Testing the accuracy of Bloomberg vs CBASpectrum Fair Value Estimates

A report for Country Energy

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1. Introduction

1. Country Energy has asked CEG to provide a critique of the AER's proposed methodology for testing whether the CBASpectrum BBB+ fair value curve or the Bloomberg BBB fair value curve provides a better basis for arriving at an estimate of the yield on BBB+ bonds with 10 years to maturity. For short we describe this as the cost of debt.

2. In relation to the issue of the debt risk premium (DRP), the AER noted that, as part of other regulatory processes, arguments regarding the robustness of methods used by Bloomberg and CBASpectrum with respect to producing data for the DRP have previously been raised and considered by the AER and other regulators.

3. In the Draft Determination the AER acknowledged that the methodologies used by Bloomberg and CBASpectrum are not completely transparent to stakeholders and that this is a factor subject to current consideration by the AER, the Australian Competition and Consumer Commission and other regulators. The AER indicated that it is currently investigating a more satisfactory methodology for testing and setting the DRP in the future, but that this is a longer term goal and will not be developed in time for the determination to apply to Country Energy.

4. In the absence of an alternative methodology, the AER then undertakes a process of analysis to determine which of CBASpectrum and Bloomberg is the most accurate in predicting observed yields. The AER concludes that the use of CBASpectrum's BBB+ fair value curve provides the best available prediction of observed yields for the purposes of determining the yield on the benchmark BBB+ 10 year corporate bond with respect to Country Energy's averaging period.

5. Working within the parameters of the AER's approach to testing Bloomberg and CBASpectrum estimates, the purpose of this report is to set out the modifications to that approach that CEG considers would enhance the robustness of the AER's approach to the extent that it attempts to analyse which of Bloomberg and CBASpectrum estimates are a better source of fair value estimates.

6. Country Energy has also asked CEG to advise on the appropriate response of the AER should a new bout of financial turmoil, similar to that recently experienced during the Global Financial Crisis, impact on the period during which the cost of debt is to be measured

2. General criteria for estimating the cost of debt

7. In previous reports submitted to the AER, we have set out general criteria that a methodology should satisfy in order to be an accurate and reliable means for arriving at an estimate of the NER cost of debt.[1] These criteria are that the methodology should:

   i. result in an unbiased estimate of the NER cost of debt;

   ii. incorporate all relevant information and not rely on irrelevant information, such that the standard error of the estimate is low;

   iii. produce results that are consistent with accepted academic finance theory and empirical research;

   iv. produce results that are timely and responsive to changes in market conditions; and

   v. be transparent, including transparency about how and to what end discretion has been employed.

8. The first criteria states that the methodology should not, on average, be expected to arrive at an estimate that is higher/lower than the NER cost of debt. That is, the methodology should not be systematically biased.

9. The second criteria requires that the methodology be as accurate as possible. In order to be as accurate as possible the methodology must have regard to all potentially relevant information and must not have regard to irrelevant information.

10. To illustrate the distinction between the first and second criteria, imagine that one was interested in estimating the average weight of a ball-bearings coming off a production line. One methodology to do this might be to take a sample of ten ball bearings and measure the average weight. Another methodology might be to take a sample of 1,000. Both methodologies will be unbiased, however, the second methodology will take into account more information than the first.

[1] For example: Hird T, *Estimating the cost of 10 year BBB+ debt: A report for ETSA, Ergon and Energex*, June 2009, p 3.

11. The third and fourth criteria are largely subordinated to the first two, in that an unbiased methodology which takes into account all relevant information should produce results that are consistent with finance theory and market conditions.

12. The final criteria ensures that the methodology is transparent enough that it can be replicated to produce the same result, applying the same assumptions.

3. The AER methodology

13. The AER methodology as set out in its Draft Decision for Country Energy is as follows:

    i. Source yield estimates for a sample of BBB+ rated bonds that meet certain criteria;

    ii. Test the accuracy of the respective fair value curves in predicting the yields on those bonds with the most accurate fair value curve;

    iii. Choose the most accurate fair value curve as the basis for determining the *observed annualised Australian benchmark corporate bond rate for corporate bonds for bonds with a BBB+ credit rating and a maturity of 10 years.*

3.1. Sample selection

14. In its sample selection the AER applies the following criteria:

- exclude all bonds that are not rated BBB+ by Standard and Poor's during the relevant period;
- exclude all bonds that do not have yield estimates available from all three of UBS rate sheets, CBASpectrum and Bloomberg Generic (BGN) yields;
- exclude all floating rate bonds or other bonds that are not fixed coupon bonds;
- exclude all bonds that are not issued in Australia (even if the issuing company is Australian);
- exclude all bonds that are issued in Australia but are not issued by an Australian company; and
- exclude all bonds that the AER determines have yields that are not consistent with a BBB+ credit rating, ie, where the AER determines that the 'market perceived credit rating' for that bond is not BBB+.

15. All but the last two exclusions are self explanatory and do not involve the use of any further discretion by the AER. The last two exclusions are not fully described and as a consequence would appear to leave open a role for discretion in future decision making by the AER.

16. It is not obvious to us what it means to be an "Australian company". Telecom New Zealand, SingTel, BHP Billiton (BHPB) and Rio Tinto all have operations in Australia and are listed on the Australian stock exchange (as well as other stock exchanges internationally) but earn most or significant revenues outside Australia. It is not clear whether all or only some of these companies would constitute an Australian company as perceived by the AER.

17. The AER also excludes bonds where it considers there is strong evidence that the market perceived credit rating is not BBB+. In its draft decision the AER has relied in part on the use of a statistical test and in part on contextual information to exclude a bond issued by Babcock and Brown Infrastructure. It is the nature of such analysis that it will inevitably involve some use of discretion in interpretation of the relevant facts to decide whether a bond has a market perceived credit rating that differs from its actual credit rating.

3.2. Testing the accuracy of fair value curves

18. Having selected its core sample of BBB+ bonds the AER then tests which fair value curve is the closest fit to all of the data measured in terms of which fair value curve as the smallest sum of squared errors in predicting each bonds estimated yield. This involves:

- over the relevant sampling period, estimating the average difference between the estimated yield for a given bond and the fair value curve at the same maturity. This is the "error" in the fair values prediction of this yield;
- taking the square of this error;
- repeating the process for all bonds in the sample; then
- adding the sum of these squared errors together and dividing by the number of bonds.

19. The fair value curve that produces the smallest sum of squared errors is determined to have the best fit to the data. This process is repeated three times using individual bond yield estimates from UBS, CBASpectrum and Bloomberg (BGN yields).

20. If one fair value curve performs best in all tests the AER determines that fair value curve as the best fit to the data. To the best of our knowledge the AER methodology

has not specified what it would do in the event that the three tests did not all select the same fair value curve. We work on the assumption that:

- If one curve is selected in 2 out of 3 tests then that curve is selected as the best fit;
- If all three curves (Bloomberg, CBASpectrum and an average of the two) are selected under one of the three tests then the AER would select the average fair value curve as the best fit.

3.3. Determining the benchmark 10 year BBB+ yield

21. If the fair value curve selected as being most accurate is CBASpectrum (as it was in the Country Energy Draft Determination) then the AER adopts the CBASpectrum 10 year BBB+ fair value estimate as the NER cost of debt.

22. It is not clear what the AER would do in the event that the Bloomberg fair value curve (or an average) is selected as most accurate. This is because the longest dated BBB fair value estimate published by Bloomberg is 7 years. In the past the AER has used the 8 year BBB fair value curve and extended this to ten years by assuming the same shaped yield curve between 8 and 10 years for BBB fair value as Bloomberg was estimating for A fair value. However, since the middle of 2009 Bloomberg has ceased producing 8 year BBB and also 8 and 10 year A fair value curves.

23. The AER has remained silent in the Country Energy Draft Determination on how it would now determine a 10 year BBB+ fair value should its test select the Bloomberg fair value as the most accurate.

4. CEG analysis

24. It is important to preface this discussion with an acknowledgment that the task of attempting to test the relative accuracy of Bloomberg and CBASpectrum fair value curves is complex. It is unlikely that there is one single 'right' test that should be applied in all circumstances. Moreover, the AER's task is made harder by the relatively poor quality of the data available. Indeed, the fact that Bloomberg and CBASpectrum have (sometimes materially) different estimates of fair value is likely, at least in part, a reflection of the quality of the information available. With a sufficiently high quality of data all parties should come to conclusions within a very small margin of each other when attempting to answer the same question.

25. Indeed, with sufficiently high quality of the data the AER would not need to select between a fair value curve produced by someone else it could simply develop its own fair value curve. For example, if there were hundreds of BBB+ bonds on issue with maturity around 10 years and which were all regularly traded at prices that were made public and where these prices were all similar then it would be a relatively simple task to estimate the fair value yield of a BBB+ bond at 10 years.

26. Working within the parameters of the AER's approach to testing Bloomberg and CBASpectrum estimates, in the remainder of this section we set out modifications to the AER's approach that could be made to take account of additional relevant information and/or to otherwise improve the accuracy of the test carried out.

4.1. Appraisal of the AER test against the general criteria

27. In section 2 above, we put forward criteria that any methodology should satisfy. Specifically, we asserted that any methodology for arriving at an estimate of the NER cost of debt should :

    i. result in an unbiased estimate of the NER cost of debt;

    ii. incorporate all relevant information and not rely on irrelevant information – such that the standard error of the estimate is low.

    iii. produce results that are consistent with accepted academic finance theory and empirical research;

    iv. produce results that are timely and responsive to changes in market conditions; and

v. be transparent including transparency about how and to what end discretion has been employed.

28. In our view the AER's methodology for selecting the most accurate fair value curve will satisfy the first criteria so long as an unbiased sample of bonds is used by the AER and neither Bloomberg not CBASpectrum estimates are themselves systematically biased. [2]

29. It is our view that the third and fourth criteria will be met so long as there is no systematic bias (that is, criteria 1 is met) and all relevant information is incorporated by the AER (criteria 2 is met). With this in mind we now turn our attention to the second criteria.

30. In our view the AER methodology could be improved with respect to meeting the second criteria. Specifically, we consider that there will often be material information relevant to any estimate of 10 year BBB+ debt from sources that currently play no role in the AER methodology as outlined above. This includes information on:

    i. the estimated yields on fixed coupon BBB+ bonds that are covered by one or two of UBS, CBASpectrum or Bloomberg but not all three;

    ii. the estimated yields on BBB+ floating rate bonds (once swapped into an equivalent fixed rate yield);

    iii. the estimated yields on bonds that do not have a BBB+ rating (such as BBB or A-rated bonds); and

    iv. the estimated yields on bonds that are issued in Australia by foreign companies.

31. Information embodied in these yield estimates may be appropriately included in the AER's formal statistical test of the accuracy of the fair value curves. However, even if not included in the formal statistical test it may nonetheless be highly relevant to the estimate of the NER cost of debt. Failure to have regard to this information will increase the likelihood that the AER methodology will inaccurately determine the NER cost of debt.

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[2] The AER methodology will result in an unbiased estimate provided that: 1) neither the Bloomberg not CBASpectrum fair value estimates are systematically biased; and 2) the sample of individual BBB+ bonds selected by the AER are not themselves a biased subset of the wider population of possible BBB+ bonds. It is reasonable to assume that over a long time period the above conditions will be met on average and the AER's methodology will lead to an unbiased estimate (ie, will be as likely to overestimate as underestimate the NER cost of debt) are two possible caveats to this conclusion. The first relates to the fact that CBASpectrum and Bloomberg fair value yields are estimates of the yields on secondary trades of bonds not on new issues of bonds. As such, to the extent that new issues trade occur at a lower price than secondary trades a source of bias will exist (to the extent that the NER cost of debt is best interpreted as the cost of issuing new BBB+ debt). Second, to the extent that Bloomberg only assigns BGNs to a sample of bonds with relatively lower/higher yields than the average then this is a potential source of bias.

32. Additionally, we consider that the AER methodology could also be improved with respect to the final criteria around transparency. As noted in section 3 above, there is currently considerable discretion that is exercised as part of the AER's approach in the selection of sample bonds. The methodology could be improved by making the exercise of this discretion more transparent, particularly with respect to the exclusion of non-Australian bonds, and those with a different 'market perceived credit rating'.

4.2. Hypothetical example demonstrating the potential usefulness of additional data sources

33. Four variants of the same simple example can demonstrate why the AER should have regard to the sources of information numbered i) to iv) in paragraph 30 above.

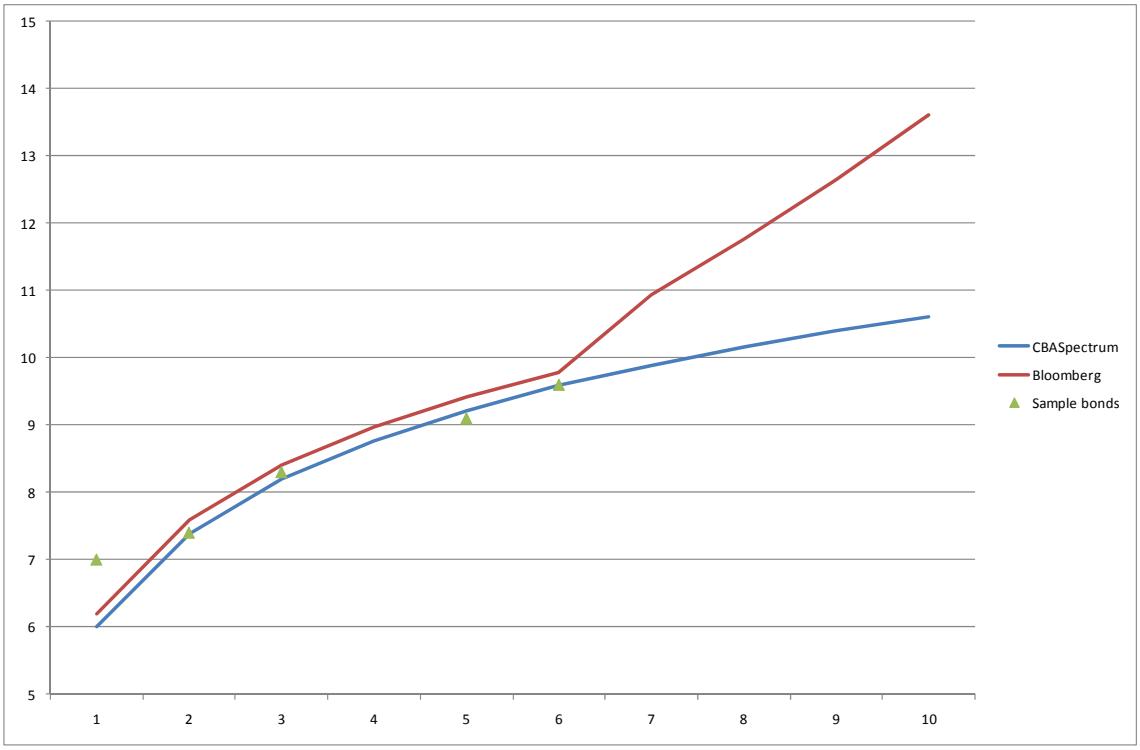
34. The AER methodology as applied in the Country Energy draft decision relied on only 5 bonds to test the accuracy of the Bloomberg and CBASpectrum fair value curves. The longest maturity bond had less than 6 years to maturity and the average maturity was 3.6 years. This means the test only measured the accuracy of the fair value curves between 0 and 6 years (and did so using only a relatively small number of bonds).

35. This means that the test has no power to test the accuracy of any divergences in the fair value curves that occur after 6 years maturity. This is an important factor because the NER cost of debt requires an estimate at 10 years maturity.

36. In order to make this example as clear and simple as possible imagine that both Bloomberg (however extended beyond 7 years) and CBASpectrum had near identical fair value curves between 0 and 6 years – with CBASpectrum being only slightly below Bloomberg. However, imagine that beyond 6 years Bloomberg yields rose steeply while CBASpectrum did not – such that at 10 years there was a 300 basis point difference between them.

37. This hypothetical example is illustrated in the below graph.

Figure 1: Hypothetical illustration of when curves depart beyond 6 years



38. As drawn, Bloomberg is better estimator (has a lower sum of squared errors) when tested against bonds between one and 6 years. However, this is primarily driven by the observation at 1 year (for the other four hypothetical bonds CBASpectrum is the better estimator).

39. However, the most important question is which of the curves is a better predictor beyond 6 years – specifically which is the better estimator at 10 years. In order to test this question we ideally need data points beyond 6 years (ie, close to 10 years). Having data points between 0 and 6 years is of limited value in this circumstance.

40. In this example (as drawn) the AER methodology would determine that Bloomberg is the most accurate fair value curve – with the effect that the NER cost of debt would be set 300bp higher than that estimated using CBASpectrum. Absent any other information this may, or may not, have been the right decision. It is simply not possible to comment on which is more accurate beyond 6 years without data from beyond 6 years.

41. However, imagine that the additional sources of information numbered i) to iv) in paragraph 30 would have shown there are a large number of bonds of close to 10 years maturity. Specifically:

v. BBB+ fixed coupon bonds that all have yield estimates from UBS and CBASpectrum (but not Bloomberg) and that all of these bonds have yields that are very close to CBASpectrum's 10 year BBB+ fair value estimate (ie, much lower than the Bloomberg fair value estimate); or

vi. BBB+ floating rate bonds that all have yield estimates that are very close to CBASpectrum's 10 year BBB+ fair value estimate; or

vii. BBB floating rate bonds that all have yield estimates that are very close to CBASpectrum's 10 year BBB+ fair value estimate; or

viii. BBB+ fixed coupon bonds that all have yield estimates that are very close to CBASpectrum's 10 year BBB+ fair value estimate.

42. In any one of these situations (or any combination of them) the additional information from the data sources listed above would be extremely useful in determining which curve was the most accurate beyond 6 years. These information sources would constitute the only information relevant to the task at hand – attempting to determine which fair value curve is more accurate at maturities above 6 years (ie, after the point at which they begin to diverge). In our view it would clearly be appropriate to have regard to these sources of information when attempting to estimate the NER cost of debt.

43. This is a hypothetical example designed to demonstrate when the additional sources of information would be relevant but also where consideration of these details would actually be more relevant to the information captured using the AER methodology. At any given time this may or may not be the case. However, the only way to determine whether this is the case is to actually analyse all of the relevant information.

44. We do provide a general discussion in Section 5 of what we believe is the likely effect having regard to this information if the AER methodology were applied at the time of writing.

4.3. Does the NER prevent one from having regard to data sources i to iv)

45. In explaining why it has not had regard to floating rate bonds and bonds of credit ratings other than BBB+ the AER makes the following observation in its ETSA draft decision.[3]

> *The approach taken by the AER is that the bonds utilised in the process of analysis:*

[3] Page 333.

- *reflects the requirements of the NER and the SORI to base the benchmark on a BBB+ credit rating*

- *is consistent with the benchmark nominal risk–free rate (CGS) which uses a fixed coupon.*

46. We agree with the AER that the NER cost of debt requires an estimate of the yield on a BBB+ bond that has a fixed coupon. However, the NER does not govern the means by which one must estimate the cost of debt for gas businesses.

47. In any event, we do not consider that the NER requires that the only source of information that can be used for this purpose is yields on fixed coupon BBB+ bonds.

48. In this regard we note that the cost of debt requires an estimate of the yield on a *10 year* BBB+ fixed coupon bond. This clearly does not mean that the only sources of information that can be used are estimated yields on 10 year maturity BBB+ fixed coupon bonds issued in Australia by Australian companies. This is for the simple reason that at any given point it time there will generally be no bonds on issue that fit these criteria.

49. In the absence of a large number of bonds with those exact characteristics it would seem to one is required to have regard to any information that is relevant to estimating the yield on a 10 year fixed coupon bond. This would include information on:

- BBB+ fixed coupon bonds with maturity of less than 6 years (ie, the AER sample);
- BBB+ floating rate bonds with a maturity closer to 10 years;
- BBB+ bonds issued in Australia by foreign companies; and
- bonds with ratings other than BBB+ (including in particular such bonds with maturities close to 10 years).

50. The NER does not necessarily require that such sources of information be given equal weight to each other. However, it would seem to us that the NER does require that some regard be given to these sources of information – with the weight given to that information determined in accordance with the circumstances. For example, if there is one fixed coupon BBB+ bond and its maturity is 2 years but there are 100 BBB+ floating rate bonds with a maturity of 10 years then the information from the floating rate bonds should obviously be given considerable weight in determining the benchmark 10-year BBB+ bond yield.

4.4. Relevance of data sources (i) to (iv)

51. In our view the AER should have regard to the alternative sources of data listed in paragraph 30 since they are all potentially relevant to the accuracy of the Bloomberg

and CBASpectrum curves at a maturity of 10 years. We consider that information from these bond yields should only be excluded if the yield estimates for these bonds are biased estimates of what we are interested in (the NER cost of debt) and if that bias cannot be reliably adjusted for.

52. In our opinion if whether a bond has a yield estimate from all UBS, Bloomberg and CBASpectrum (as opposed to from two or one of these sources) does not make it unreliable or biased as a relevant source of information. Such bonds should therefore be included in any test (provided that they pass a separate test for being an outlier as discussed below).

53. Similarly, it is not obvious to use that BBB+ bonds issued in Australian by foreign companies will have yields that can be expected to be biased relative to BBB+ bonds issued by Australian companies. As far as we are aware the criteria used by credit rating agencies to assign a bond a BBB+ credit rating do not depend on the nationality of the issuer. For this reason we note that we do not believe that it is an appropriate restriction on the available data to exclude yield estimates of bonds issued in Australia by foreign companies. Of course, a bond issued by a foreign company could still reasonably be excluded on the basis of an outlier test.

54. We also note that the definition of a foreign company is problematic in a globalised economy. As described earlier, SingTel and Telecom New Zealand both have operations in Australia and both are listed on the Australian stock exchange as well as foreign stock exchanges and both earn material revenues from Australian and foreign operations. Notably precisely the same statements would be true of BHP Billiton and Rio Tinto. We cannot envisage any simple or meaningful definition of an Australian company for the purposes of the AER's test. Moreover, for the reasons set out in the previous paragraph we do not consider that any such definition is required or useful.

55. It is, however, the case that bonds with credit ratings that differ from BBB+ can be expected to have biased yields relative to BBB+ bonds. That is, bonds rated higher than BBB+ can be expected to have yields that are lower than BBB+ bonds and *vice versa.* However, given that the nature of the bias is well understood it is still possible to have regard to these yields when attempting to estimate the NER cost of debt. Consistent with the above example, if we observe a large number of BBB rated bonds with 10 years to maturity that are not outliers and that all have a yield estimate lower than either CBASpectrum or Bloomberg's 10 year BBB+ estimates this is releant information to allow us to conclude that the lower of these BBB+ fair value estimates is more accurate at 10 years.

56. As a matter of theory we strongly find that the equivalent fixed rate on a floating rate bond should be an unbiased proxy for the fixed rate on an otherwise identical bond (ie,

identical issuer, maturity and security). This is a simply follows the laws of arbitrage.[4] Minor variations in yields may exist to the extent, for example, the coupon payment cycle is different for the bonds (eg, quarterly for a floating rate bond and semi-annually for a fixed rate bond).[5]

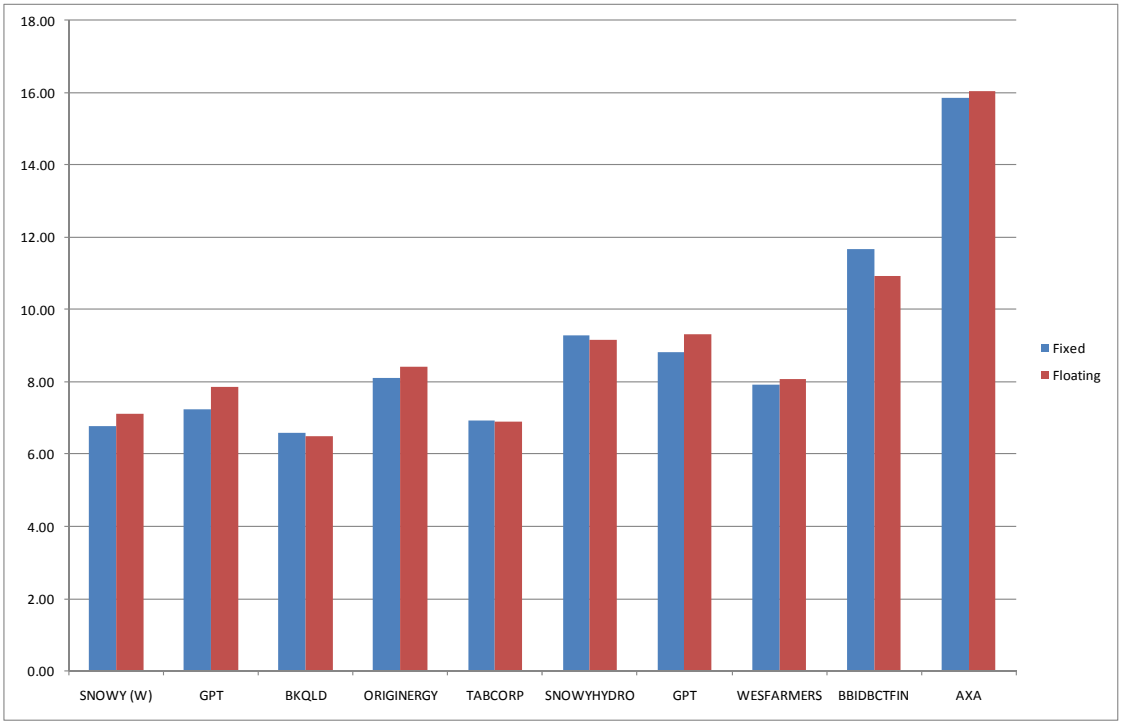
57. This is strongly borne out by the evidence from the UBS rate sheets over the period 27 October 2009 to 25 November 2009. The UBS rate sheets include ten companies who simultaneously issued floating rate and fixed coupon bonds with the same maturity and who which UBS assign a BBB+ rating in this period. As can be seen in the below graph, in each case the average yield on each fixed coupon bond was very similar to the average equivalent fixed yield[6] on its 'sister' floating rate bond.

[4] If an investor was faced with the option of buying otherwise identical fixed and floating rate bonds then they could buy the floating rate bond and enter into a swap arrangement (ie, sell the floating component of the bond in exchange for a fixed payment). At the end of this process they would have a fixed income stream equivalent to the fixed income stream from a fixed bond. If the yield on a fixed bond was any higher/lower than the equivalent fixed yield on the floating rate bond then investors would simply buy the fixed/floating bond in preference to the other until the yields equilibrated.

[5] However, this should only have a minor effect within the payment cycle period and should have no effect on the dates that the floating rate coupon is reset. Notably, there is no reason to presume that such timing issues would have a systematically biased affect on the relative yields.

[6] UBS rate sheets provide information on the prevailing swap rate to the maturity of the bond to enable the swap calculation to take place, namely by adding the estimated trading margin and the prevailing swap rate. This information is provided to enable precisely this calculation.

Figure 2: BBB+ floating rate vs fixed rate yields for otherwise near identical bonds



Source: UBS, CEG analysis

58. The fact that the yields are not identical may reflect different points in the payment cycle (as discussed above) or may reflect different analysts views (eg, a different UBS analyst covering the floating rate bond than the fixed rate bond) or even may simply reflect different dates at which each was last updated. However, there is no reason to believe that any of these factors systematically bias equivalent fixed rate yields on floating rate bonds below the yields on their sister fixed coupon bonds. This is consistent with the above figure which shows in four out of the ten cases the fixed bond had a higher estimated yield than the floating rate bond.

4.5. Excluding outliers

59. The AER methodology excludes outliers on the grounds that investors may perceive a bond as having a different level of risk than implied by its actual credit rating (a market perceived credit rating that differs from its actual credit rating). We agree with the AER that it is appropriate to identify potential outliers and to give them less weight (or zero weight) in any subsequent analysis.

60. Identifying an outlier bond is a difficult process at the best of times but is made particularly difficult in recent history – with the global financial crisis causing a wide

divergence between estimated bond yields for the same bond (eg, differences of opinion between UBS, Bloomberg BGN and CBASpectrum) and wide divergences between the yields on bonds with the same credit rating.

61. We make the following suggestions on how the AER might usefully amend its process for testing for outliers.

4.5.1. Testing for changes in relative spread to CGS rather than absolute yield

62. When considering whether there has been a structural break such that a bond has become an outlier it is more reliable to test for a change in the spread to CGS relative to that of other bonds rather than a change in the absolute yield on the bonds.

63. The yield on a bond is affected by both the level of risk free interest rates and the term structure of risk free interest rates. We may observe the yield on a long dated BBB+ bond rising relative to its past levels (or relative to the yield on short maturity BBB+ bonds) because of a change in the level of risk free interest rates (term structure of risk free interest rates). This may occur without any change in the bond's risk premia (or risk premia relative to other BBB+ bonds).

64. If we are interested in testing for structural breaks in the risk premia demanded by investors then we should use a measure of risk premia (eg, spread to CGS yield) rather than a measure of yield to test for that structural break.

65. Moreover, we know that risk premia change over time. Indeed, the risk premia on 10 year BBB+ debt (as measured by CBASpectrum and Bloomberg) has more than tripled from pre to post financial crisis. When assessing whether a bond is an outlier it is therefore:

- less relevant to ask whether the bond's risk premia has increased; and
- more relevant to ask whether the bond's risk premia has increased relative to the risk premia for other similar bonds.

66. In the Country Energy draft decision the AER clearly applies the correct (second) test when, in relation to Figure B.4, it discusses the movement in the BBI bond yield relative to that of other BBB+ rated bonds.

67. However, when the AER applies the Chow test for a structural break it does so in an absolute sense rather than in a relative sense. This makes it possible that the result of the Chow test may pick up a change in the level of yields/risk premia generally rather than a change in the level of the BBI risk premia relative to other risk premia.

68. Clearly it is the latter test which is relevant for analysing potential outlier's not the former test. The former test would find a structural break in most bond risk premia post financial crisis. Indeed, we find that all of the bonds in the AER sample have such a structural break in their absolute value of their risk premia. However, this does not mean that all BBB+ bonds are outliers. The relevant question is whether a specific BBB+ bond's risk premia increased relative to that of other BBB+ bonds such that it can be deemed an outlier.

4.5.2. Testing whether a structural break makes a bond an outlier

69. The Chow test applied to relative risk premia only tests whether there has been a structural break in a bonds relative risk premia. It does not test whether the structural break has made the bond an outlier. For example, a bond may have consistently had a risk premium that was 1% lower than the average for BBB+ bonds and then, following some event, may have consistently had a risk premium that was 1% higher than the average of other BBB+ bonds.

70. The Chow test might identify this as a structural break in the relative risk premium for this bond. However, this would not necessarily mean that the bond is an outlier. It simply means that there has been a structural break in its risk premium relative to that of other bonds.

71. In order to test whether the structural break has resulted in the bond becoming an outlier one must also test whether the risk premium for that bond has moved sufficiently far away from the risk premium on other bonds. In order to do this one must perform a statistical test that has regard to the difference between that bond's risk premium and the average of other bonds in the sample and also has regard to the variance in the sample.

72. CEG described three standard tests for outliers in our report on the cost of debt in relation to the AMI decision. [7]

- Chauvenet's test[8] defines a criterion based upon how far an observation diverges from the mean of the sample. The observation is determined to be an outlier if it lies outside a normally distributed confidence interval about the mean with a significance level of 1/(2n), where n is the number of observations in the sample. It should be noted that the nature of Chauvenet's test is that the smaller the sample size the larger the significance level applied – such that with small samples very low significance levels are used to identify potential outliers;

[7] Hird T, 'Estimating the cost of 10 year BBB+ debt during the period 17 November to 5 December 2008', p 57.

[8] Chauvenet, W. (1863) *A Manual of Spherical and Practical Astronomy:* Lippincott, Philadelphia.

- the "classic" outlier detection test[9] excludes those observations that lie further than two standard deviations from the mean. This is approximately equivalent, under the assumption that observations are drawn from a normal distribution, to excluding those observations where the null hypothesis that they are drawn from the same population can be rejected at a particular level of significance using a two-tailed test;

- the "box plot" test[10] excludes observations that:

  - exceed the 75th percentile by 1.5 multiples of the interquartile range; and

  - lie below the 25th percentile by 1.5 multiples of the interquartile range.

73. A method such as one of the above provides an appropriate statistical method for identifying whether a structural break in relative risk premia has led to a bond becoming an outlier.

4.5.3. Application to BBI

74. We have applied each of the above three tests during the Draft Determination averaging period (23 September to the 13 October 2009). We find that testing the risk premia on the BBI bond and the 5 bonds in the in the AER final sample yields the following results:

- the BBI bond is identified as an outlier by all of the tests. This is true where the significance level in the "classic" test is set at 6% or more, meaning that BBI will be identified as an outlier if we define this to be a bond that has a risk premium that is within the most extreme 6% of the distribution (the 6% of observations furthest from the mean);
- none of the other bonds are identified as outliers using any of the tests. The first bond (other than BBI) that the "classic" test would identify as an outlier is the Coles Myer bond at a 49% significance level. That is the Coles Myer bond would only be treated as an outlier if we defined this to be the 49% of observations furthest from the mean;

75. When we re-apply each of the above three tests to the risk premia on the BBI bond during the period 27 October to 25 November we find that:

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[9] See, for example, Rand R. Wilcox, Basic Statistics: Understanding Conventional Methods and Modern Insights Wilcox Oxford University Press page 23

[10] Ibid, page 24

- the BBI bond risk premia would no longer be identified as an outlier by the "box plot" test . It would be identified as an outlier by Chauvenet's test. The BBI risk premia would only be identified as an outlier by the "classic" test at a significance level of 9% or less.
- none of the other bonds are identified as outliers using any of the tests (the first other bond the "classic" test would identify as an outlier is the Coles Myer bond at a 38% significance level).

76. If we extend our sample to include all BBB+ fixed coupon bonds that UBS has yield estimates (see list in Table 2 below) then:

- during the draft decision averaging period, the BBI bond risk premia would continue to be identified as an outlier by the "box plot" test and Chauvenet's test. It would be identified as an outlier by the "classic" test at a significance level of 3% and less.
- During the period 27 October to 25 November, the BBI bond risk premia would not be identified as an outlier by the "box plot" test nor Chauvenet's test. It would only be identified as an outlier by the "classic" test at a significance level of 41% or less (and the Tabcorp bond would be identified as an outlier before the BBI bond would be).

77. The above results in relation to BBI are summarised in the below table.

Table 1: Summary of results testing for whether BBBI is an outlier

Sample	Test	23 September to 13 October	27 October to 25 November
Draft Decision (6 bonds)	Chauvenet's test	Outlier	Outlier
	Box plot	Outlier	Not an outlier
	Classic	Outlier at 6% significance	An outlier at 9% significance
All fixed rate BBB+ bonds covered by UBS (16 bonds)	Chauvenet's test	Outlier	Not an outlier
	Box plot	Outlier	Not an outlier
	Classic	Outlier at 3% significance	An outlier at 41% significance

Source: UBS, CEG analysis

78. This suggests that, based on more recent data, the AER may wish to reconsider whether the BBI bond should continue to be identified as an outlier. It is likewise worth noting that the Tabcorp bond would potentially be identified as an outlier (on the low side) before the BBI bond would be if the full sample of BBB+ bonds from UBS were used.

5. Current interpretation of additional sources of data

79. It will be appropriate to have regard to information contained in yields for bonds listed in paragraph 30 above. These are relevant sources of information and we consider that regard should be had to them in all circumstances.

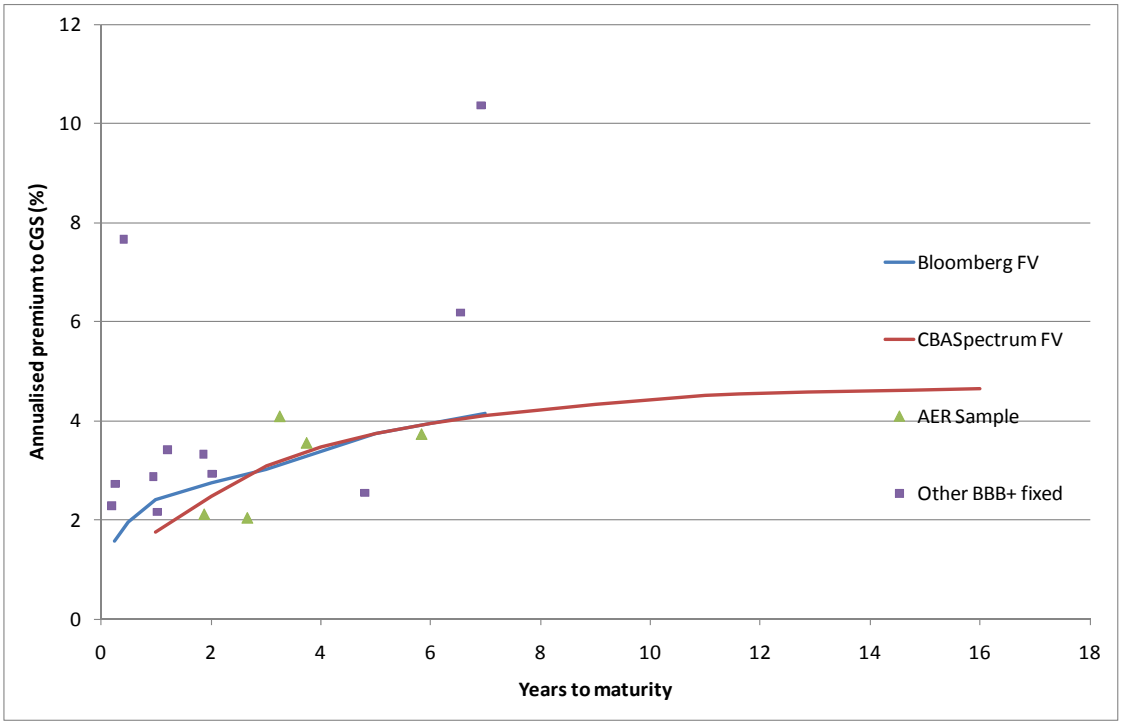
80. This does not mean that these sources of information will always be of critical importance when determining the NER cost of debt. However, in some circumstances these sources of information will be *more* valuable than the yields on the fixed rate bonds used in the Country Energy draft decision. A hypothetical example has been used above to illustrate how this might be true. In order to ascertain the relevance of this data the data itself must be analysed – one cannot conclude it is of no relevance without first inspecting it.

81. This section provides a high level analysis of what impact having regard to the additional sources of information (numbered i) to iv) in paragraph 30) would be likely to have were the AER methodology to be reapplied at the time of writing.

5.1. Additional BBB+ fixed rate bonds

82. The figure below graphically describes the yield estimates available for BBB+ fixed coupon bonds from the UBS rate sheets (averaged over the period 27 October 2009 to 25 November 2009). These bonds and yields are listed in Table 2 below. Of these bonds the 5 that were in the AER draft decision sample are marked as green triangles and the additional data points are marked as purple squares. Also shown is the position of the CBASpectrum and Bloomberg fair value curves over that period.

Figure 3: BBB+ fixed coupon bonds not in all 3 databases



Source: UBS, CEG analysis

83. From this graph three important observations can be made. The first is that all but one (two) of the additional bonds has a yield that is above the CBASpectrum (Bloomberg) fair value curve.

84. The second is that without the additional data points it is clear simply from a visual inspection that CBASpectrum would be found to be most accurate (have the least sum of squared errors). However, with the additional data points Bloomberg would be found to be most accurate. Thus, including the additional data points would change the outcome of the test (this is true even if only the additional bonds with relatively low risk premia were included).

85. The third is that it is not at all obvious that including this data will improve the selection of the fair value curve that is the best estimate of the NER cost of BBB+ debt at 10 years maturity. The fact that Bloomberg, with its more concave earlier shape, better describes BBB+ bond yields at less than 2 years to maturity is not a guarantee that it better describes the cost of BBB+ debt at 10 years. To be able to assess this question we really need data that tells us something about the likely cost of BBB+ debt at 10 years.

Table 2: Fixed rate BBB+ bonds – full set

Issuer	Maturity
DB RREEF	4-Feb-10
SNOWY (W)	25-Feb-10
CHALLTREAS	23-Apr-10
GPT	7-Nov-10
BKQLD	2-Dec-10
DB RREEF	8-Feb-11
ORIGINERGY	6-Oct-11
TABCORP	13-Oct-11
AMEX	5-Dec-11
COLESMYER	25-Jul-12
SNOWYHYDRO	25-Feb-13
WESFARMERS	11-Sep-14
GPT	22-Aug-13
SANTOS	23-Sep-15
BBIDBCTFIN	9-Jun-16
AXA	26-Oct-16

Source: UBS rate sheets

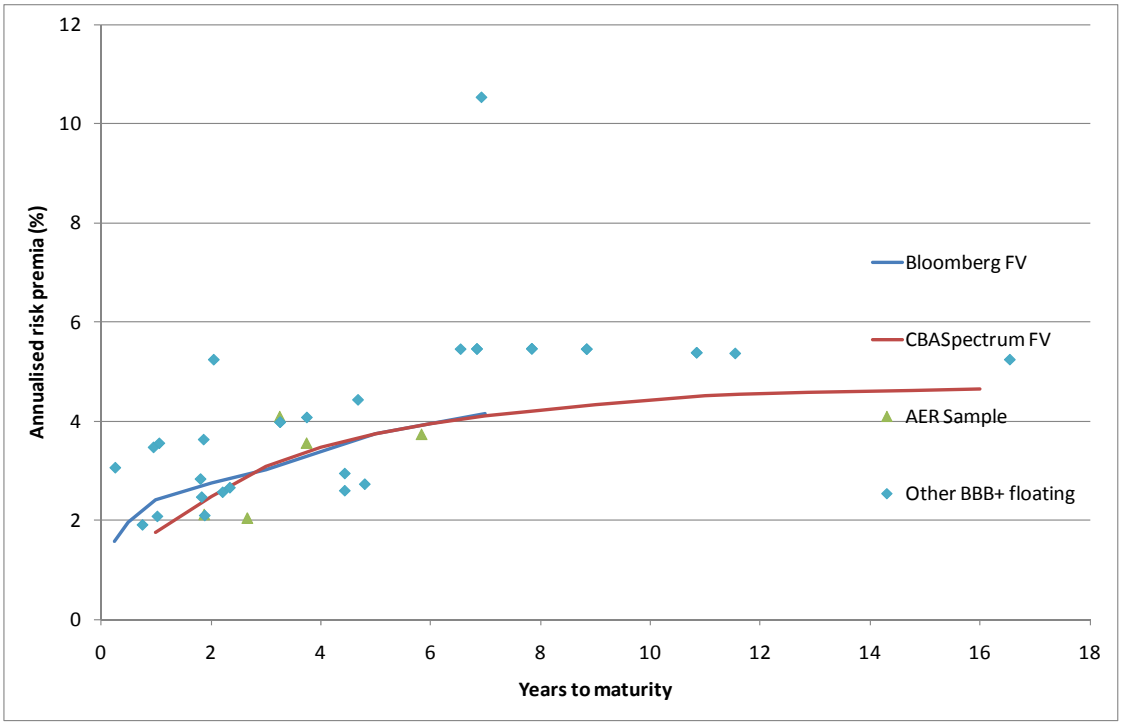
86. It can be seen that relaxing the requirement that a bond have a yield estimate from all three sources more than doubles the number of fixed rate BBB+ bonds in the UBS sample.

5.2. Additional BBB+ floating rate bonds

87. Figure 4 below graphically represents the yield estimates available for BBB+ floating rate bonds (swapped into equivalent fixed rate bonds).[11] These data points are marked as blue diamonds. The data on trading margin and swap rate are taken from the UBS rate sheets (averaged over the period 27 October 2009 to 25 November 2009). In addition we continue to show the 5 bonds that were in the AER draft decision (marked as green triangles). Also shown is the position of the CBASpectrum and Bloomberg fair value curves over that period.

[11] Using the method described in previous reports to the AER by CEG, including in response to the AMI draft decision. CEG, September 2009, *Estimating the cost of 10 year BBB+ debt during the period 17 November to 5 December 2008.*

Figure 4: BBB+ Floating rate bonds (swapped into equivalent fixed rate yields)



Source: UBS, CEG analysis

88. The most important observation from this chart is that introducing floating rate bonds dramatically increases the number of available observations. This is true at the short maturity range but, more importantly, is true at the long maturity range. At the long maturity range the available estimates of equivalent fixed yields on floating rate bonds are materially higher than the fair value estimates of CBASpectrum and of Bloomberg (to the extent that Bloomberg has fair value estimates in this range).

89. It follows that if weight were given to these observations of long dated BBB+ floating rate bonds then one would be more likely to conclude that the highest fair value curve in the vicinity of the 10 year fair value curve was the best estimate (at the current time).

90. However, such a conclusion relies on:

    a. finding that some or all of these bonds are not outliers; and

    b. finding that the equivalent fixed yield on a floating rate bond is a reliable indicator of the yield that would exist on a fixed rate bond with the same rating and issued by the same company.

91. We have not investigated the first question as this is a 'point in time' question and of little relevance to any future application of the methodology. At the relevant time it would be appropriate to use the techniques outlined in section 4.5 above. However, we do note that the long dated observations all belong to bonds issued by BBI, AXA and Reliance. As noted above, there is evidence of at least one of these issuers (BBI) being treated as an outlier in the past.

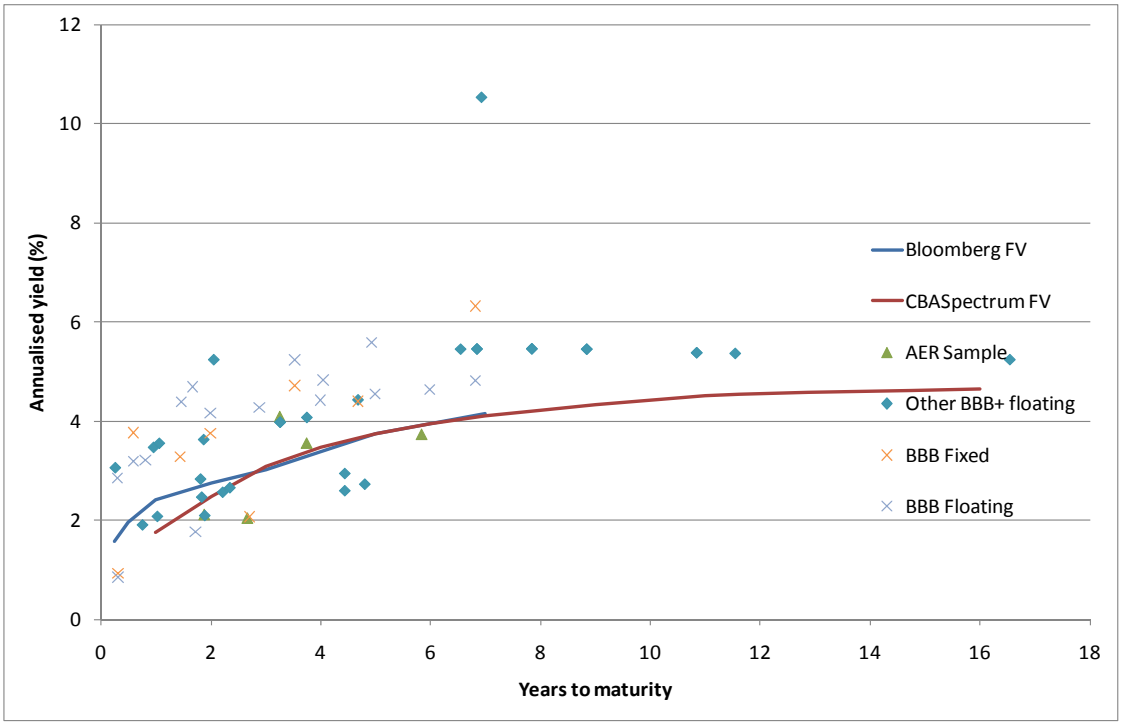
92. We have investigated the second question. As a matter of theory we strongly find that the equivalent fixed rate on a floating rate bond should be a near perfect proxy for the fixed rate on an otherwise near identical bond (ie, identical issuer, maturity and security). The reasons for this are discussed above starting at paragraph 56.

93. Another important observation from Figure 4 above relates to the extrapolation of the Bloomberg fair value curve, should this be necessary (ie if the AER determines that the Bloomberg fair value curve is more accurate than CBASpectrum). In deciding how best to extrapolate the Bloomberg fair value curve out to ten years, the existence of BBB+ bonds in the range 8 to 12 years could relevantly be used to inform such an extrapolation.

5.3. Additional bonds with ratings other than BBB+

94. The below figure graphically describes the yield estimates available for BBB fixed, and BBB and BBB+ floating rate bonds (swapped into equivalent fixed rate bonds). The data is taken from the UBS rate sheets (averaged over the period 27 October 2009 to 25 November 2009). In addition we continue to show the 5 bonds that were in the AER draft decision (marked as green triangles). Also shown is the position of the CBASpectrum and Bloomberg fair value curves over that period.

Figure 5: BBB fixed and floating and BBB+ floating rate bonds

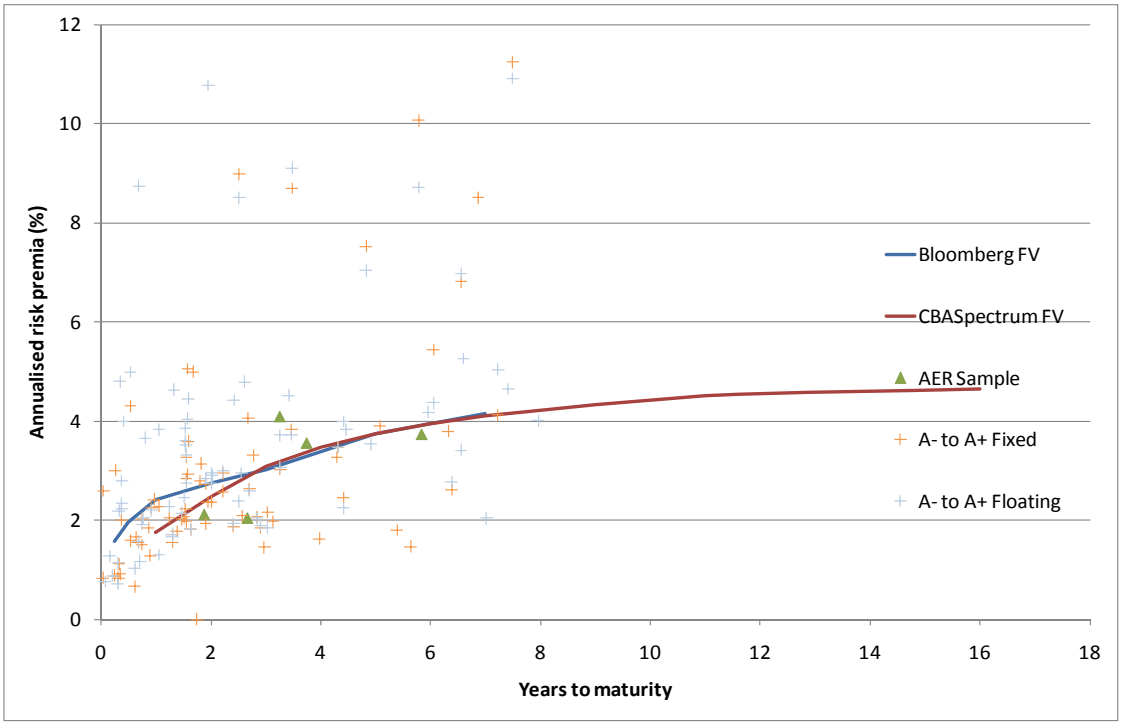


Source: UBS, CEG analysis

95. The most obvious observation from this dataset is that risk premia on BBB rated bonds (fixed and floating) are fairly typically distributed above the (two candidates for) BBB+ fair value curves. (Had they been below this, there may have been cause to believe that the candidates for BBB+ fair value curves were too high.) A further observation is that the estimated risk premia on the long dated (beyond 7 years) BBB+ floating rate bonds are higher than for all but two of the BBB bonds. Opn its own this fact would lead one to question whether these yields are representative of BBB+ bonds (given that BBB+ bonds should have lower yields than BBB bonds). However, given that the BBB+ bonds have a longer maturity and risk premiums appear to be rising with maturity this result is not necessarily unexpected.

96. The below figure graphically describes the yield estimates available for A- fixed, and BBB and BBB+ floating rate bonds (swapped into equivalent fixed rate bonds). The data is taken from the UBS rate sheets (averaged over the period 27 October 2009 to 25 November 2009). In addition we continue to show the 5 bonds that were in the AER draft decision (marked as green triangles). Also shown is the position of the CBASpectrum and Bloomberg fair value curves over that period.

Figure 6: A- to A+ fixed and floating rate bonds



Source, UBS and CEG analysis.

97. The most important observation to come from having regard to A- to A+ rated bonds is that bond yields in this category have a very large range – extending below and above the range for BBB and BBB+ bonds described above. Relevantly, if none of these observations were treated as outliers then including A- to A+ bonds in the AER's test would tend to make it more likely to select the higher fair value curve. This is unusual because one would expect that including higher rated bonds would have the opposite effect.

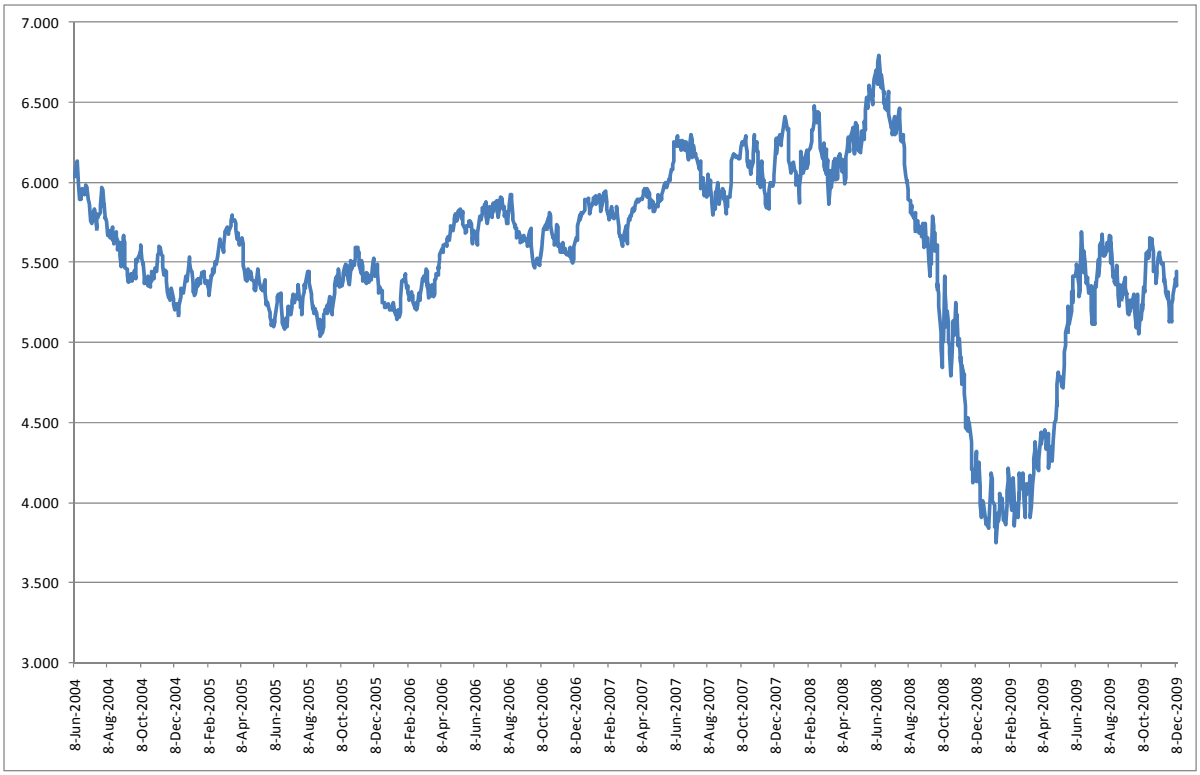
98. The clearest conclusion that is relevant to the selection of a BBB+ fair value curves is that there is a great deal of variation in bond valuations generally and specifically in the rating category A- to A+. This uncertainty is relevant to any assessment of whether a bond with an unusually low/high yield is an outlier or simply reflects the general level of variance across bonds in that rating category.

6. Accounting for atypical market events during the averaging period

99. We are informed that the AER has set an averaging period for both the risk free rate and the cost of debt at a time close to the final decision being made.

100. Recent experience during the financial crisis has demonstrated how shocks to the world financial system can lead to a flight to safety/liquidity by investors. The result of this flight to safety/liquidity has been dramatic falls in the yields on safe Government issued bonds. This effect is demonstrated in the below Figure which describes how the yield on the Commonwealth Government Security (CGS) maturing on the 15 February 2017 behaved over the course of the financial crisis of late 2008 and early 2009.

Figure 7: Behaviour of nominal CGS over the global financial crisis



Source: RBA and CEG analysis

101. As can be seen, yields on CGS reached unprecedented lows during the global financial crisis then returned to more normal levels (although slightly subdued relative to history – perhaps reflecting lower inflation expectations following the crisis).

102. During such periods it is well accepted that, notwithstanding the fall in the yield on government debt, the cost of equity tends to rise. It is precisely the higher required return on risky corporate assets during a crisis that creates the flight to the safety of government bonds. That is, the fall in CGS yields is 'the other side of the coin' to an increased cost of corporate equity and corporate debt during economic crises.

103. This relationship was explored in a number of reports to the AER in the context of the recent NSW electricity determination and the WACC review under the NER.[12] The AER accepted such a view when it increased the estimated market risk premium associated with corporate equity from 6.0% to 6.5% in the wake of the global financial crisis. We are unaware of any expert or any financial model that would predict the cost of equity falls by the same amount as the yield on government bonds during a global financial crisis.

104. In our view there is no well accepted financial model that would predict that during such crises the cost of equity falls at the same rate as the yield on government bonds. In fact, there is more support for the conclusion that the cost of equity rises in such periods.[13] We note that this is not a prediction of the capital asset pricing model (CAPM). The CAPM expresses the cost of equity as the sum of the risk free rate and a risk premium. However, it is well documented that these two variables move in opposite directions during a financial crisis.

105. For these reasons we recommend that should the Country Energy averaging period be affected by significant dislocation in financial markets then either:

- the averaging period should be shifted back in time prior to such dislocation being evident; or
- the MRP used to calculate the cost of equity should be recalibrated based on forward looking conditions in markets at that time (for example using a DGM model such as that used set out in our previous report for Country Energy)[14].

106. Of course, the exact identification of when a period of dislocation may have started will not necessarily be simple. The global financial crisis is often cited to have been triggered by the collapse of Lehman Brothers investment bank in September 2008 but this was not the first sign of dislocation in financial markets. There are different possible means by which the beginning of such a period could be identified:

- A single event such as the events of September 11 2001 where the ACCC altered its averaging period to end prior to that date;
- A significant fall in the yield on long term nominal CGS. For example, a fall of more than 10% in yields over a single 30 day period; and/or
- A significant fall in equity markets over a short period. For example, a 15% to 20% fall in the level of the ASX200 over a 30 day period

[12] See, submissions by the JIA, including reports from CEG, available at http://www.aer.gov.au/content/index.phtml/itemId/722190.

[13] See section 4.4 of: CEG, *A reasonable averaging period when setting the NER WACC parameters,* January 2009.

[14] CEG, *The market risk* premium and relative risk for Country Energy: A report for Country Energy, June 2009.

107. It is quite likely that a period of dislocation in financial markets could be identified having regard to all three of these identifiers.

Appendix A. Extension of hypothetical example

108. This appendix elaborates on the usefulness of including sources of information in addition to these currently considered in the AER methodology. In doing so we use a variant of the simplified example discussed in the body of this report.

A.1. Observed yields on bonds with floating rates and ratings other than BBB+

109. The primary purpose of the analysis is to develop an estimate of the NER 10 year BBB+ cost of debt. There are two characteristics that are specified in the NER these are:

- Maturity (ie, 10 years); and
- Credit rating (ie, BBB+).

110. The current test only uses data on Australian fixed coupon BBB+ bonds. As a result of this (and the AER's exclusion of the BBI bond as an outlier) only 5 bonds are included in the AER sample. The longest maturity bond had less than 6 years to maturity and the average maturity was 3.6 years. This means that what has been tested is the accuracy of the fair value curves between 0 and 6 years using a relatively small number of bonds.

111. It is possible that the most accurate fair value curve between 0 and 6 years is also the most accurate fair value curve at 10 years. However, this need not be the case.

112. A simple example can illustrate this point. Imagine that both Bloomberg (however extended beyond 7 years) and CBASpectrum had near identical fair value curves between 0 and 6 years – with CBASpectrum being only slightly below Bloomberg. However, imagine that beyond 6 years CBASpectrum yields rose steeply while Bloomberg did not – such that at 10 years there was a 200 basis point difference between them.

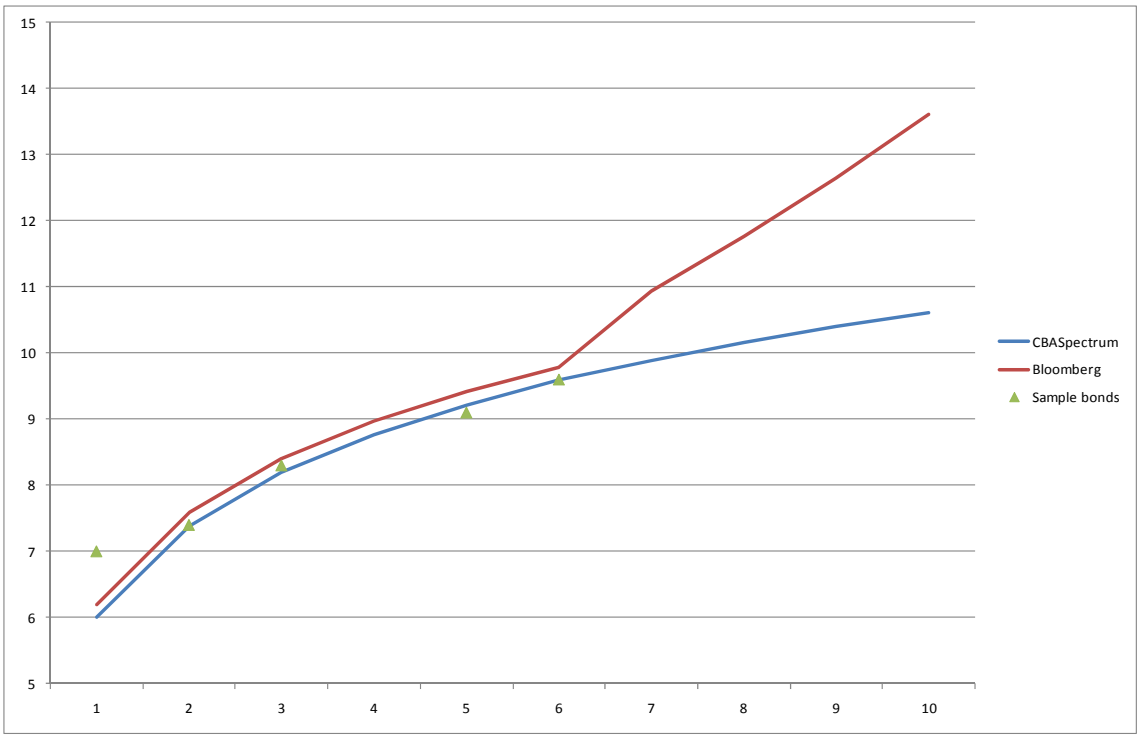
113. Any test based on bonds with maturities of less than 6 years will find the two curves to be very close to equally good (ie, each curve will have a very similar sum of squared errors). This is because the curves are near identical between 0 and 6 years. However, the selection of one curve over the other will have a dramatic impact on the estimated NER cost of debt at 10 years maturity.

114. The problem is that between 6 and 10 years the fair value curves can move in any manner (even wildly erratic manners) and this will have no impact on the test because

there is not bond yield data between 6 and 10 years that satisfies the criteria adopted by the AER for selecting its sample.

115. This hypothetical example is illustrated in the below graph.

Figure 8: Hypothetical illustration of when curves depart beyond 6 years



Source, CEG analysis. All numbers underlying the above graph are hypothetical

116. As drawn, Bloomberg is better estimator (has a lower sum of squared errors) when tested against bonds between one and 6 years. However, this is primarily driven by the observation at 1 year (for the other four hypothetical bonds CBASpectrum is the better estimator).

117. However, the most important question is which of the curves is a better predictor beyond 6 years – specifically which is the better estimator at 10 years. In order to test this question we ideally need data points beyond 6 years (ie, close to 10 years). Having data points between 0 and 6 years is of limited value in this circumstance.

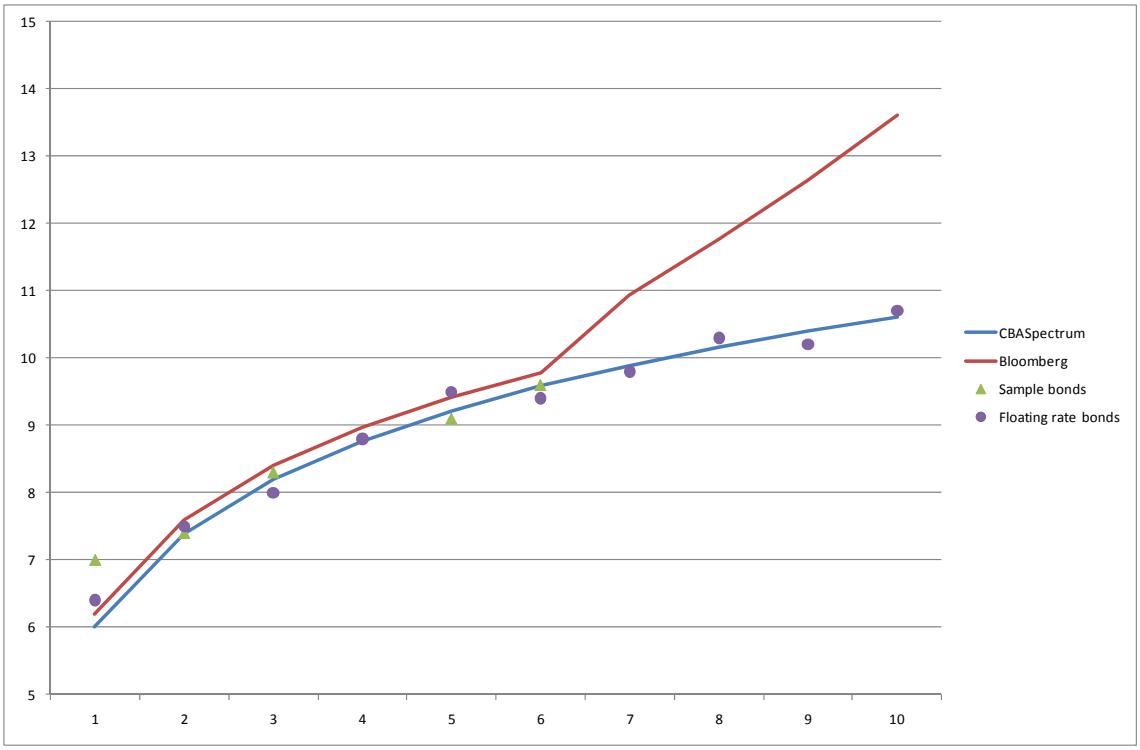
118. If there are no fixed rate BBB+ bonds (that are not outliers) with maturity of greater than 6 years then it will be valuable to seek relevant information from alternative sources. The two obvious sources of relevant information are yields on bonds with

maturities of more than 6 years and a similar credit rating to BBB+ (eg, BBB or A-rated bonds) or the implied fixed coupon yield on a BBB+ floating rate bond.

A.2. Including floating rate bonds

119. For example, imagine that there were 10 BBB+ rated floating rate notes that met the remainder of the AER's sample selection criteria (eg, not outliers and issued by Australian companies in Australia). Now also imagine that when plotted on the above graph they looked as follows.

Figure 9: Hypothetical Including BBB+ FRN's in the sample



Source, CEG analysis. All numbers underlying the above graph are hypothetical

120. In the hypothetical example described above it appears to us that it would be extremely valuable to have regard to the implied fixed yield on floating rate bonds when testing the accuracy of the fair value curves. The implied fixed yield on the floating rate bonds is consistent with the yield on fixed coupon bonds for maturities of less than 6 years. However, they have the advantage of providing a data source beyond 6 years.

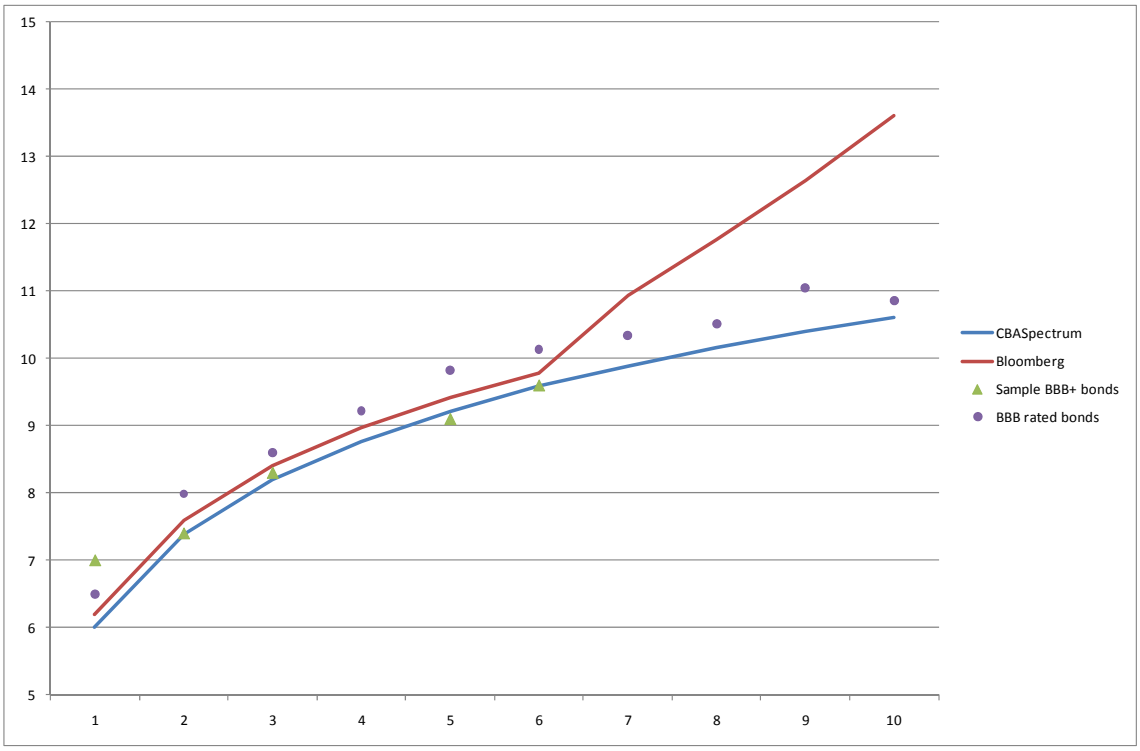
121. In this hypothetical example, the floating rate bond data provides a direct way of testing the accuracy of the curves beyond 6 years. This is valuable because it is in

this maturity range that the NER requires an estimate to be made (which is generally true) and because, in this example, it is beyond 6 years when the material divergences between the curves begin.

A.3. Including bonds with credit ratings other than BBB+

122. Continuing with the same hypothetical example, imagine that there were no yields on floating rate notes available but that there were ten bonds with a credit rating of BBB that met the remainder of the AER's sample selection criteria (eg, not outliers and issued by Australian companies in Australia). Now also imagine that when plotted on the graph in Figure 8 they looked as follows.

Figure 10: Including BBB rated fixed coupon bonds



Source, CEG analysis. All numbers underlying the above graph are hypothetical

123. Once again, the information embodied in the BBB rated bonds is very valuable in distinguishing between the Bloomberg and CBASpectrum fair value yields in this hypothetical example. As illustrated, at maturities of less than 6 years the BBB bonds yields are everywhere above the estimated BBB+ fair value curves. This is to be expected as BBB bonds should, other things equal, trade at a higher yield to the relatively lower risk BBB+ bonds.

124. However, beyond 6 years the observations for BBB bonds remain above the CBASpectrum BBB+ fair value estimate (as would be expected) but are below the Bloomberg fair value curve. Given that the BBB+ fair value curve should be below the yields on (most) BBB rated bonds then this is relevant evidence in favour of selecting the CBASpectrum fair value curve as the most accurate in this hypothetical example.

125. We note that both Bloomberg and CBASpectrum already use the yield on bonds other than BBB+ to derive their fair value curves. Bloomberg uses the yield on bonds rated BBB- to BBB+ to derive its BBB fair value curve. Both Bloomberg and CBASpectrum ensure that their fair value curves never cross – which means that fair value curves are not determined independently of the observed yields on differently rated bonds. We also note that AER has in the past used the A rated yield curve to determine the shape of the BBB yield curve. These are all examples of using the information embodied in bond yields from one credit rating to determine the fair value of bond yields with a different credit rating.

A.4. Minimising exclusions of fixed rate BBB+ bonds

126. An important reason why the Country Energy draft decision sample size is so small is that the AER excludes any bond that does not have a yield estimate available from all of the following three sources:

- UBS rate sheets;
- CBASpectrum; and
- Bloomberg BGN estimates.

127. Thus, if a bond has an estimated yield available from UBS and CBASpectrum but not from Bloomberg BGN it is excluded from the sample. The effect of this is that the information embodied in the UBS and CBASpectrum yield estimates is also discarded. It is worth noting that Bloomberg BGN has the lowest level of coverage out of the three data sources. Thus, the primary effect of the criteria that bonds be covered by all sources is to exclude bonds that do not have a Bloomberg BGN. Bloomberg reports estimated yields from its contributors for a much larger range of bonds than it reports BGN yields. It is unclear the basis on which Bloomberg chooses to determine a BGN yield for a given bond or how that BGN yield is determined from its contributors.

128. In order for the current '3 sources of yield estimates' criteria to be justified there must be a strong reason to believe that bonds that have BGN yield estimates are more relevant to an assessment the NER cost of debt than bonds that have yield estimates available from only one or both of UBS and CBASpectrum. We note that the AER methodology already has a separate process for identifying and excluding outliers. We also note that this process has excluded an outlier that did have yield estimates from each of the 3 sources (ie, BBI). Thus, failure to have representation from all three sources is presumably not intended as a filter to exclude outliers.

129. We also note that the fact that the basis on which Bloomberg selects bonds to be assigned BGNs nor how it arrives at those BGN yields is unknown to us. This suggests that to use the existence or otherwise of a BGN yield should not form a basis for whether yield estimates on a particular bond are relevant.

130. If we include all BBB+ fixed rate bonds that have a yield estimate available from one of the three sources currently used by the AER, then the sample of available bonds increases significantly (although not at the long maturity end). This is demonstrated in the table below in relation to the Country Energy draft decision averaging period where the AER's six bonds (including BBI) are shaded and a further 10 BBB+ bonds are available.

Table 3: Yields on all fixed rate BBB+ bonds

Issuer	Maturity
DB RREEF	4-Feb-10
SNOWY (W)	25-Feb-10
CHALLTREAS	23-Apr-10
GPT	7-Nov-10
BKQLD	2-Dec-10
DB RREEF	8-Feb-11
ORIGINERGY	6-Oct-11
TABCORP	13-Oct-11
AMEX	5-Dec-11
COLESMYER	25-Jul-12
SNOWYHYDRO	25-Feb-13
WESFARMERS	11-Sep-14
GPT	22-Aug-13
SANTOS	23-Sep-15
BBIDBCTFIN	9-Jun-16
AXA	26-Oct-16

Source: UBS rate sheets, CEG analysis

131. It can be seen that relaxing the requirement that a bond have a yield estimate from all three sources more than doubles the number of fixed rate BBB+ bonds in the UBS sample.

132. Currently the AER performs its test three times (one for each data source). This means that including bonds with yields from one source but not another will make the samples of bonds different in each test. We would not consider this problematic. We also note that it is not obvious why performing three tests with three different sets of data is better than rather than simply taking an average of the data from all sources and performing a single test. For example, if a bond had yield estimates for UBS and

Bloomberg but not CBASpectrum (as is the case with the Origin bond above) then it would nonetheless be included in the test at a value equal to the average of the Bloomberg and UBS yields.

A.5. Bonds issued by Australian companies overseas

133. Another source of potential information is the yield on bonds issued by Australian companies denominated in overseas currencies. The yields on these bonds are slightly more problematic to convert into equivalent domestic yields because an adjustment must be made for expected movements in exchange rates. However, there are derivative markets that can be used to determine the AUD interest rate an issuer would incur if they issued debt overseas and then hedged exchange rate risks over the life of the bond.

134. In periods when new issuance into the Australian market is non-existent and the only bonds issued by Australian firms are into foreign markets, then it would appear appropriate to give the cost of issuing debt in this fashion at least some weight in determining the Australian benchmark rate under the NER.

A.6. Bonds issued by foreign companies into Australia

135. The Country Energy draft decision determines that bonds issued by foreign companies into Australia should not be included in any assessment of the Australian BBB+ 10 year cost of debt.

136. In a modern globalised economy it is difficult to conceive of a meaningful 'bright line' between an 'Australian company' and a 'foreign company'. For example, American Express has recently issued BBB+ debt in Australia. American Express has Australian operations (serves Australian customers and earns income in Australian dollars) which is likely a factor in it choosing to issue debt in Australia (just as the fact BHPB and Rio Tinto earn most of their income in US dollars is likely a factor in why they issue hardly any Australian dollar denominated debt).

137. However, let us assume that we can distinguish between 'Australian' and 'foreign' companies in a meaningful way. Also, let us assume that BHPB is an 'Australian company' and that Anglo American (a diversified mining company of similar size to BHPB with operations in Australia and overseas) is 'not Australian'. Now imagine that both BHPB and Anglo American issued BBB+ rated debt in Australia. There is no obvious reason for assuming that the yield investors would demand on that debt would be higher or lower for the foreign firm. That is, the yield on Anglo American debt would likely be an unbiased estimator of the yield on BHPB debt (both would be rated BBB+ and both would be issued by similar firms). In our view, it would be appropriate to give the same weight to the yield on Anglo American debt as one would give to BHPB debt.

138. For the same reason we consider that the yield on the American Express debt listed in Table 3 above should not be excluded from consideration because it is issued by what is deemed to be a 'foreign company'. Of course, it could still be excluded on the grounds that it is an outlier if there were evidence to support that view. As it is, the Amex yield is almost exactly half way between the CBASpectrum and Bloomberg fair value curves at the relevant maturity - so there would not appear to be any obvious grounds for treating this bond as an outlier.