615	666
APA Pipelines	14-May-09	7	575	620
Westfield	26-Aug-09	6	350	398
Foxtel	24-Aug-09	7	265	317
Murray Goulburn	28-Sep-09	7	250	331
Woodside	03-Nov-09	5	230	285
		AVERAGE	405	458
10-year				
BHP Billiton	18-Mar-09	10	400	476
Woodside	24-Feb-09	10	613	663
Brambles	15-Mar-09	10	550	629
Rio Tinto	14-Apr-09	10	658	780
APA Pipelines	14-May-09	10	575	728
Westfield	26-Aug-09	10	350	419
Foxtel	24-Aug-09	10	265	313
Murray Goulburn	28-Sep-09	10	250	334
Murray Goulburn	28-Sep-09	12	265	334
		AVERAGE	436	520
		AVERAGE ALL ISSUES	462	514

APPENDIX 6 CGS and Debt Margins in Indicative Averaging Period (semi-annual)[143]

	Bloomberg BBB 5 year Debt Margin[144]	Bloomberg BBB 7 year Debt Margin	Extrapolated Bloomberg BBB 10 year Debt Margin[145]	Interpolated 10 year CGS	Extrapolated 10 year Total Debt Cost
19-Oct-09	3.6265%	3.9649%	4.4725%	5.6372%	10.1097%
20-Oct-09	3.6209%	3.9471%	4.4363%	5.6169%	10.0532%
21-Oct-09	3.6318%	3.9700%	4.4773%	5.6071%	10.0844%
22-Oct-09	3.5431%	3.8853%	4.3987%	5.6773%	10.0760%
23-Oct-09	3.5490%	3.8814%	4.3801%	5.7453%	10.1254%
26-Oct-09	3.5610%	3.8951%	4.3963%	5.7432%	10.1395%
27-Oct-09	3.5058%	3.8373%	4.3347%	5.7134%	10.0481%
28-Oct-09	3.5237%	3.8572%	4.3574%	5.6657%	10.0231%
29-Oct-09	3.5942%	3.9181%	4.4039%	5.5609%	9.9648%
30-Oct-09	3.4551%	3.7795%	4.2661%	5.5833%	9.8493%
02-Nov-09	3.4383%	3.7698%	4.2671%	5.5588%	9.8260%
03-Nov-09	3.4329%	3.7609%	4.2528%	5.5049%	9.7576%
04-Nov-09	3.4704%	3.7968%	4.2863%	5.5751%	9.8614%
05-Nov-09	3.5576%	3.8659%	4.3285%	5.6074%	9.9358%
06-Nov-09	3.5187%	3.8287%	4.2938%	5.6596%	9.9534%
09-Nov-09	3.4626%	3.7781%	4.2514%	5.6952%	9.9466%
10-Nov-09	3.5098%	3.8160%	4.2755%	5.6753%	9.9508%
11-Nov-09	3.4311%	3.7418%	4.2079%	5.6325%	9.8404%
12-Nov-09	3.4583%	3.7736%	4.2466%	5.6005%	9.8471%
13-Nov-09	3.5267%	3.8370%	4.3023%	5.5887%	9.8910%
Average	**3.5209%**	**3.8452%**	**4.3318%**	**5.6324%**	**9.9642%**

[143] Data obtained from Reserve Bank of Australia table "INTEREST RATES & YIELDS: MONEY MARKET & COMMONWEALTH GOVERNMENT SECURITIES" found at http://www.rba.gov.au/Statistics/interest_rates_yields.html

[144] Debt margin derived by subtracting the interpolated CGS from the relevant Bloomberg BBB fair yield

[145] derived by subtracting the 5 year debt margin from the 7 year debt margin, dividing by two, then multiplying by three, and adding that margin to the 7 year debt margin (linear extrapolation method)

ATTACHMENT 1 Engagement Letter from WestNet Energy

WestNetEnergy

19 November 2009

Matthew Lemke
Second Opinion Financial Advisory
15 Russell St
Camberwell
Victoria 3124

Dear Matthew,

RE: DETERMINATION OF A DEBT RISK PREMIUM FOR USE IN CALCULATION OF RATE OF RETURN FOR WA GAS NETWORKS' MID WEST AND SOUTH WEST GAS DISTRIBUTION SYSTEM ACCESS ARRANGEMENT REVIEW

WA Gas Networks Pty Ltd (WAGN) owns the Mid-West and South-West Gas Distribution System (GDS). Revisions to its Access Arrangement for the period 1 January 2010 to 30 June 2014 are currently being prepared.

WestNet Energy Pty Ltd (WNE) provides engineering, procurement and construction management services to WAGN in respect to the GDS. This letter has been prepared in the course of providing those services.

One of the revisions to the Access Arrangement for the GDS revolves around the determination of a rate of return that WAGN should be entitled to earn on its investment in the GDS. A key input to the determination of the rate of return is an appropriate debt risk margin.

We seek your services in:

1) identifying a methodology for determining the appropriate debt risk margin, and
2) calculating the debt risk margin in accordance with the methodology

Can you please advise details as to:

1) your ability to take on this assignment
2) the approach you will adopt including deliverables
3) an estimate of the cost of the consultancy
4) anticipated time to complete the assignment

Should you have any queries in respect to the consultancy, do not hesitate to contact me on 08 6213 7151.

Yours sincerely,

Deborah Evans
Manager Regulatory Affairs

WestNet InfrastructureGroup

ATTACHMENT 2 Standard & Poor's Bulletin (4 May 2009)

Bulletin:
Ratings On Australian Electricity Network Sector Not Immediately Affected By Regulator's Pricing Decision
04-May-2009

MELBOURNE (Standard & Poor's) May 4, 2009--Standard & Poor's Ratings Services said today that the Australian Energy Regulator's (AER) final decision on the weighted-average cost-of-capital (WACC) parameters that will affect electricity network companies at their next regulatory price reset has no immediate implications for the ratings on the following companies: The CitiPower Trust (A-/Stable/--), Powercor Australia LLC (A-/Stable/A-2), ETSA Utilities Finance Pty Ltd. (A-/Stable/--), SP AusNet Group (A-/Negative/--), United Energy Distribution Holdings Pty Ltd. (UED; BBB/Stable/--), and ElectraNet Pty Ltd. (BBB+/Negative/A-2).Nevertheless, we consider the AER decision to be adverse for the sector's creditworthiness. The regulator's decision will lower regulated cash flow and, without any corrective actions, erode the already-thin credit metrics of these companies. No immediate rating actions have been taken, however, as we expect these companies to adopt capital-structure remediation strategies over the next 12 months to preserve their respective financial profiles and support their credit ratings. We note that the financial flexibility available to this sector includes lowering discretionary capital expenditure, reducing distributions, and raising new equity. A lack of action in support of credit quality by one or all of these companies could lead to rating downgrade of at least one notch. The Victorian electricity network companies (CitiPower, Powercor, UED, and SP AusNet) will be subject to the first application of the new regulatory framework, with a price reset scheduled to begin in July 2010.

Ratings are statements of opinion, not statements of fact or recommendations to buy, hold, or sell any securities. Standard & Poor's (Australia) Pty. Ltd. does not hold an Australian financial services license under the Corporations Act 2001. Any rating and the information contained in any research report published by Standard & Poor's is of a general nature. It has been prepared without taking into account any recipient's particular financial needs, circumstances, and objectives. Therefore, a recipient should assess the appropriateness of such information to it before making an investment decision based on this information.

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ATTACHMENT 3 Standard & Poor's report on WA Networks

Summary:
WA Network Holdings Pty Ltd.

28-Jul-2009

Credit Rating: BBB-/Stable/NR

Rationale

The ratings on WA Networks Holdings Pty Ltd. (WAN) and WAN's 100%-owned operating subsidiary WA Gas Networks Pty Ltd. (WAGN) reflect our view of the predictable and regulated earnings the group derives from its natural-monopoly gas-distribution network in the state of Western Australia (AAA/Stable/A-1+). Somewhat offsetting these strengths are WAN's aggressive financial profile, the group's exposure to the risk appetite of its shareholders, and gas throughput risk. WAN has two major shareholders: Babcock & Brown Infrastructure (BBI; not rated, 74.1%) and DUET Group (BBB-/Stable/--, 25.9%).

In our opinion, WAN's excellent business profile is underpinned by its natural-monopoly gas-distribution network, which faces low bypass risk and high economic barriers for duplication. Furthermore, we consider the network to possess low operational risks, as is typical for underground gas-distribution networks, which tend to be less exposed to weather-related incidents than electricity-distribution networks.

WAN has a high level of cash-flow certainty because of the established and transparent regulatory framework. The existing arrangement sets out network prices until January 2010, and the Economic Regulator of WA will remain responsible for the subsequent regulatory process. In an effort to synchronize the determination with the proposed introduction of the new National Gas Law's in WA, the timeline for completion of the regulatory reset has been delayed until July 2010.

WAN is exposed to the risk tolerance and cash requirements of its two listed and yield-focused shareholders. This risk is exacerbated by the lack of specific financial boundaries under potential stress scenarios, such as an adverse regulatory determination. Somewhat mitigating this risk, however, is the shareholders' agreement that stipulates no material decision can be made without the approval of both shareholders, incorporating (but not limited to) annual business plans, additional indebtedness or capital expenditure, and changes to the dividend policy. In our view, the value of this agreement would be weakened if DUET were to sell its ownership stake to a less-active shareholder.

WAN's financial profile is aggressive, as reflected in its high leverage and thin financial metrics. Funds from operations (FFO) to total debt and FFO interest cover are anticipated to remain about 6% and 1.8x, respectively, over the next five years. In an environment of higher interest rates, any pressure for distributions or predominately debt-funded capital works could lead to pressure on WAN's metrics.

Exposure to fluctuations in gas throughput—driven by climatic conditions, loss of major customers, or gas supply disruptions—is an inherent risk for WAN given the price-cap regulatory framework. This was recently highlighted by an incident in W A that limited gas supplies to WAN's network; however, WAN's earnings were only minimally affected by this one-off event.

Liquidity

In our opinion, WAN's liquidity position is adequate. At June 30, 2009, WAN had almost A$51.7 million in cash and committed undrawn facilities. Outside of a A$20 million working-capital facility that matures in September 2009, WAN has no significant refinancing requirements until September 2010, when a A$200 million credit-wrapped MTN will mature. We expect that WAN will refinance the A$20 million working-capital facility in August 2009. While WAN has satisfactory funds available to execute its capital-expenditure plans over the next 12 months, WAN will need to ensure it adequately manages its capital position in line with its liquidity, capital works, and refinancing requirements over the medium term.

Outlook

The stable outlook reflects our expectation that WAN will:

- Successfully refinance the company's current working-capital facility;
- Continue to perform and be managed in line with its existing business plan;
- Maintain adequate funding for its capital works; and
- Maintain adequate liquidity over the medium term.

The shareholders' agreement provides comfort that any adverse deviation from WAN's current business plan is less likely, given the countervailing shareholding of the DUET Group.

We consider that the WAN credit rating could come under pressure if the creditworthiness of the majority shareholder were to materially deteriorate and there were evidence of this negatively affecting WAN. Moreover, if there were any behavioral change by the shareholders, negative deviation from WAN's current business plan, or if WAN were unable to refinance its working-capital facility by August 2009, the ratings may be lowered.

A rating upgrade is unlikely given our expectations for WAN's financial profile over the medium term.

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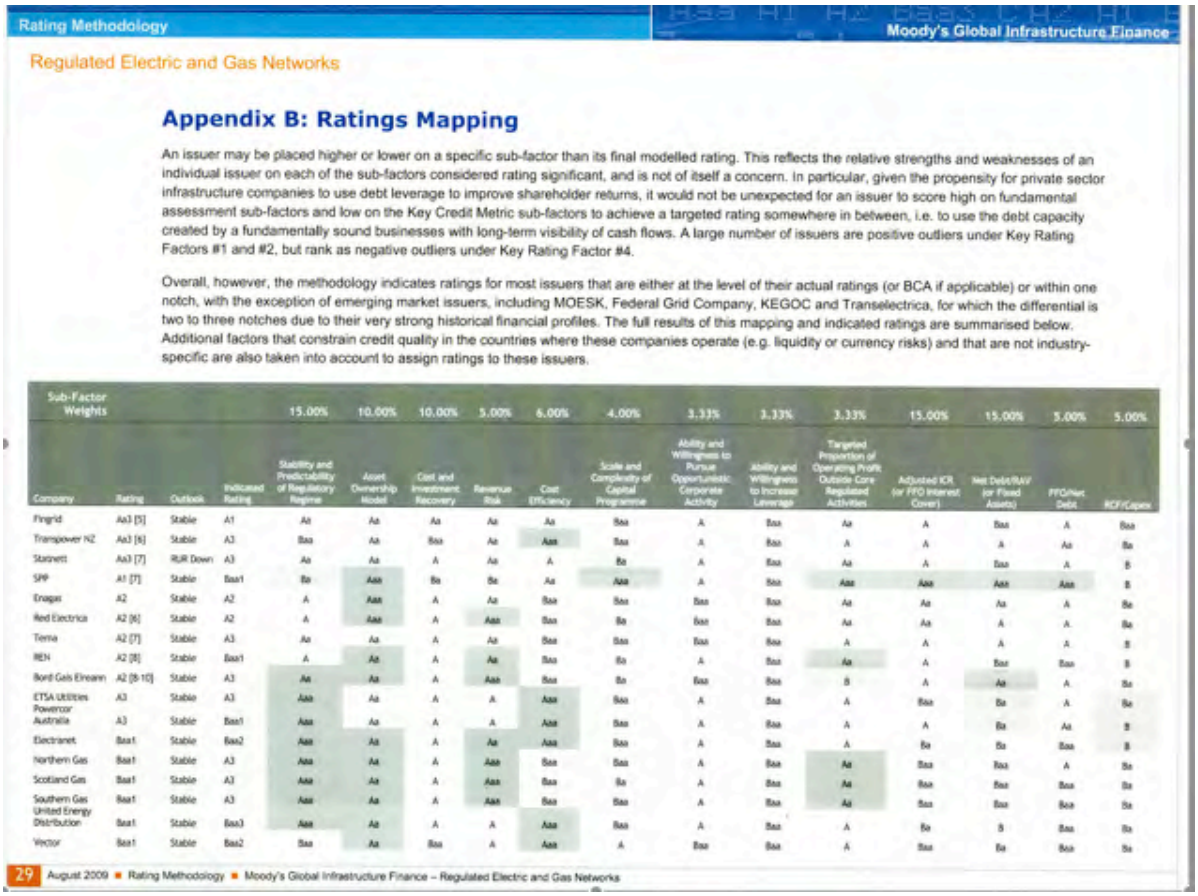
ATTACHMENT 4

"Regulated Electric and Gas Networks" by Moody's Global Infrastructure Finance, August 2009 – "Appendix B" of the Moody's report entitled "Ratings Mapping"



Rating Methodology

Moody's Global Infrastructure Finance

Regulated Electric and Gas Networks

Appendix B: Ratings Mapping

An issuer may be placed higher or lower on a specific sub-factor than its final modelled rating. This reflects the relative strengths and weaknesses of an individual issuer on each of the sub-factors considered rating significant, and is not of itself a concern. In particular, given the propensity for private sector infrastructure companies to use debt leverage to improve shareholder returns, it would not be unexpected for an issuer to score high on fundamental assessment sub-factors and low on the Key Credit Metric sub-factors to achieve a targeted rating somewhere in between, i.e. to use the debt capacity created by a fundamentally sound businesses with long-term visibility of cash flows. A large number of issuers are positive outliers under Key Rating Factors #1 and #2, but rank as negative outliers under Key Rating Factor #4.

Overall, however, the methodology indicates ratings for most issuers that are either at the level of their actual ratings (or BCA if applicable) or within one notch, with the exception of emerging market issuers, including MOESK, Federal Grid Company, KEGOC and Transelectrica, for which the differential is two to three notches due to their very strong historical financial profiles. The full results of this mapping and indicated ratings are summarised below. Additional factors that constrain credit quality in the countries where these companies operate (e.g. liquidity or currency risks) and that are not industry-specific are also taken into account to assign ratings to these issuers.

Sub-Factor Weights				15.00%	10.00%	10.00%	5.00%	6.00%	4.00%	3.33%	3.33%	3.33%	15.00%	15.00%	5.00%	5.00%
Company	Rating	Outlook	Indicated Rating	Stability and Predictability of Regulatory Regime	Asset Ownership Model	Cost and Investment Recovery	Revenue Risk	Cost Efficiency	Scale and Complexity of Capital Programme	Ability and Willingness to Pursue Opportunistic Corporate Activity	Ability and Willingness to Increase Leverage	Targeted Proportion of Operating Profit Outside Core Regulated Activities	Adjusted ICR (or FFO Interest Cover)	Net Debt/RAV (or Fixed Assets)	FFO/Net Debt	RCF/Capex
Fingrid	Aa3 [5]	Stable	A1	Aa	Aa	Aa	Aa	Aa	Baa	A	Baa	Aa	A	Baa	A	Baa
Transpower NZ	Aa3 [6]	Stable	A3	Baa	Aa	Baa	Aa	Aaa	Baa	A	Baa	A	A	A	Aa	Ba
Statnett	Aa3 [7]	RUR Down	A3	Aa	Aa	A	Aa	A	Ba	A	Baa	Aa	A	Baa	A	B
SPP	A1 [7]	Stable	Baa1	Ba	Aaa	Ba	Ba	Aa	Aaa	A	Baa	Aaa	Aaa	Aaa	Aaa	B
Enagas	A2	Stable	A2	A	Aaa	A	Aa	Baa	Baa	Baa	Baa	Aa	Aa	Aa	A	Ba
Red Electrica	A2 [6]	Stable	A2	A	Aaa	A	Aaa	Baa	Ba	Baa	Baa	Aa	Aa	A	A	Ba
Terna	A2 [7]	Stable	A3	Aa	Aa	A	Aa	Baa	Baa	Baa	Baa	A	A	A	A	B
REN	A2 [8]	Stable	Baa1	A	Aa	A	Aa	Baa	Ba	A	Baa	Aa	A	Baa	Baa	B
Bord Gais Eireann	A2 [8-10]	Stable	A3	Aa	Aa	A	Aaa	Baa	Ba	Baa	Baa	B	A	Aa	A	Ba
ETSA Utilities	A3	Stable	A3	Aaa	Aa	A	A	Aaa	Baa	A	Baa	A	Baa	Ba	A	Ba
Powercor Australia	A3	Stable	Baa1	Aaa	Aa	A	A	Aaa	Baa	A	Baa	A	A	Ba	Aa	B
Electranet	Baa1	Stable	Baa2	Aaa	Aa	A	Aa	Aaa	Baa	A	Baa	A	Ba	Ba	Baa	B
Northern Gas	Baa1	Stable	A3	Aaa	Aa	A	Aaa	Baa	Baa	A	Baa	Aa	Baa	Baa	A	Ba
Scotland Gas	Baa1	Stable	A3	Aaa	Aa	A	Aaa	Baa	Ba	A	Baa	Aa	Baa	Baa	Baa	Ba
Southern Gas	Baa1	Stable	A3	Aaa	Aa	A	Aaa	Baa	Baa	A	Baa	Aa	Baa	Baa	Baa	Ba
United Energy Distribution	Baa1	Stable	Baa3	Aaa	Aa	A	A	Aaa	Baa	A	Baa	A	Ba	B	Baa	Ba
Vector	Baa1	Stable	Baa2	Baa	Aa	Baa	A	Aaa	A	Baa	Baa	A	Baa	Ba	Baa	Ba

29 August 2009 ■ Rating Methodology ■ Moody's Global Infrastructure Finance – Regulated Electric and Gas Networks

Rating Methodology — Moody's Global Infrastructure Finance

Regulated Electric and Gas Networks

Sub-Factor Weights				15.00%	10.00%	10.00%	5.00%	6.00%	4.00%	3.33%	3.33%	3.33%	15.00%	15.00%	5.00%	5.00%
Company	Rating	Outlook	Indicated Rating	Stability and Predictability of Regulatory Regime	Asset Ownership Model	Cost and Investment Recovery	Revenue Risk	Cost Efficiency	Scale and Complexity of Capital Programme	Ability and Willingness to Pursue Opportunistic Corporate Activity	Ability and Willingness to Increase Leverage	Targeted Proportion of Operating Profit Outside Core Regulated Activities	Adjusted ICR (or FFO Interest Cover)	Net Debt/RAV (or Fixed Assets)	FFO/Net Debt	RCF/Capex
Wales & West	Baa1	Stable	Baa1	Aaa	Aa	A	Aaa	Baa	Baa	Aa	A	Aa	Ba	Baa	Baa	B
Spark Infrastructure	Baa1	Negative	Baa2	Aaa	Aa	A	A	Aaa	Baa	A	Baa	A	Baa	B	A	Ba
WA Network	Baa2	Stable	Baa3	Aaa	Aa	A	A	Aaa	Aa	A	A	A	Ba	B	Ba	Ba
Federal Grid Company	Baa2 [11-13]	Stable	Baa3	B	Aaa	Ba	Baa	Baa	B	Baa	Ba	A	Aaa	Aaa	Aaa	B
OBNGP	Baa2	Negative	Baa1	Aaa	Aa	A	A	Aaa	Ba	A	A	A	Ba	Baa	Ba	B
Energy Partnership (Gas)	Baa2	Negative	Baa3	Aaa	Aa	A	A	Aaa	Aa	A	Baa	A	Ba	B	Ba	Ba
Enwstra	Baa2	Negative	Baa3	Aaa	Aa	A	A	Aaa	Aa	A	Baa	A	Ba	B	Ba	B
Transelectrica	Baa3 [13]	Stable	Baa3	B	Aaa	Ba	Ba	Ba	Ba	A	Ba	B	Aaa	Aa	Aaa	Ba
KEGOC	Baa3 [14]	Negative	Ba1	B	Aaa	Ba	B	Baa	B	A	B	Baa	A	Aaa	Aaa	B
MOESK	Ba2	Stable	Baa3	B	Aaa	Ba	Ba	Ba	B	Baa	Ba	Baa	Aaa	Aaa	Aaa	Ba

Positive Outlier

Negative Outlier

ATTACHMENT 5 RBA's F3 Table - October 2009

F.3 Capital Market Yields and Spreads — Non-government Instruments

	Corporate bonds with 1 to 5 years maturity											
	Yields per cent per annum			Spreads over bonds issued by the Australian Government basis points			Spreads over swap rates basis points			5-year credit default swap spreads basis points		
	AA	A	BBB	AA	A	BBB	AA	A	BBB	AA	A	BBB
2006 Jun	6.32	6.44	6.55	53	66	75	14	25	38	9	24	44
2007 Jun	7.01	7.08	7.32	58	66	88	15	25	45	5	19	50
2008 Jun	8.90	9.38	9.45	216	265	267	106	155	159	84	100	142
2008/09												
Oct	6.67	7.88	8.73	221	342	429	134	254	343	117	212	350
Nov	5.88	7.14	7.90	240	362	446	166	286	371	138	260	418
Dec	5.87	7.24	7.53	279	415	449	211	347	383	161	312	535
Jan	5.40	6.83	7.13	270	409	443	211	352	389	138	280	414
Feb	5.52	7.12	8.09	248	406	503	207	365	463	189	303	398
Mar	6.21	8.07	8.93	301	485	574	261	443	534	159	342	475
Apr	6.03	7.90	8.63	282	463	538	240	420	494	114	263	409
May	5.90	7.92	8.48	224	421	478	200	396	452	90	165	198
Jun	5.95	8.24	8.33	174	397	407	154	373	384	92	170	194
2009/10												
Jul	6.02	7.91	8.36	151	338	382	133	317	361	82	128	153
Aug	6.05	7.68	8.79	128	294	400	96	260	365	71	117	147
Sep	6.04	7.35	8.36	133	272	363	89	228	316	60	93	120
Oct	6.26	7.44	8.27	131	256	329	86	212	281	66	94	118
Daily												
1 Oct	6.04	7.32	8.26	133	272	351	89	228	304	77	101	127
2 Oct	5.89	7.18	8.10	136	276	354	87	226	302	..	..	..
5 Oct	6.03	7.31	8.25	134	273	352	91	229	305	..	..	..
6 Oct	6.02	7.29	8.24	133	270	351	88	224	303	..	..	..
7 Oct	6.01	7.30	8.23	131	269	349	88	226	304	..	..	..
8 Oct	6.16	7.43	8.37	132	270	350	89	226	304	70	96	121
9 Oct	6.14	7.42	8.36	133	271	351	89	226	304	..	..	..
12 Oct	6.21	7.48	8.41	130	267	346	89	225	302	..	..	..
13 Oct	6.19	7.45	8.32	133	269	342	90	225	297	..	..	..
14 Oct	6.22	7.33	8.40	131	252	346	88	209	300	..	..	..
15 Oct	6.39	7.50	8.55	132	253	346	90	211	301	62	90	112
16 Oct	6.45	7.56	8.61	134	255	347	89	210	300	..	..	..
19 Oct	6.45	7.56	8.59	133	253	344	88	209	296	..	..	..
20 Oct	6.45	7.63	8.55	133	258	339	88	213	292	..	..	..
21 Oct	6.44	7.62	8.50	135	259	338	87	212	288	..	..	..
22 Oct	6.47	7.64	8.53	130	255	334	87	212	288	67	93	113
23 Oct	6.49	7.66	8.55	129	254	333	88	213	288	..	..	..
26 Oct	6.49	7.68	8.56	129	254	332	88	214	288	..	..	..
27 Oct	6.45	7.65	8.51	129	255	332	88	215	288	..	..	..
28 Oct	6.42	7.62	8.48	129	255	331	88	215	288	..	..	..
29 Oct	6.28	7.47	8.33	131	257	333	87	213	286	66	94	118
30 Oct	6.26	7.44	8.27	131	256	329	86	212	281	..	..	..

Sources: AFMA; Bloomberg; RBA; UBS AG, Australia Branch

ATTACHMENT 6 RBA's F3 Table – November 2009

F.3 Capital Market Yields and Spreads — Non-government Instruments

	Corporate bonds with 1 to 5 years maturity											
	Yields per cent per annum			Spreads over bonds issued by the Australian Government basis points			Spreads over swap rates basis points			5-year credit default swap spreads basis points		
	AA	A	BBB	AA	A	BBB	AA	A	BBB	AA	A	BBB
006 Jun	6.32	6.44	6.55	53	66	75	14	25	38	9	24	44
007 Jun	7.01	7.08	7.32	58	66	88	15	25	45	5	19	50
008 Jun	8.90	9.38	9.45	216	265	267	106	155	159	84	100	142
008/09												
Nov	5.88	7.14	7.90	240	362	446	166	286	371	138	260	418
Dec	5.87	7.24	7.53	279	415	449	211	347	383	161	312	535
Jan	5.40	6.83	7.13	270	409	443	211	352	389	138	280	414
Feb	5.52	7.12	8.09	248	406	503	207	365	463	189	303	398
Mar	6.21	8.07	8.93	301	485	574	261	443	534	159	342	475
Apr	6.03	7.90	8.63	282	463	538	240	420	494	114	263	409
May	5.90	7.92	8.48	224	421	478	200	396	452	90	165	198
Jun	5.95	8.24	8.33	174	397	407	154	373	384	92	170	194
009/10												
Jul	6.02	7.91	8.36	151	338	382	133	317	361	82	128	153
Aug	6.05	7.68	8.79	128	294	400	96	260	365	71	117	147
Sep	6.04	7.35	8.36	133	272	363	89	228	316	60	93	120
Oct	6.26	7.44	8.27	131	256	329	86	212	281	66	94	118
Nov	6.03	7.08	7.85	145	257	324	93	207	269	72	86	102
aily												
2 Nov	6.28	7.48	8.30	134	260	333	86	213	282	..	..	..
3 Nov	6.13	7.32	8.13	132	258	329	85	212	279	..	..	..
4 Nov	6.24	7.36	8.16	141	261	331	92	213	278	..	..	..
5 Nov	6.29	7.41	8.22	141	260	330	92	213	279	66	93	117
6 Nov	6.35	7.47	8.29	139	258	330	92	213	280	..	..	..
9 Nov	6.35	7.48	8.31	137	258	329	91	212	278	..	..	..
10 Nov	6.33	7.48	8.30	137	259	330	90	213	279	..	..	..
11 Nov	6.32	7.43	8.29	138	257	330	91	211	280	..	..	..
12 Nov	6.37	7.46	8.32	138	255	329	91	208	278	65	96	108
13 Nov	6.33	7.45	8.24	138	257	325	91	210	274	..	..	..
16 Nov	6.30	7.41	8.22	138	256	325	91	210	275	..	..	..
17 Nov	6.18	7.29	8.08	137	255	322	90	210	273	..	..	..
18 Nov	6.20	7.31	8.08	136	255	320	90	210	271	..	..	..
19 Nov	6.15	7.24	7.99	137	254	318	93	210	270	65	94	99
20 Nov	6.10	7.18	7.94	138	253	318	92	209	270	..	..	..
23 Nov	6.10	7.18	7.95	138	253	319	93	209	270	..	..	..
24 Nov	6.11	7.18	7.96	140	253	320	92	207	270	..	..	..
25 Nov	6.16	7.23	8.02	141	255	323	92	208	270	..	..	..
26 Nov	6.12	7.19	7.97	144	259	326	91	207	269	72	86	102
27 Nov	6.05	7.10	7.88	148	261	328	90	205	267	..	..	..
30 Nov	6.03	7.08	7.85	145	257	324	93	207	269	..	..	..

ources: AFMA; Bloomberg; RBA; UBS AG, Australia Branch

ATTACHMENT 7 Confidential report separately submitted