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ECONOMISTS  
GROUP

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# Criteria for assessing fair value curves: an update

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September 2016



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# 1 Introduction

1. CEG has been asked by AusNet Services to consider the appropriateness of the available third party data curves as a source for estimating the DRP that applies to a benchmark efficient firm. This request was made as an update to our previous report,<sup>1</sup> in which we evaluated the BBB DRP curves published by Bloomberg (BVAL curve), RBA, and Reuters.
2. One material change in the BVAL curve is its recent addition of a 7-year bond issued by Jemena (LW474837), which was added to the BVAL sample on 29 June 2016. Given the sparsity of long-maturity bonds in the BVAL sample, it is important to carry out analysis regarding whether the Jemena bond had undue impact on the 10-year BVAL estimate. In particular, we analyse whether the BVAL curve was more consistent with the debt characteristics of a benchmark efficient firm, in light of the analysis carried out in our previous report.
3. In the time period since AusNet Services made its request, the BVAL sample subsequently added another 7-year bond issued by Mirvac Group (QZ330503). The bond was first added to the sample on 1 September 2016, but was then omitted from the sample on 7 September 2016.
4. This report therefore analyses the impact of the bonds issued by Jemena and Mirvac, paying particular attention to how they impact the levels and shapes of the BVAL and Reuters curves. Our analysis suggests that the conclusions drawn in our previous report continue to hold, and have, in fact, been further affirmed by the recent developments in the BVAL curve in response to the bonds issued by Jemena and Mirvac.
5. Specifically, we find that the RBA curve has the most desirable properties for estimating the DRP applicable to a benchmark efficient firm, and that if multiple data sources are to be selected, then there is no reason to include the BVAL curve without also including the Reuters curve, given that there is no basis to conclude that the BVAL curve is superior to the Reuters curve (if anything a more robust response of the Reuters curve to the Jemena and Mirvac bonds suggests that the opposite may be true).
6. The rest of this report is structured as follows:
  - Section 2 reviews the criticisms of the BVAL curve as set out in our previous report;

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<sup>1</sup> CEG, Criteria for assessing fair value curves, January 2016.

- Section 3 discusses the recent changes in the BVAL curve as a result of the inclusion of the Jemena and Mirvac bonds, and contrasts them against the changes in the Reuters curve; and
  - Section 4 concludes.
7. I acknowledge that I have read, understood and complied with the Federal Court of Australia's Practice Note CM 7, "Expert Witnesses in Proceedings in the Federal Court of Australia". I have made all inquiries that I believe are desirable and appropriate to answer the questions put to me. No matters of significance that I regard as relevant have to my knowledge been withheld.
8. I have been assisted in the preparation of this report by Johnathan Wongsosaputro in CEG's Sydney office. However, the opinions set out in this report are my own.



Thomas Nicholas Hird

## 2 Previous criticisms of the BVAL curve

9. The AER's current approach towards estimating the cost of debt that applies to a Benchmark Efficient Entity (BEE) makes use of a simple average of Bloomberg's AUD broad BBB BVAL curve and the RBA's broad BBB curve, both of which are calculated at a 10-year tenor.<sup>2</sup>
10. CEG has previously evaluated both the BVAL and RBA curves, along with Reuters' AUD broad BBB corporate credit curve, in the context of estimating the cost of debt for a BEE.<sup>3</sup> In that report, we evaluated the curves according to the following five criteria:
  - a. Dataset that best matches the characteristics of debts issued by a BEE;
  - b. A large dataset that is consistent with criterion (a);
  - c. Derived from a transparent and robust method;
  - d. Regularly published by an independent reputable organisation; and
  - e. Track record of accuracy.
11. Our analysis found that the RBA curve fulfilled all five criteria, while the Bloomberg and Reuters curves only fulfilled criteria (d). We therefore concluded that the RBA curve had superior properties compared to the BVAL and Reuters curves. To the extent that curves had to be selected in advance, we advised that it would be appropriate to give 100% weight to the RBA curve. We also advised that, given the BVAL and Reuters curve had similar performance against the criteria, if one were to be given weight then the same weight should be given to the other. On the other hand, if there was a possibility of carrying out statistical testing to identify the most appropriate curve in any given period then this may suggest different weights to those that would be optimal if the weights had to be determined in advance.
12. There has been no change in the facts that would cause us to alter these recommendations.
13. In our other reports, we further identified a number of problematic issues with the 10-year estimates obtained from the BVAL curve. First, the 10-year BVAL estimate was, at the time of writing, disproportionately influenced by the yield of a single bond

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<sup>2</sup> The RBA curve is extrapolated to 10 years, while the BVAL curve is extrapolated if no 10-year estimate is available. See: AER, AusNet Services transmission determination 2017-18 to 2021-22, Draft Decision, Attachment 3 – Rate of Return, July 2016, p. 3-328.

<sup>3</sup> CEG, Criteria for assessing fair value curves, January 2016.

issued by Asciano (EK907291), which had a residual maturity of 9 years, while the next highest residual maturity was only 6.2 years as at February 2016.<sup>4</sup>

14. Although, the addition of the Jemena bond to the BVAL sample has reduced the influence of the Asciano bond, it has done so in a manner that further exacerbates the problematic issues associated with the BVAL curve. Specifically, the reduction in influence of the Asciano bond was matched with disproportionate influence being assigned to the Jemena bond, whose yields are clearly not in line with the rest of the bonds in the sample. This observation is supported by the fact that the Mirvac bond had similar yields to the Jemena bond, but the former was removed for being an outlier with respect to the rest of the sample.
15. Second, since none of the underlying bonds had residual maturities exceeding 10 years, the BVAL estimates for tenors at 10 years and longer had to be obtained via extrapolation. Our analysis of historical BVAL estimates and conversations with Bloomberg representatives suggested that the extrapolation was carried out using Bloomberg's Australia Government Bonds Generic Yield Curve – an approach that would likely underestimate the yields at longer maturities (we note that the BVAL spread to CGS curve is still fairly flat or even negatively sloped beyond 10 years).

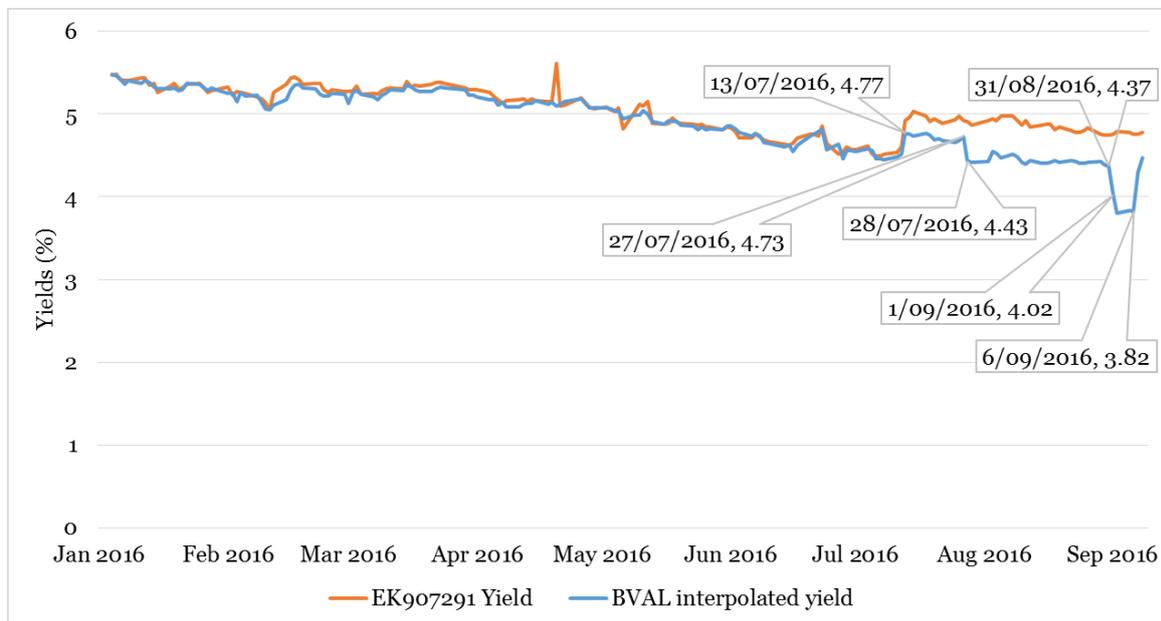
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<sup>4</sup> CEG, Recent financial market conditions and the BVAL curve – updated to 19 February 2016.

### 3 Recent changes in the BVAL curve

16. The BVAL curve has recently undergone a substantial change after a bond issued by Jemena (LW474837) was added to its underlying sample on 29 June 2016. This can be seen in Figure 3-1, in which the yield of the Asciano bond (EK907291) appears to move in lock-step with its associated BVAL interpolated yield up until 13 July 2016, after which the two series appear to diverge. In addition, there appears to be a substantial 32 bp downward spike in the BVAL interpolated yield on 29 July 2016, which was not matched by Reuters estimates (noting RBA estimates are not available on a daily basis).
17. Another fairly odd development can be observed on 1 September 2016, when the BVAL interpolated yield declined by 35 bp compared to its estimate on the previous day. This was followed by a corresponding upward shift of 45 bp between 6 September 2016 and 7 September 2016. Both of these shifts match with the inclusion of a bond issued by Mirvac Group (QZ330503), which was briefly included in the BVAL sample from 1 September 2016 to 6 September 2016, before being removed as of 7 September 2016.

**Figure 3-1: Comparison of Asciano bond yield against BVAL yield**

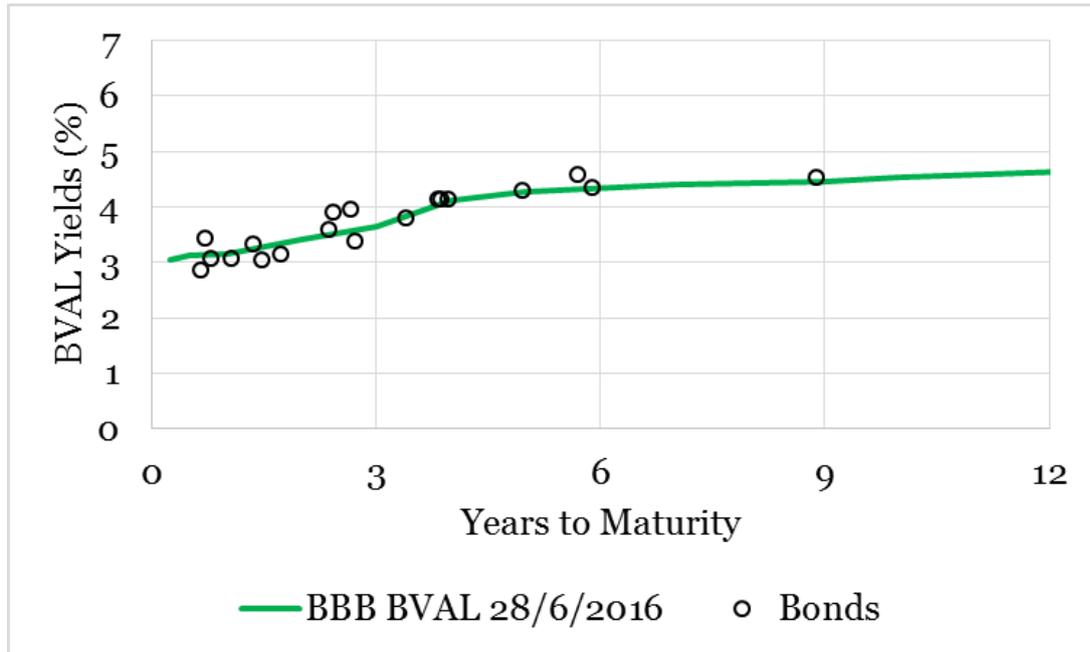


Source: Bloomberg, CEG analysis

18. Further insights can be drawn by examining the BVAL curve and its underlying bond constituents on specific dates. As seen from Figure 3-2 and Figure 3-3, the 7-year bond issued by Jemena was first included in the BVAL sample on 29 June 2016. It can also be seen that the inclusion of the Jemena bond (the yield on which is

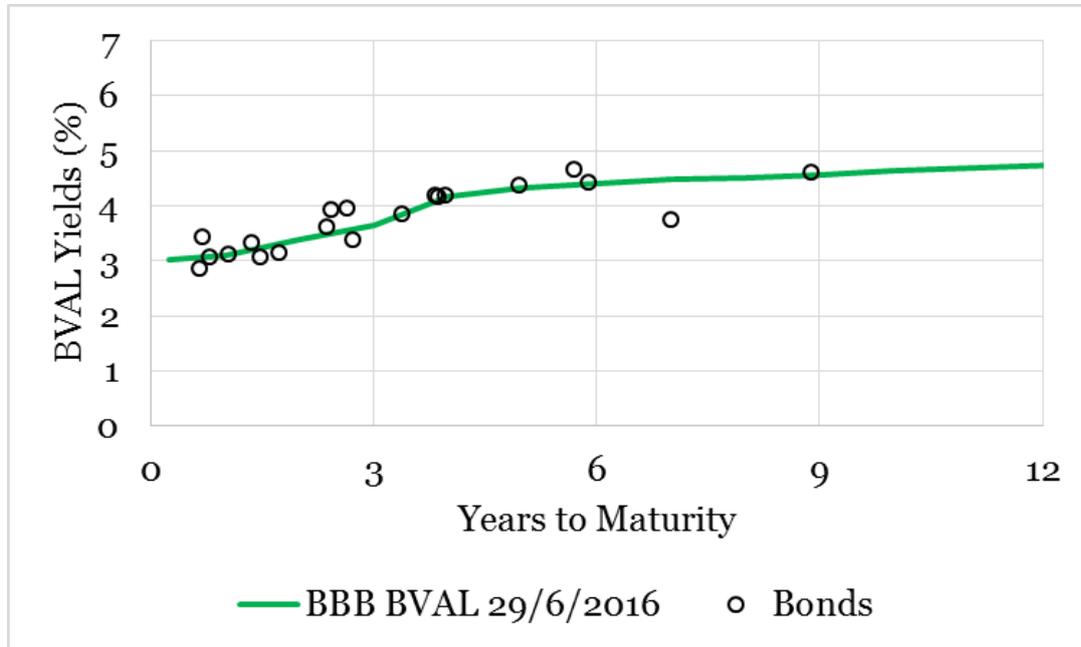
represented by the dot at 7 year maturity in Figure 3-3) did not initially appear to have a material impact on the longer end of the BVAL curve, which continued to pass very close to the Asciano bond, which has the longest residual maturity in the sample.

**Figure 3-2: BVAL curve and bond constituents, 28 June 2016**



Source: Bloomberg, CEG analysis

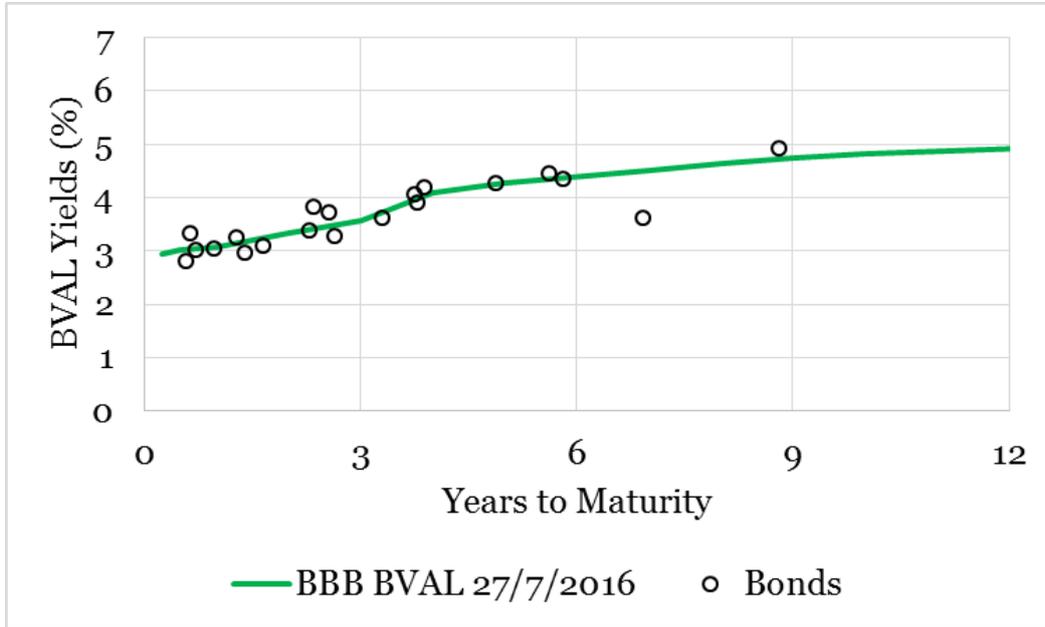
**Figure 3-3: BVAL curve and bond constituents, 29 June 2016**



Source: Bloomberg, CEG analysis

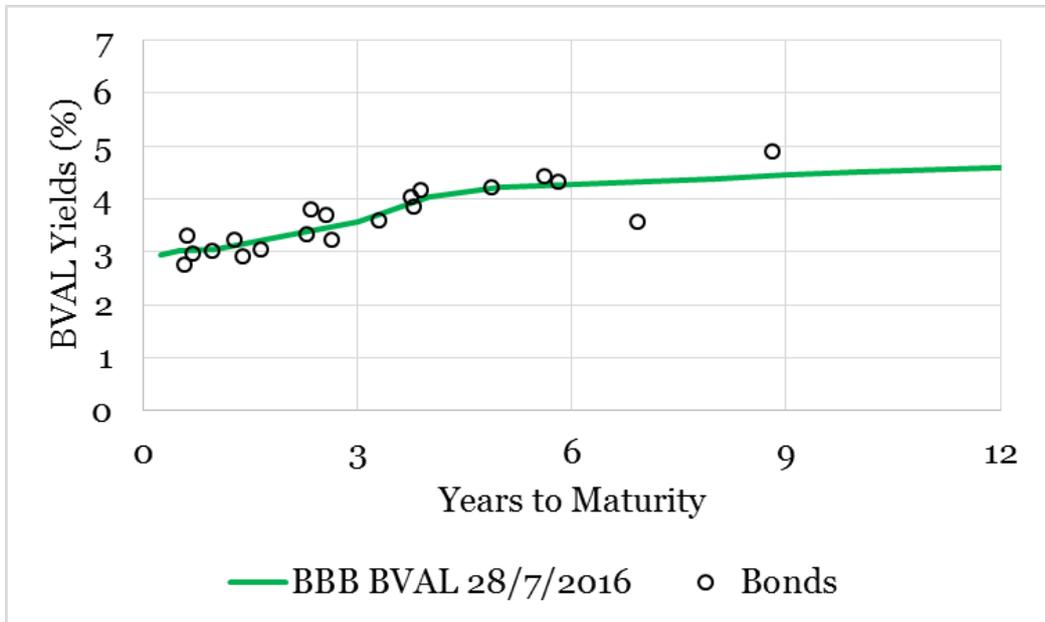
19. Coincident with the sharp decline of the BVAL interpolated yield on 28 July 2016 (shown in Figure 3-1), Figure 3-4 and Figure 3-5 show that there was no corresponding reduction in yields of the underlying bonds on that day. In particular, the largest decrease in yields on that day was only 5.5 bp, which cannot explain the 31 bp decrease in the 10-year BVAL estimate.
20. Instead, Figure 3-4 and Figure 3-5 suggest that the sharp decline was most likely due to an increase in the weight assigned to the Jemena bond that has an exceptionally low yield, causing the BVAL curve to pivot downwards between the Jemena and Asciano bonds instead of simply being guided by the Asciano bond alone in an almost one-to-one manner.

**Figure 3-4: BVAL curve and bond constituents, 27 July 2016**



Source: Bloomberg, CEG analysis

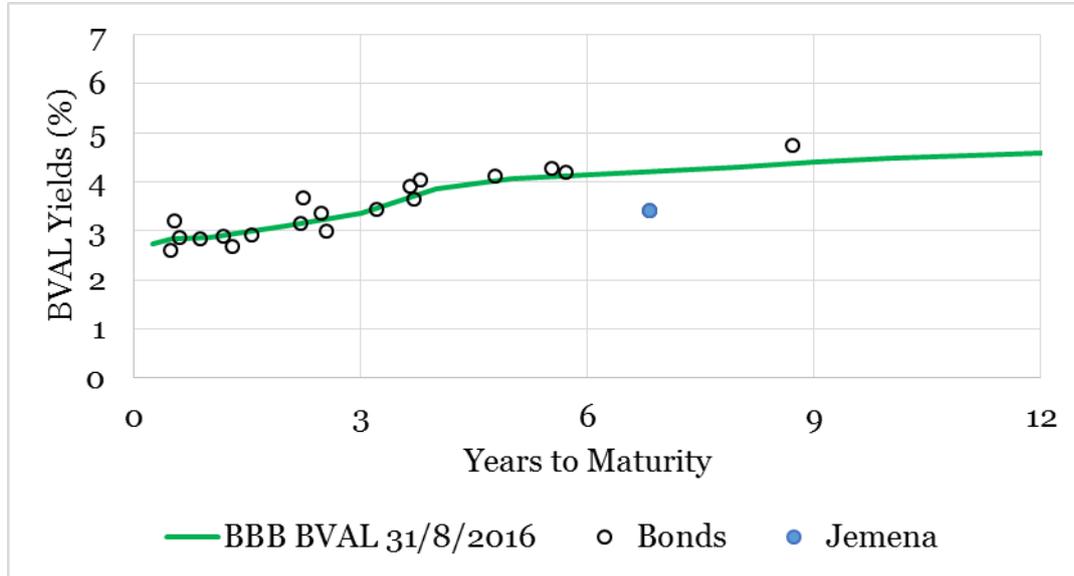
**Figure 3-5: BVAL curve and bond constituents, 28 July 2016**



Source: Bloomberg, CEG analysis

21. Figure 3-6 shows the BVAL curve and its constituents as at 31 August 2016, and it can be seen that the BVAL curve continues to fall below the Asciano bond and above the Jemena bond.

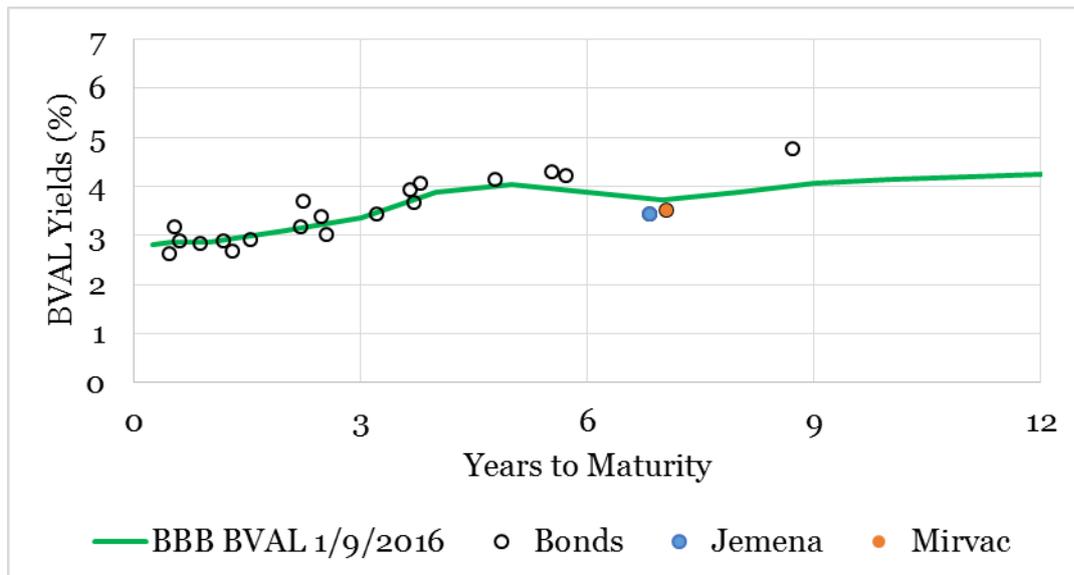
**Figure 3-6: BVAL curve and bond constituents, 31 August 2016**



Source: Bloomberg, CEG analysis

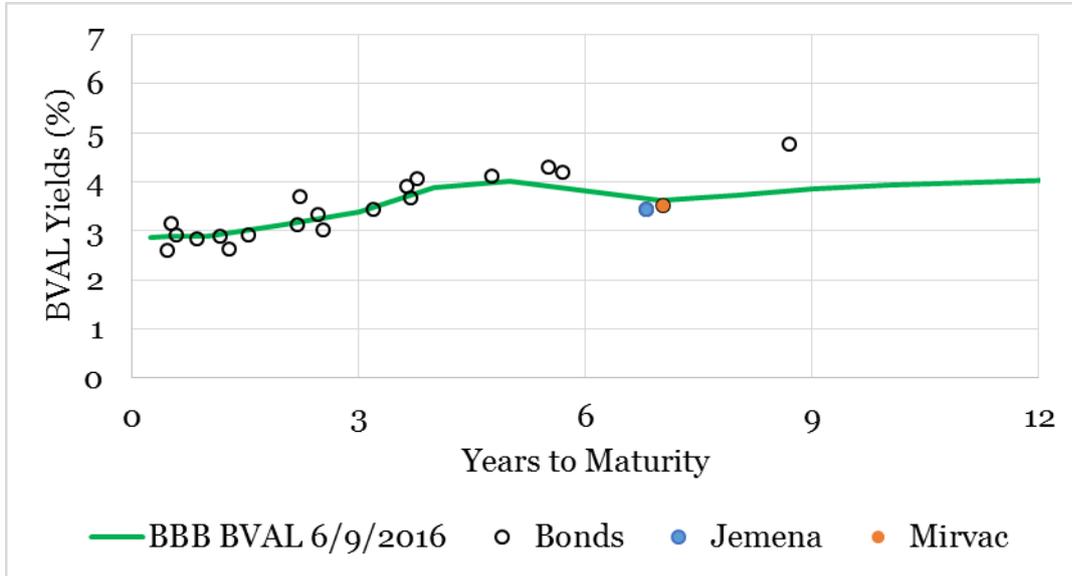
22. Figure 3-7 shows the BVAL curve as at 1 September 2016, in which the Mirvac bond was first included in the BVAL sample. This caused a kink in the BVAL curve between 5 and 9 years, which continued until 6 September 2016, as seen in Figure 3-8.

**Figure 3-7: BVAL curve and bond constituents, 1 September 2016**



Source: Bloomberg, CEG analysis

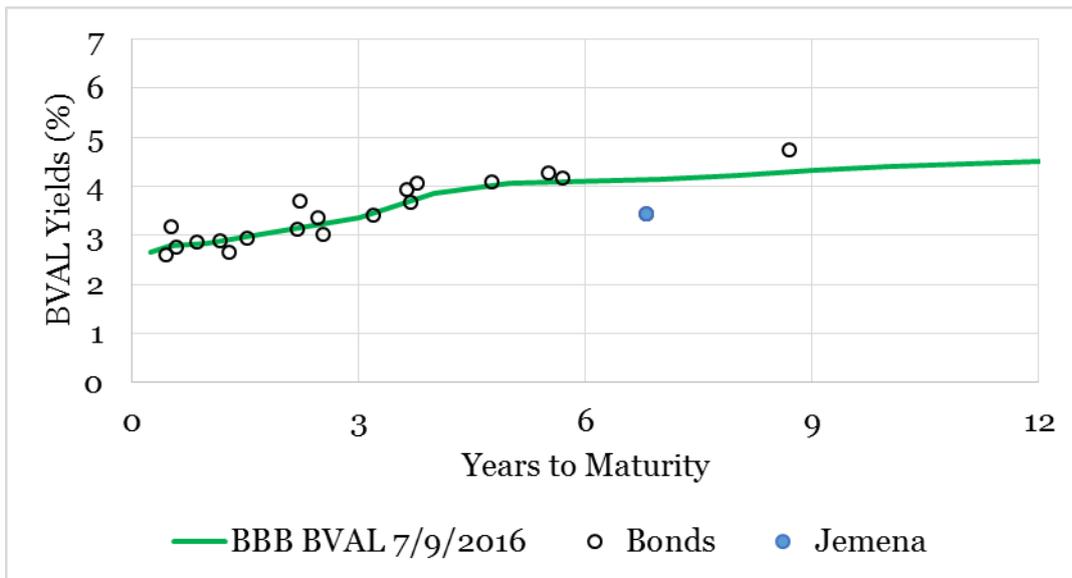
**Figure 3-8: BVAL curve and bond constituents, 6 September 2016**



Source: Bloomberg, CEG analysis

- The Mirvac bond was removed from the BVAL sample on 7 September 2016. It can be seen from Figure 3-9 that the omission of the Mirvac bond also removed the kink at 7 years, resulting in the curve taking on a similar shape to that observed on 31 August 2016 (Figure 3-6), before the Mirvac bond was included.

**Figure 3-9: BVAL curve and bond constituents, 7 September 2016**



Source: Bloomberg, CEG analysis

### 3.1 Problems with the inclusion of the Jemena bond

24. As discussed in section 2, one of our criticisms of the BVAL curve concerned the lack of long-maturity bonds in its underlying sample. In light of this, the inclusion of a bond with seven years maturity would, other things equal, be a welcome addition. However, the specific Jemena bond in question has some undesirable properties that are inconsistent with the rest of the curve, in our view inappropriate for the purpose of fitting a broad BBB curve.
25. As seen in Figure 3-3 to Figure 3-6, the yields of the Jemena bond are consistently and materially below the yields of other bonds with considerably shorter residual maturities. Consistent with this, the Jemena bond has conflicting credit ratings across rating institutions, with S&P assigning a BBB+ rating, while Moody's assigned it a rating of A3. It is, therefore, not obvious that the Jemena bond should be included in the construction of a BBB curve. Consistent with this Reuters includes the same bond in its AUD broad A credit curve instead of its broad BBB curve. Overall, this suggests that the Jemena bond is straddling the boundary between a BBB+ rating and an A- rating, which could result in yield estimates that are biased downwards.
26. While the RBA, like Bloomberg, includes the Jemena bond in its BBB sample, it must be reiterated that the Jemena bond receives a much smaller weight in the RBA estimate given the much larger number of long term bonds in the RBA sample (28 bonds with greater than 6 years maturity in the RBA's August estimate). This means that any potential downward bias associated with the inclusion of the Jemena bond in the RBA sample is mitigated.
27. However, this assumption does not hold for the BVAL sample which consists of a small number of bonds that are mostly clustered around the lower tenors. In the BVAL sample, the Jemena bond is one of only two bonds with residual maturities exceeding 6 years (the other being the Asciano bond).

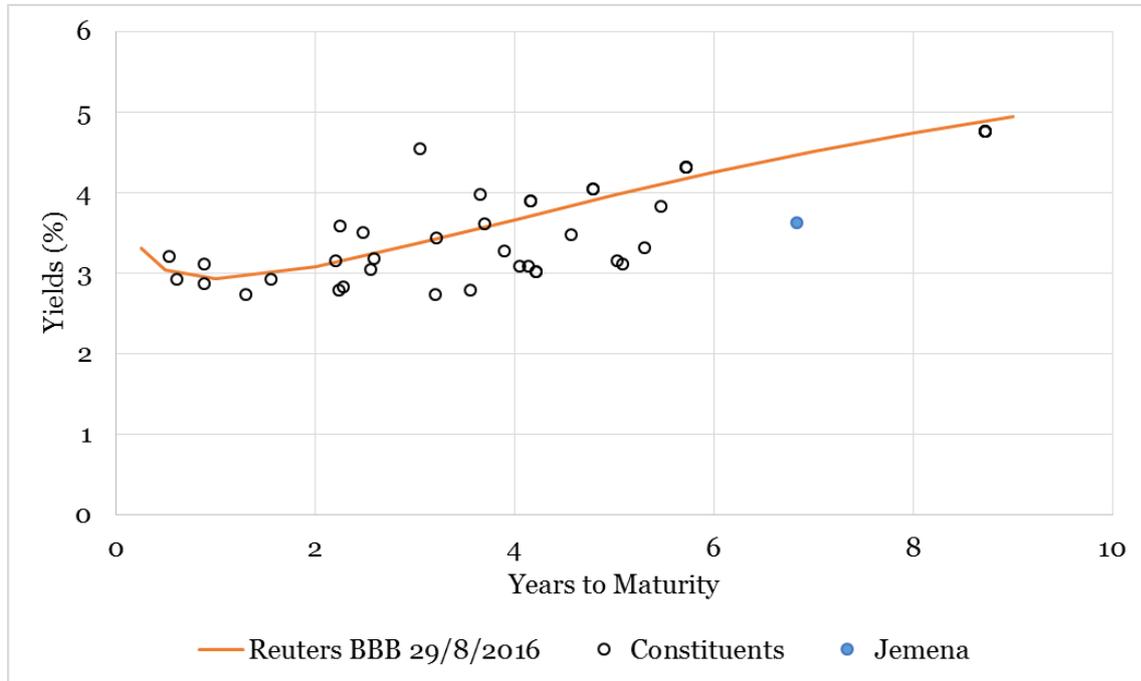
#### 3.1.1 Reuters' classification of the Jemena bond

28. Figure 3-10 shows the Reuters broad BBB curve as at 29 August 2016, along with its bond constituents.<sup>5</sup> The figure further includes the yield of the Jemena bond, which is not part of Reuters' BBB sample. A visual inspection of the figure suggests that, had the Jemena bond been included in the sample, it would have been at the very low end of the expected range for its tenor, relative to the rest of the bonds in the sample.

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<sup>5</sup> The yields shown are collected from Reuters instead of Bloomberg.

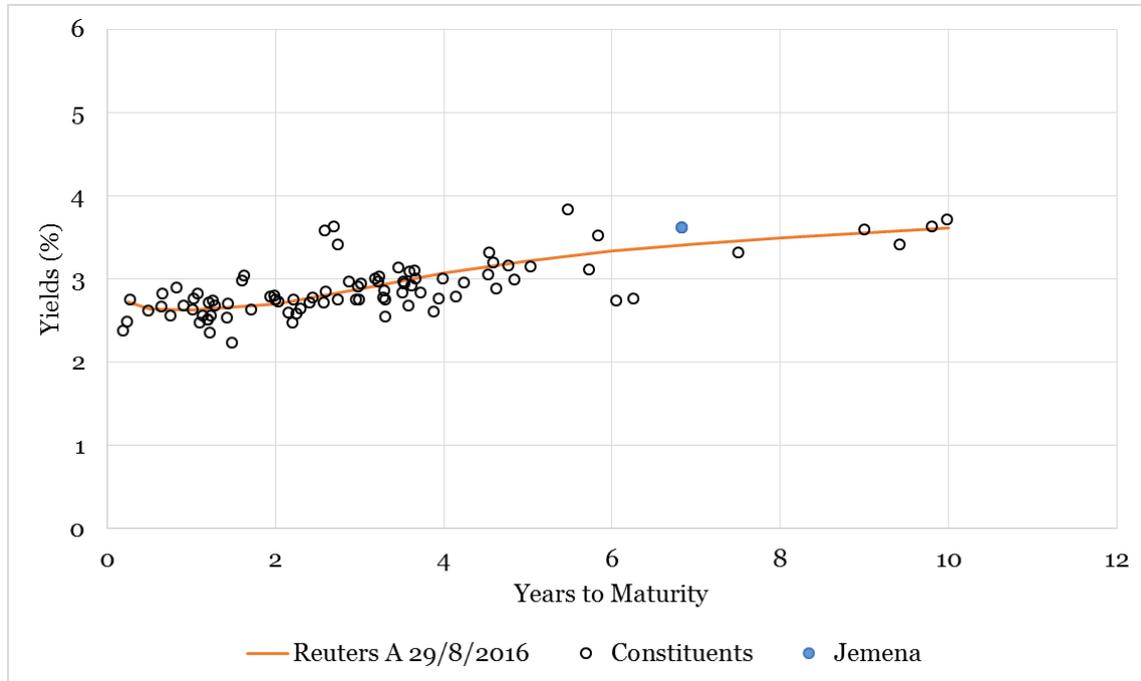
**Figure 3-10: Reuters broad BBB curve**



Source: Reuters, CEG analysis; \*The Jemena bond is not part of Reuters' BBB sample, and is only included for comparison

29. Figure 3-11 shows the Reuters broad A curve as at 29 August 2016 and its bond constituents, which includes the Jemena bond. Compared to the broad BBB curve in Figure 3-11, the Jemena bond appears to be in line with the broad A curve compared to other bonds with long maturities, which suggests that it would be more appropriate for the Jemena bond to be placed in the A sample instead of BBB.

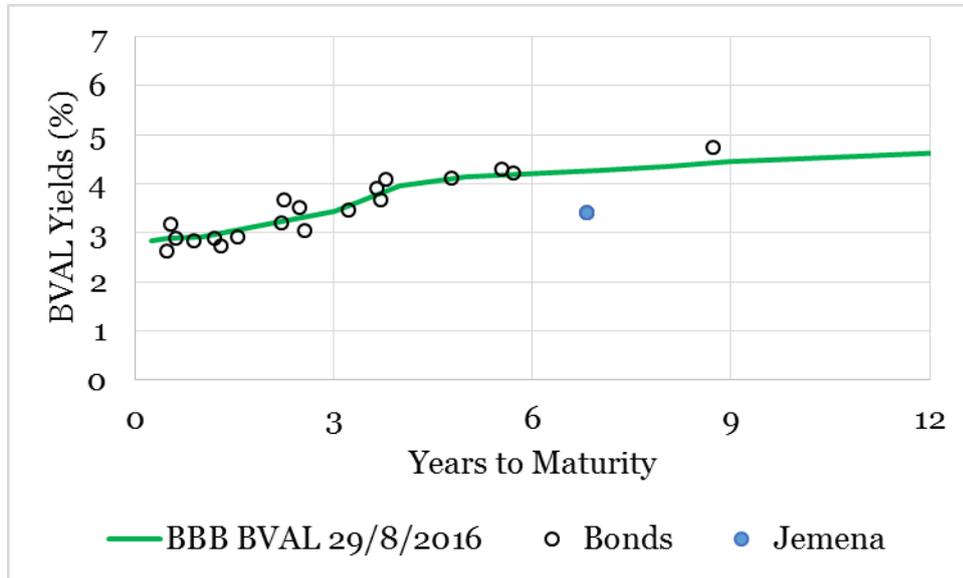
**Figure 3-11: Reuters broad A curve**



Source: Reuters, CEG analysis; \*The Jemena bond is part of Reuters' A sample

30. Similar observations can be made with the samples of the BVAL broad BBB and broad A curves, as shown in Figure 3-12 and Figure 3-13 respectively. While the Jemena bond has an exceptionally low yield relative to all of the other bonds in the broad BBB sample, it appears to fit well with the rest of the broad A sample.

**Figure 3-12: BVAL broad BBB curve**



that Reuter's assignment of this bond is more appropriate than Bloomberg's assignment.

### 3.1.2 Jemena bond and Bloomberg's bond selection criteria

32. Bloomberg's bond selection criteria for the BVAL curve is proprietary and cannot be determined conclusively, although it is known that the BVAL methodology excludes "call/put/convertible options and/or sinking/amortizing/inflation linked structures".<sup>6</sup>
33. Analysis of the historical sample of bond constituents also indicates three further restrictions. Namely, that the bonds must be issued by firms incorporated in Australia, must be denominated in AUD, and must have credit ratings that fall within the broad BBB band.
34. The Jemena bond is a fixed-rate AUD bullet bond issued by a firm incorporated in Australia. As pointed out in section 3.1, however, the bond has conflicting credit ratings, with S&P assigning it a BBB+ rating, while Moody's rated it A3, and no rating was assigned by Fitch.
35. We note that Bloomberg's methodology has historically incorporated some elements of subjective judgement in similar circumstances. For example, there are a number of AUD bonds issued by Coca Cola Amatil that were assigned BBB+ ratings by both S&P and Fitch, while being rated A3 by Moody's. However, these bonds were included in the broad A BVAL curve instead of the broad BBB curve, on the basis that:<sup>7</sup>

*The reason that some coca cola bonds appeared in the AUD BBB curve in April but not anymore is because of internal changes we made. We assessed the AUD BBB curve and, whilst these coca cola bonds are indeed BBB rated, they were much richer than other BBB rated AUD bonds (see attached file). As such, we decided that the A rated curve (BVSCO160 Index) is more appropriate for these bonds and better represents their yields, which is where you will be able to find them now.*

36. While Bloomberg is not bound by their previous decisions concerning the curve that bonds with conflicting credit ratings should be classified under, application of the same logic to the Jemena bond would suggest that Bloomberg has misclassified the Jemena bond.

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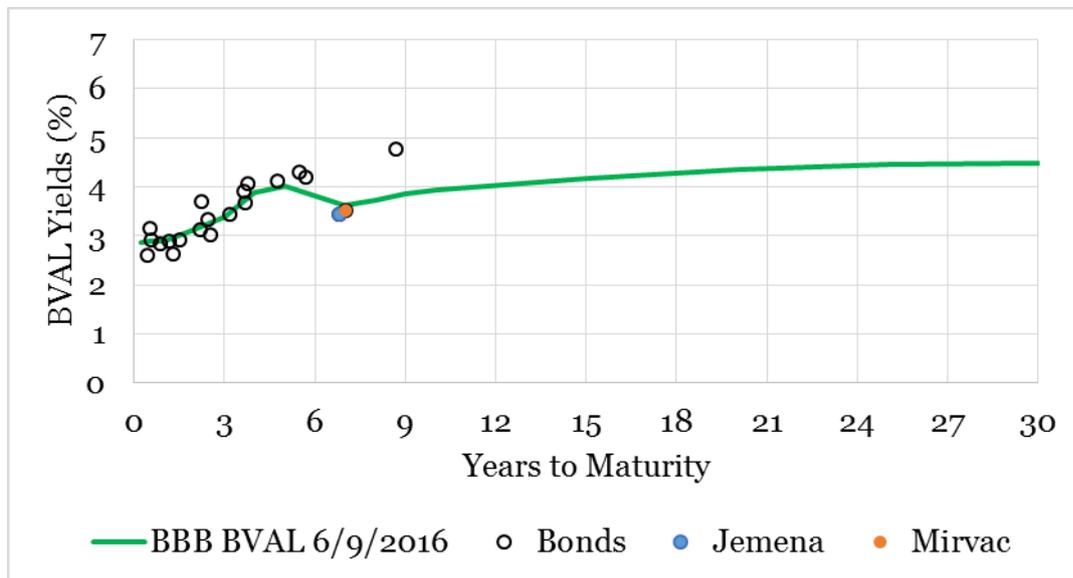
<sup>6</sup> Bloomberg, BVAL: BVAL Curves, p. 3.

<sup>7</sup> Quoted by ACCC Regulatory Unit, Return on debt estimation: a review of the alternative third party data series, August 2014, p.32.

### 3.2 Issues with the inclusion of the Mirvac bond

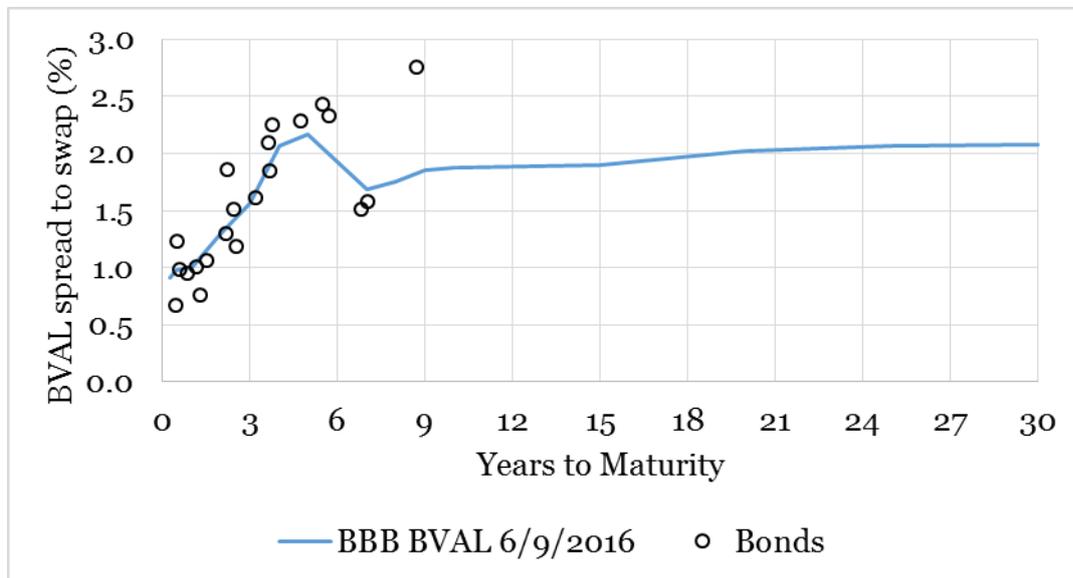
- 37. The inclusion of the Mirvac bond from 1 September 2016 to 6 September 2016 further emphasises the problematic nature of the small sample size of the BVAL curve. As seen in Figure 3-6 to Figure 3-9, the inclusion of the Mirvac bond from 1 September 2016 to 6 September 2016 resulted in a substantial change in the shape of the BVAL curve.
- 38. This is even more clearly seen in Figure 3-14 and Figure 3-15, when the full BVAL yield curve and spread to swap curve are shown. Both figures show that the resulting curves exhibit a considerable shift in level, and that the BVAL extrapolation methodology is clearly unable to accommodate the said change in level when extrapolating the curve to longer maturities.
- 39. These are worrying results because they indicate that the BVAL estimates are not robust to shifts in the yields and spreads of individual bonds. Including the BVAL estimates in the calculation of benchmark cost of debt would thus result in considerable uncertainty because a single rare issuance of a long-maturity AUD bond by a domestic firm could have a sizable impact on the 10-year BVAL estimates.

**Figure 3-14: BVAL yield curve and bond constituents, 6 September 2016**



Source: Bloomberg, CEG analysis

**Figure 3-15: BVAL spread to swap curve and bond constituents, 6 September 2016**



Source: Bloomberg, CEG analysis

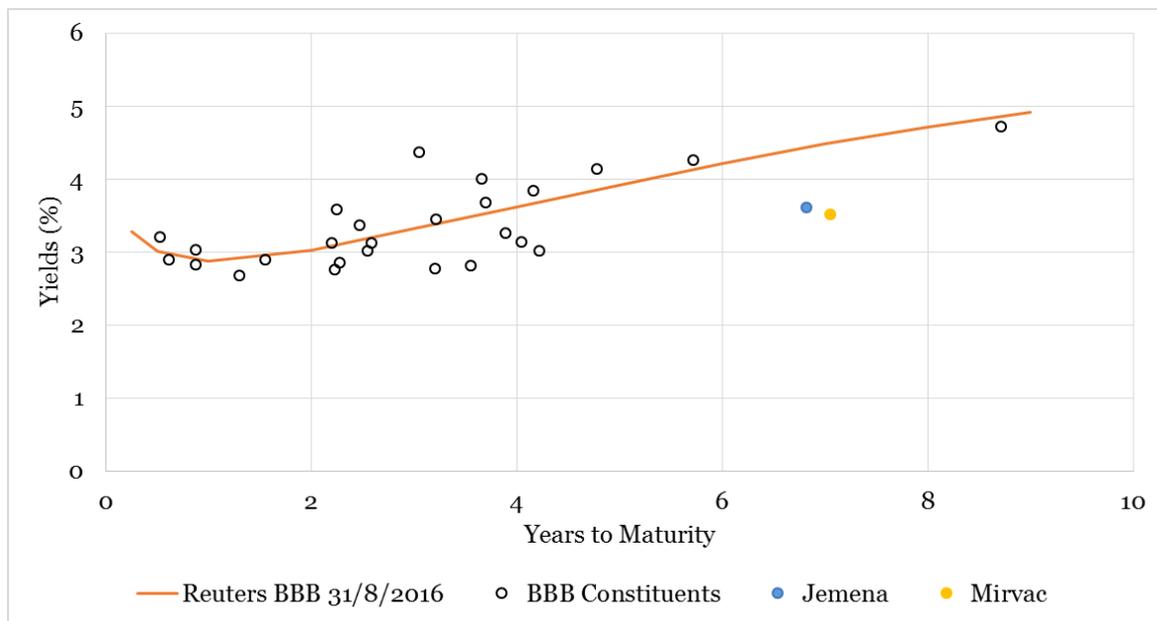
### 3.2.1 Response of the Reuters curve to the Mirvac bond

40. As mentioned in section 3.1, the Jemena bond has BBB+ S&P rating and A3 Moody's rating, with Reuters ultimately classifying the bond as part of its broad-A sample. In contrast, the Mirvac bond is rated BBB+ by S&P and Baa1 by Moody's. The Mirvac bond is therefore classified as part of the Reuters broad-BBB sample.
41. Figure 3-16 and Figure 3-17 show the Reuters broad BBB curve as at 31 August 2016 (before the Mirvac bond was included) and 1 September 2016 (after the Mirvac bond was included) respectively.<sup>8</sup>
42. As seen in the charts, although the inclusion of the Mirvac bond did result in a small decline in the level of the curve – as would be expected whenever a low-yield observation is included in the sample – the magnitude of the decline is much smaller compared to the changes observed with the BVAL curve. In addition, unlike the BVAL curve, whose shape changed dramatically when the Mirvac bond was included, the Reuters curve has shown greater robustness in terms of broadly maintaining its shape before and after the inclusion of the Mirvac bond.

<sup>8</sup> Reuters representatives confirmed that the Mirvac bond was first added on 31 August 2016, but could not confirm whether it was added during the opening or closing of the market. Since the bond did not show up on our sample when collected at mid-day on 31 August 2016, it was most likely added at the close of trading on that day.

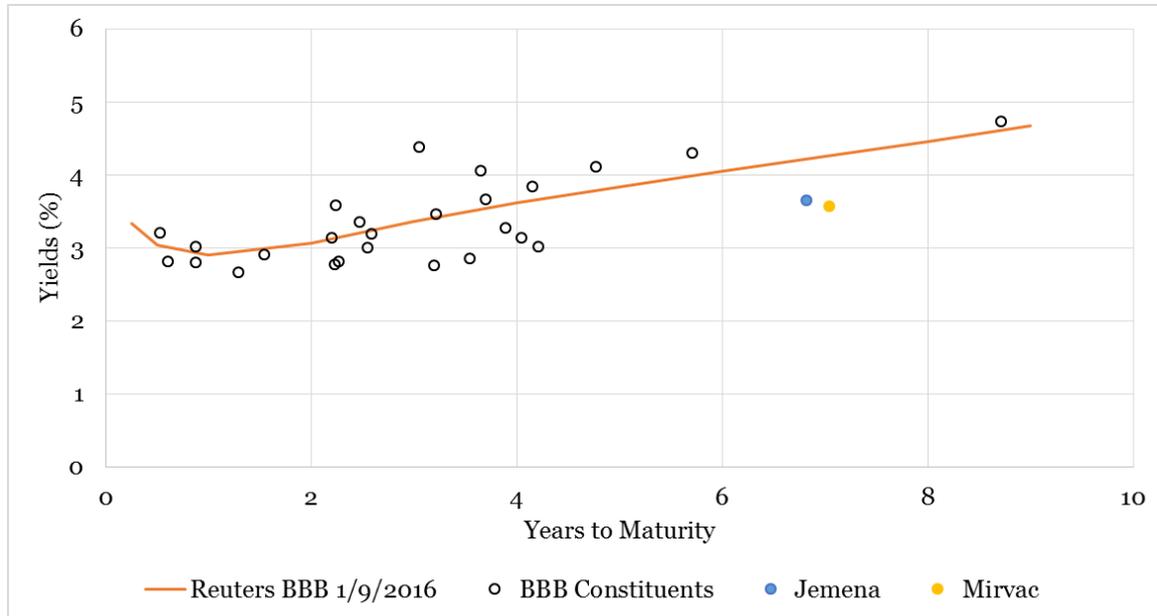
43. The greater robustness of the Reuters curve to the addition of the Mirvac bond can partially be attributed to its slightly larger sample size. Between 31 August 2016 and 9 September 2016, the BVAL curve had 20-21 bonds, while the Reuters curve had 26-27. It is further known that Reuters uses a cubic spline when fitting its curve, while comparatively little is known about the approach used for estimating the BVAL curve, other than the fact that Bloomberg utilises a set of reference curves (particularly Bloomberg’s Australia Government Bond Generic Yield Curve).
44. Given that little is currently known about the proprietary BVAL curve-fitting methodology, we do not attempt to draw any general conclusions regarding the superiority of the curve-fitting approaches used by the BVAL and Reuters curves. Nevertheless, it is fairly clear that the Reuters curve has responded more robustly to the inclusion of the Mirvac bond as compared to the BVAL curve.
45. These findings affirm our earlier arguments that should the BVAL estimates be used as part of the calculation of the benchmark DRP, then there is no reason not to give at least equal weight to the Reuters estimates.

**Figure 3-16: Reuters curve, Jemena and Mirvac included, 31 August 2016**



Source: Reuters, CEG analysis; \*The Jemena and Mirvac bonds were not in the sample on 31 August 2016 and are only shown for comparison

**Figure 3-17: Reuters curve, Jemena included, 1 September 2016**



Source: Reuters, CEG analysis; \*The Mirvac bond was in the sample on 9 September 2016, but the Jemena was not, since Reuters classifies it as part of its broad-A curve. The Jemena bond is only shown for comparison.

### 3.2.2 Arbitrary removal of the Mirvac bond and retrospective deletion of earlier estimates

46. The Mirvac bond was removed from the BVAL sample on 7 September 2016. As of 12 September 2016, Bloomberg has also retrospectively deleted the 7- to 10-year estimates for the 1 September 2016 through 6 September 2016 period. That is, the historical BVAL series now omit the 7- to 10-year estimates over this period, although they had been available if the series were downloaded before 12 September 2016 (as we did).
47. We have communicated with a representative from Bloomberg's Global Data Team in order to clarify their reasoning for removing the Mirvac bond and for retrospectively deleting the 7- to 10-year estimates over the corresponding period.
48. Bloomberg confirmed that it considered the Mirvac bond to be an outlier compared to the rest of the sample and not because the yields of the bond were incorrectly reported:

*[S]ome data is missing because there was bad data being fed into our pricing algorithms. The values on those dates are not affirmed and therefore they are removed from our system...*

*We can confirm that QZ330503 is correct. It was just simply an outlier to the rest of the constituents*

49. We also enquired as to why the Jemena bond had not been removed as well, even though its reported yield was broadly similar to that of the Mirvac bond, to which Bloomberg responded:

*[Y]ield level is one of the factors, but not the only, when we determine whether a bond should be used as a constituent...*

*We are not allowed to disclose more information on our outlier detection mechanism*

50. The discussion above affirms the criticism set out in paragraph 10.c, that the BVAL estimates do not appear to be derived from a robust and transparent method. While no information is known about the factors that Bloomberg takes into account for identifying and omitting outliers, there are nonetheless two factors that are likely to be fairly important in detecting outliers.
51. First, as seen in Figure 3-7 and Figure 3-8, the Mirvac bond has a slightly higher yield compared to the Jemena bond, while maturing approximately three months later. Both bonds therefore appear to be fairly similar in terms of their magnitudes of deviation from the rest of the sample.
52. Second, in terms of credit ratings, the Jemena bond deviates further from the broad-BBB range that the BVAL curve seeks to model. While the Mirvac bond is rated BBB+ by S&P and Baa1 by Moody's, the Jemena bond has a Moody's rating that falls outside the target broad-BBB range.
53. Taken together, these two factors suggest that the justifications for omitting the Mirvac bond apply at least as strongly (or slightly more strongly) to the Jemena bond, such that both bonds should have been removed from the sample. Bloomberg's decision to only omit the Mirvac bond without removing the Jemena bond therefore appears somewhat arbitrary and questionable.
54. It is particularly notable that Reuters did not omit the Mirvac bond from their sample, perhaps because there is less necessity for doing so, given that their curve-fitting approach appears to be more robust to the inclusion of the Mirvac bond. This robustness is a potentially desirable property of a DRP source, since it reduces reliance on subjective judgement when selecting outliers.
55. The RBA's sample for August 2016 did not include the Mirvac bond. The RBA might have omitted the Mirvac bond based on subjective judgement, but it is also plausible that the bond might not have been picked up in their search, given that it was issued on 30 August 2016. In either case, the RBA's large sample of bonds, coupled with its parametric Gaussian kernel approach, suggest that its 10-year estimate is likely to be robust to the inclusion of a single outlier bond.
56. The properties of the three curves therefore require different approaches to be taken in response to outliers such as the Mirvac bond. The RBA curve can rely on its large

sample for robustness, while the Reuters curve is fitted in a manner that appears robust to the inclusion of the Mirvac bond. Meanwhile, the BVAL curve required subjective judgement for removing outliers, without which the level and shape of the resulting curve would change substantially.<sup>9</sup>

57. It may be reasonable to conclude that robust methods that are less reliant on subjective judgement are more desirable for the purpose of regulatory benchmarking, as opposed to methods that rely heavily on subjective judgement.

**Table 3-1: Comparison of approaches required for addressing outliers**

Curve	Approach to outliers as observed with Mirvac bond
BVAL	Relies heavily on subjective judgement to identify outliers and omit them
RBA	Not currently known, but large sample size and Gaussian kernel approach result in lower weight on single bonds further away from the 10-year target tenor
Reuters	Curve fitting approach appears fairly robust to the inclusion of the single Mirvac bond

### 3.3 Extrapolation of the BVAL curve

58. In its Draft Decision, the AER stated its position that if the BVAL 10-year estimate were found to be inappropriate, it would not discard the BVAL curve entirely, and would instead extrapolate outwards from the BVAL 7-year estimate:<sup>10</sup>

*Finally, even if we were not to adopt the BVAL 10 year estimate, our final decision would be to adopt the BVAL 7 year estimate extrapolated as per the methodology set out in our contingencies. We are not satisfied that any information submitted by stakeholders raises material new concerns with the BVAL's 7 year estimate that were not considered in previous decisions. Therefore, we remain satisfied that the reasons underlying our choice of approach, as upheld by the Tribunal, remain valid.<sup>1176</sup> To the extent that there are shortcomings in the BVAL curve beyond its 7 year published estimate, we are not persuaded it is appropriate to discard the BVAL curve altogether. We consider it would remain an important and robust source of information, and would adopt the approach that we used in decisions prior to Bloomberg's publication of a 10 year estimate.*

<sup>9</sup> This is not to say that the RBA and Reuters curves do not ever omit outliers. As discussed earlier, the RBA and BVAL curves both omitted a number of bonds issued by Coca Cola Amatil on the basis that they were not representative of the sample. However, the RBA and Reuters curves appear to be more robust to individual outliers such as the Mirvac bond, such that whether or not the bonds are removed will result in changes that are less material compared to the BVAL curve.

<sup>10</sup> AER, AusNet Services transmission determination 2017-18 to 2021-22: Attachment 3 – Rate of return, Draft Decision, July 2016, p. 3-302.

59. We note that the evidence surveyed in this report suggests that not just the BVAL 10 year but also the BVAL 7 year estimate is unduly influenced by a single bond (the Jemena bond). The AER’s contingency in this case would imply extrapolating from 5 years. In our view, there is dubious merit in using the RBA curve to extrapolate the BVAL curve from 5/7 years as opposed to just ceasing to use the BVAL estimate in favour of the RBA estimate.
60. For the reasons discussed below, attempting to combine two different curves in this simplistic way may make matters worse than better – and would have done so at the time that the AER first made the proposal.
61. The AER determined that such an approach would lead to a 55 bp decrease in the BVAL estimate when calculated over AusNet Services’ averaging period (25 January 2016 to 19 February 2016).<sup>11</sup>

**Table 3-38 Extrapolation margins—Final decision approach compared to the contingency approach**

Approach	BVAL extrapolation formula	BVAL extrapolation margin
Final decision approach	Uses published BVAL 10 year yield estimate	+39 basis points
Contingency approach— where BVAL 10 year published estimate is unavailable	$BVAL\ 10\ year\ yield = BVAL\ published\ 7\ year\ yield + RBA\ 10\ year\ yield - RBA\ 7\ year\ yield$	-16 basis points

Source: AER, RBA, Bloomberg.

62. As shown in the second and third columns of Table 3-2, such a result occurred because the RBA curve was downward sloping between the 7- and 10-year tenors from January 2016 to March 2016. From April 2016 onwards, however, the RBA curve has resumed exhibiting a positive slope between the 7- and 10-year tenors, as well as between the 5- and 10-year tenors.

<sup>11</sup> AER, AusNet Services transmission determination 2017-18 to 2021-22: Attachment 3 – Rate of return, Draft Decision, July 2016, Table 3-38, p. 3-302.

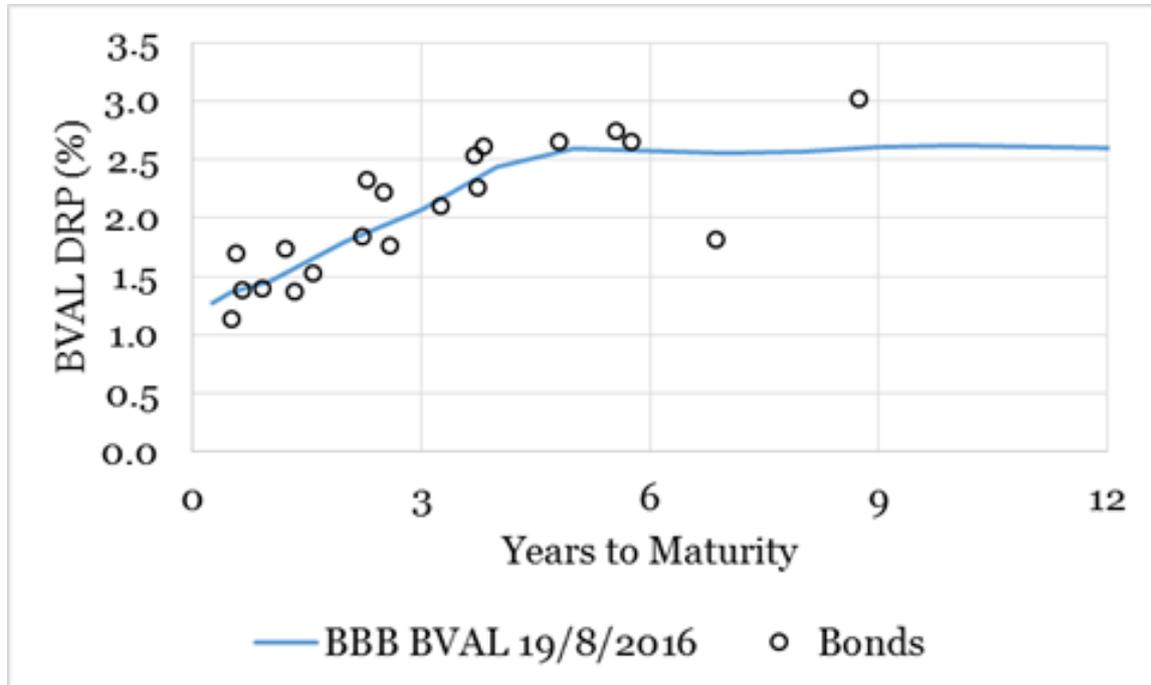
**Table 3-2: BVAL DRPs extrapolated from 5 and 7 years (semi-annual)**

	RBA margin		RBA	BVAL	BVAL SAPN (extrapolated from)		BVAL AER (extrapolated from)	
	5 to 10	7 to 10	10 year	10 year	5	7	5	7
29/1/16	-0.38	-0.39	2.86	2.64	3.92	3.27	1.95	2.15
29/2/16	-0.32	-0.31	3.09	2.80	4.16	3.39	2.17	2.34
31/3/16	-0.25	-0.20	2.69	2.69	3.68	3.08	2.07	2.27
29/4/16	-0.03	-0.06	2.43	2.51	3.76	3.04	2.28	2.36
31/5/16	0.05	-0.01	2.49	2.52	3.72	3.06	2.31	2.39
30/6/16	0.33	0.24	2.68	2.46	3.95	3.08	2.65	2.63
29/7/16	0.23	0.19	2.41	2.44	4.01	3.09	2.58	2.57
31/8/16	0.40	0.27	2.31	2.43	3.88	3.03	2.65	2.59

Source: AER, Bloomberg, RBA, CEG analysis; \*RBA margin has not been applied for the BVAL AER estimate as at 19 August 2016.

63. The overall effect of replacing the BVAL 10-year estimated DRP with the AER's extrapolated DRP depends on the relative slopes of the BVAL and RBA curves. Comparing the last two columns of Table 3-2 with the values in the middle column (BVAL (10 year)) suggest that the AER's contingency method lowers the BVAL 10-year estimates from January 2016 to May 2016 but raises it in June and July. This is consistent with the Jemena bond depressing the slope of the BVAL curve beyond 7 years and the former negative slope in the RBA curve being reversed.
64. In relation to the last point we note that the BVAL spread to CGS is currently flat/negative beyond 5 years – consistent with the Jemena bond biasing down DRP estimates for long term bonds.

**Figure 3-18: BVAL Spread to CGS on 19 August 2016**



Source: Bloomberg; CGS yields obtained from Bloomberg's AUD Australia Government Bond BVAL Yield Curve

65. More generally, we note that extrapolating the BVAL curve from 5 or 7 years using the shape of the RBA/Reuters DRP curve can be problematic for a number of reasons. First, the slope of the RBA/Reuters DRP curve beyond 5/7 years is a function of the level of the curve at 5/7 years. Specifically, a higher DRP level at 5/7 years is likely to, other things equal, be associated with a lower DRP slope beyond 5/7 years.
66. Therefore, an internal inconsistency can be created if the level of the BVAL curve at 5/7 years is not similar to the level of the RBA/Reuters curve at 5/7 years. By way of example, this was clearly the case when the AER first put forward its 'contingency'. At the end of February 2016 the RBA 7 year estimate was 3.40% while the BVAL 7 year estimate was 2.65% (i.e., 0.75% difference).
67. In this circumstance, the reason that the RBA curve had a negative DRP slope between 7 and 10 years was precisely because its 7 year estimate was so high. Taking the associated negative slope and applying it to a (much lower) BVAL 7 year estimate would be internally inconsistent. It would amount to subtracting a negative slope associated with a very high RBA 7 year estimate from a much lower BVAL 7 year estimate.
68. This example highlights why the AER's proposed style of extrapolation is not generally reliable and especially where the level of the curve being extrapolated (e.g., the BVAL curve) is materially different to the level of the curve doing the



extrapolation (e.g., the RBA/Reuters curves) at the maturity from which extrapolation is being applied (e.g., 5/7 years).

69. To the extent that extrapolation of the BVAL curve is to be applied (to give an estimate of the cost of debt that is independent from those already available from RBA/Reuters) then the methodology should, in our opinion, be independent of the RBA/Reuters curves. The SAPN extrapolation method provides this independence and the results of applying this methodology are set out in Table 3-2 above.

## 4 Conclusion

70. Our January 2016 report concluded that if weights given to different data sources must be predetermined then 100% weight should be given to the RBA curve. We also advised that if weight was to be given to the BVAL curve then the same weight should be given to the Reuters curve. There has been no new evidence that would cause those conclusions to be altered.
71. There is new evidence, surveyed in this report, which strengthens those conclusions. Most notably in relation to the impact on each curve as a result of two newly issued bonds (Jemena and Mirvac) that have yields that are outliers for the broad BBB rated category of bonds (and, in the case of the Jemena bond, is actually an A rated category bond based on Moody's rating). These bonds will not materially affect the RBA estimate due to its large sample size.
72. However, they do have the potential to affect the curves with smaller samples size (BVAL and Reuters) more materially. Of these two curves it is our view that the BVAL curve has adapted to these new issues least well – with erratic movements in yield estimates and inappropriate categorisation of the Jemena bond to the BBB band.
73. The Reuters curve has reacted in a more robust manner to the addition of the Mirvac bond, but we note that this property may not necessarily generalise to future possible bond additions. This contrasts with the RBA curve with its considerably larger sample size, which would more reliably remain robust to individual bond outliers.
74. For the above reasons, the recent developments in the BVAL curve, as well as the corresponding developments in the Reuters and RBA curves, do not change the conclusions that we arrived at in our previous report. Instead, we consider that these developments lend support to those conclusion: that the RBA curve has the most desirable properties for estimating the DRP applicable to a benchmark efficient firm; and that if multiple data sources are to be selected, then there is no reason to include the BVAL curve without also including the Reuters curve, given that there is no basis to conclude that the BVAL curve is superior to the Reuters curve.