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Memorandum

To:	JWS
From:	CEG – Asia Pacific
Date:	26 June 2018
Subject:	**ENA debt data**

1 Purpose

1. The purpose of this memorandum is to address the following high level questions

   a. Have the businesses surveyed by the AER typically, across their entire portfolios, issued debt at a lower risk premium than the AER would have compensated based 10 year RBA/Bloomberg BBB benchmark;

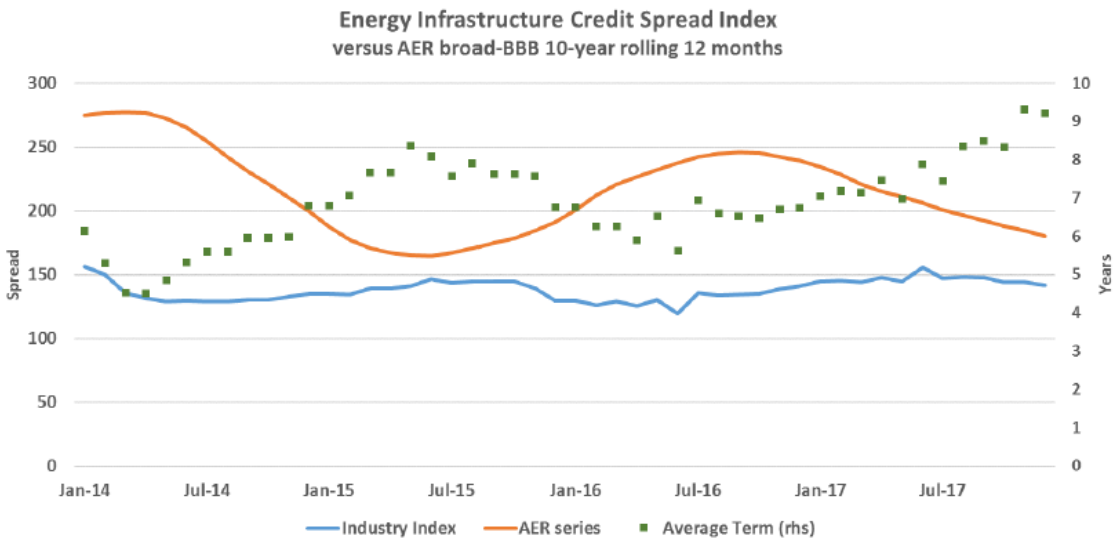
   b. If so, why is this? In particular is it because:

      - The firms in the sample have issued at below the RBA/Bloomberg BBB benchmark even when matched for tenor; or
      - Some other reason?

2 Question A: Has compensation exceeded cost?

2. Figure 2 of the AER discussion paper compares 12 month trailing average of actual debt risk premiums (DRPs) for debt issued by surveyed businesses with the 12 month trailing average of Bloomberg/RBA 10 year BBB benchmark. This figure is reproduced below.

Figure 2 The current AER approach compared against EICSI[39]



Source: Chairmont, AER data.

3. Casual inference from this chart suggests an average "outperformance" of around 70bp or so.

4. However, this is not the case because:

   a. The AER does not compensate for debt costs based on the RBA/Bloomberg series but, rather, on an inflation adjusted version of this series. When this adjustment is implemented it is clear that, even without any other adjustment, compensation is less than cost over the period shown;

   b. Even putting that issue aside the above analysis is problematic because:

      i. The 'industry index' gives the same weight to 1 year debt as 10 year debt. This is inappropriate and 10 year debt should receive 10 times the weight of 1 year debt;

      ii. The simple trailing average does not attempt to compare the AER benchmark series with actual debt raisings only on the days debt has actually been issued;

      iii. The Chairmont sample does not include callable/subordinated debt;

      iv. Including short term debt without capturing all transaction costs (including upfront costs) is problematic. There is a need to more carefully deal with fees and transaction costs when including short term debt.

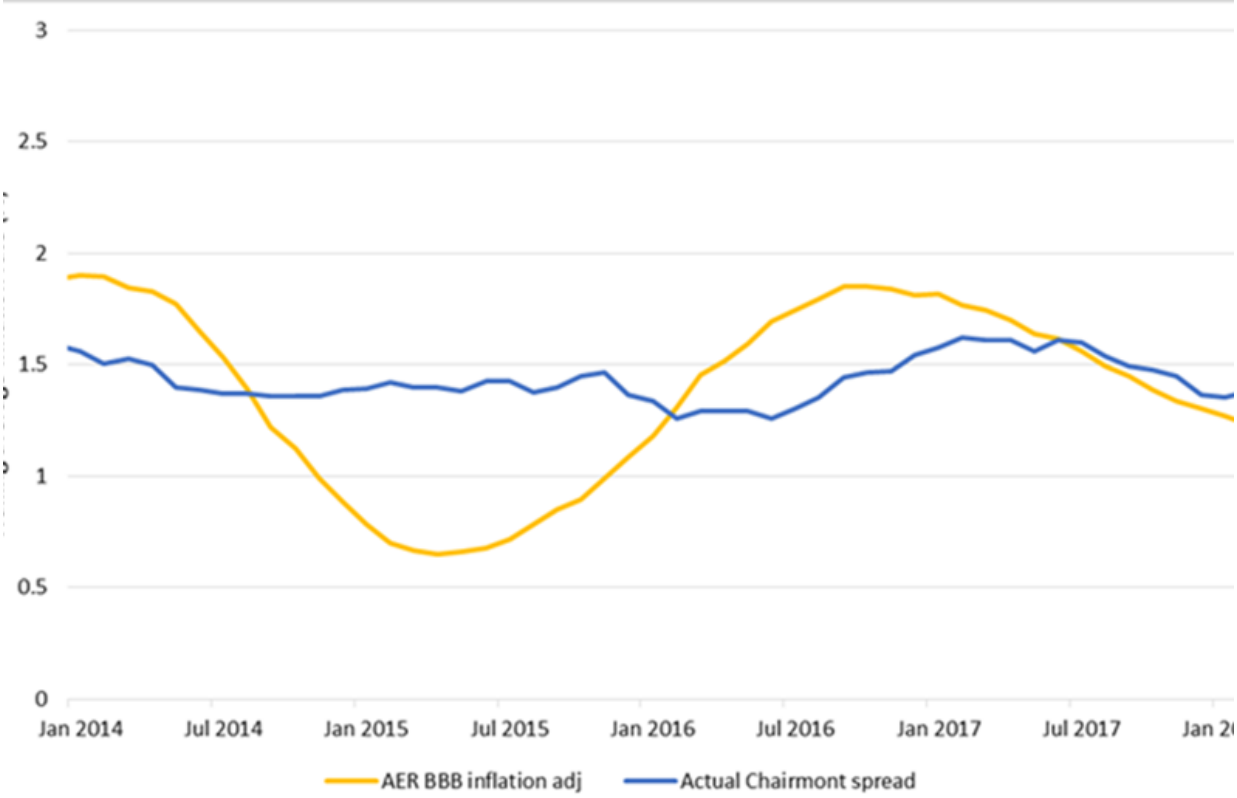
2.1 Inflation adjustment

5. The regulatory framework derives a real cost of debt by subtracting a 10 year inflation forecast from the nominal benchmark. Actual inflation is added back in over the course of the regulatory period.

6. In order to account for this we have calculated a 12 month trailing average of the inflation forecast that the AER would arrive at using its stated methodology (RBA forecasts for the short term and 2.5% thereafter). This has averaged 2.5% from 1 January 2013 onwards. We have then subtracted the actual inflation from each date until March 2018 (the last known inflation figure). We then take a rolling average of actual inflation and subtract this from the rolling average of forecast inflation. (This value is typically well above 50bp.)

7. The resulting amount is how much the AER benchmark must be reduced by in order to actually illustrate the level of compensation provided (i.e., after adjusting for the difference between forecast and actual inflation). It can be seen that after making this adjustment the measure of compensation is below the Chairmont measure of cost (even before making any further changes the Chairmont measure of cost).

Figure 2-1: Inflation adjustment



2.2 Other adjustments to the Chairmont measure of costs

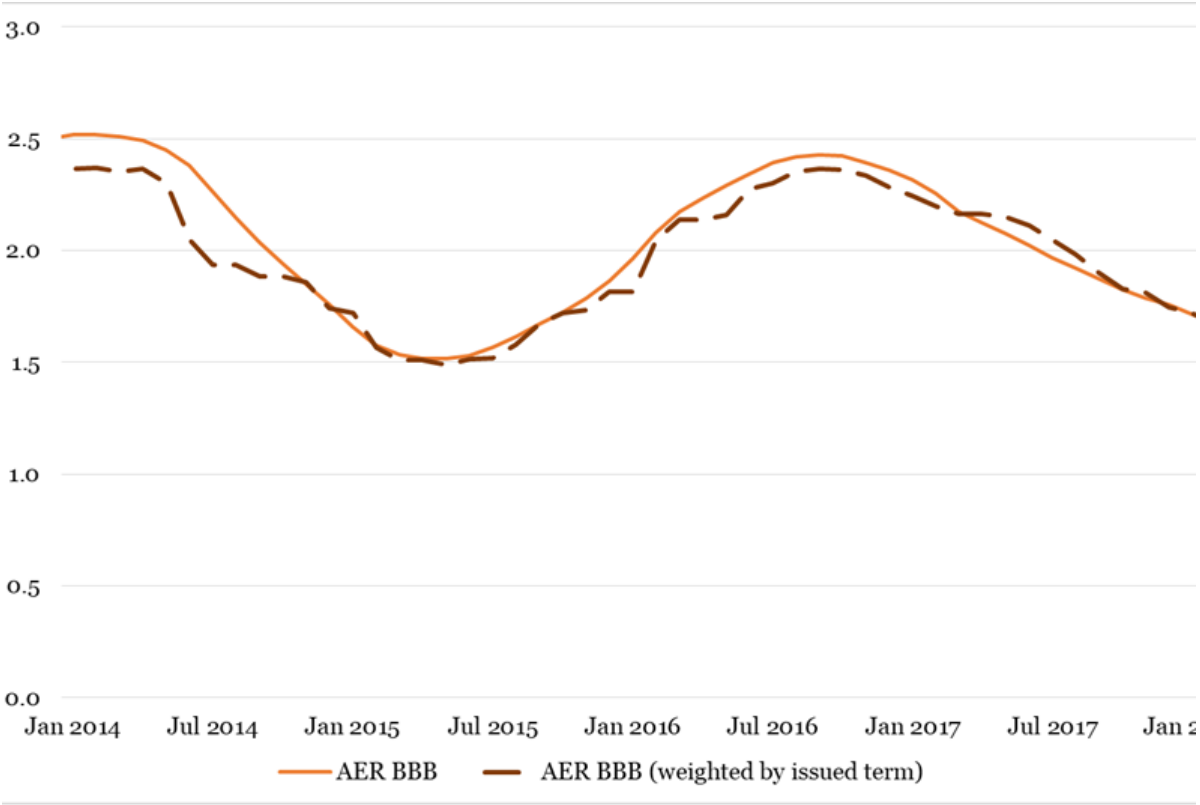
2.2.1 Weight by tenor

8. In order for the survey data to be meaningfully interpreted it is important that each observation be weighted by its tenor. Intuitively, 10 year debt should be given 10 times the weight as 1 year debt because it remains in the portfolio for 10 times as long. More technically, if a business issues $1m of 10 year debt every year forever and $1m of 1 year debt every year forever then the 10 year debt will, after ten years, stabilise at $10m of debt while the 1 year debt will always remain at $1m. That is, the 10 year debt will have 10 times the weight in the portfolio – even if every year the same amount of 10 and 1 year debt is issued.

2.2.2 Weighting only the days on which debt is issued

9. The AER presents 12 month rolling averages of the benchmark and debt issues. However, in any 12 months debt is only issued on a handful of days. If the benchmark series only takes an average on days that the industry issued debt (and each day is weighted by the tenor of debt issued on that day) then the 12 month weighted average of the benchmark is slightly lower than the simple average.

Figure 2-2: Impact on benchmark of weighting by day and term of debt issued



2.2.1 Callable and subordinated bonds

10. The Chairmont sample does not include callable/subordinated debt. This may be reasonable if the purpose of the analysis to compare DRPs on debt with similar characteristics to the AER benchmark to the predicted DRP. However, if this was the objective then debt with different credit ratings and tenors should also be excluded.

11. We understand that the purpose of the AER Figure 2 is to assess, for the sample of firms surveyed, the average difference across the portfolio of debt used to finance the RAB between the actual DRPs and the benchmark 10 year predicted DRP.

12. In this regard we note that callable and subordinated debt are typically issued at higher cost than standard debt in order to lower the overall risk/credit rating of the entire portfolio. That is, if these debts were issued on 'standard terms' they would have lower DRPs but other debts would have higher DRPs (because the risk of these non-subordinated and non-callable debts would be raised). Thus, it would amount to a form of 'cherry-picking' to exclude these instruments but to include the instruments that benefit from the issuance of these debts.

13. For the purpose of weighting callable debt by tenor we have ascribed a tenor of 10 years or actual maturity whichever is the lower.

2.2.2 *Fees*

14. Chairmont states:

> *Fees associated with debt raising are only included if they act as an additional borrowing margin, such as line fees or commitment fees, as these are constant costs that are sometimes applied in place of a higher lending margin on bank debt. Other fees such as undrawn fees or establishment costs are not considered part of the borrowing margin. The former is a substitute for the borrowing margin, when the loan is undrawn, while the latter is a debt raising expense, which AER treats separately in its allowance consideration.*

15. This may be a reasonable approach if the AER's compensation for debt raising matches the debt raising costs incurred. However, there is reason to be sceptical about such a conclusion. This is especially true in relation to short term debts where upfront fees can translate into very high effective DRPs on that debt. Given the inclusion of a large number of 5 year and lower debts this is an important issue to consider.

16. Similarly undrawn fees maybe an important part of total fees. These fees are paid by the business in order to have liquid debt drawing facilities available. The alternative would be to raise more debt as required and incur greater transaction costs in doing so. One can think of undrawn fees as a prepayment of future debt raising costs.

17. Chairmont does not mention the transaction costs associated with managing the portfolio of financial derivatives but these should also be included.

18. In our view the AER should attempt to convert the total debt raising costs for each instrument[1] into an annualised bppa estimate. (Noting that in order to do so accurately the AER may require more information from businesses as it is not obvious that all debt raising costs/information has been provided.) This should be added to the DRP of that instrument. In order to ensure an apples with apples comparison the AER benchmark should be expressed on an inclusive of debt raising costs basis.

19. Our preliminary estimate of this effect is to reduce the measured outperformance from 30bp to 25bp. However, this does not attempt to capture transaction costs associated with financial instruments or, obviously, costs not recorded (such as

[1] Derivatives that are used as an overall portfolio hedge can be allocated proportionally to each of the issuers' debt instruments.

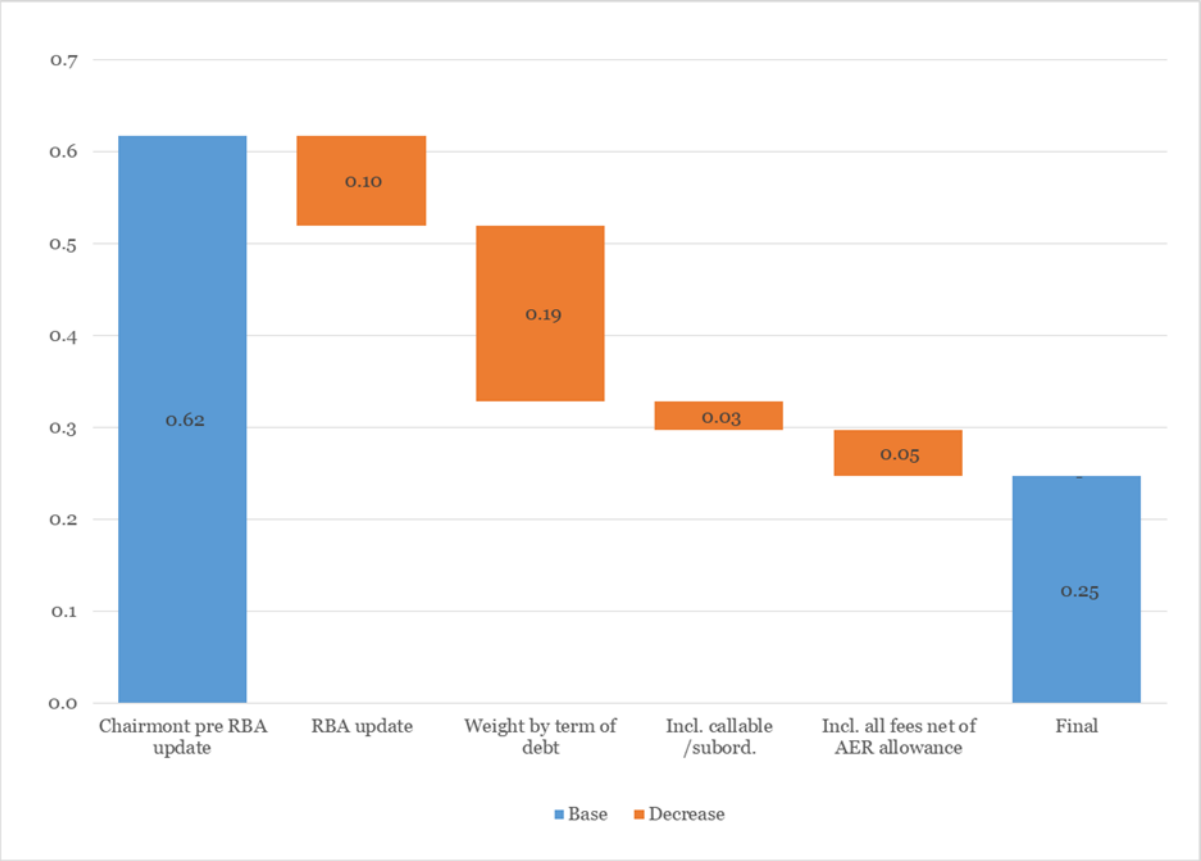
costs of maintaining a credit rating and other corporate treasury functions). For more detail see the appendix to this memo.

2.2.3 *Cumulative impacts*

20. The following chart decomposes each of the changes described above. The starting point (62 bp) is the simple average of the difference between DRPs on debts issued and the 10 year BBB benchmark DRP on the same day. There is then:

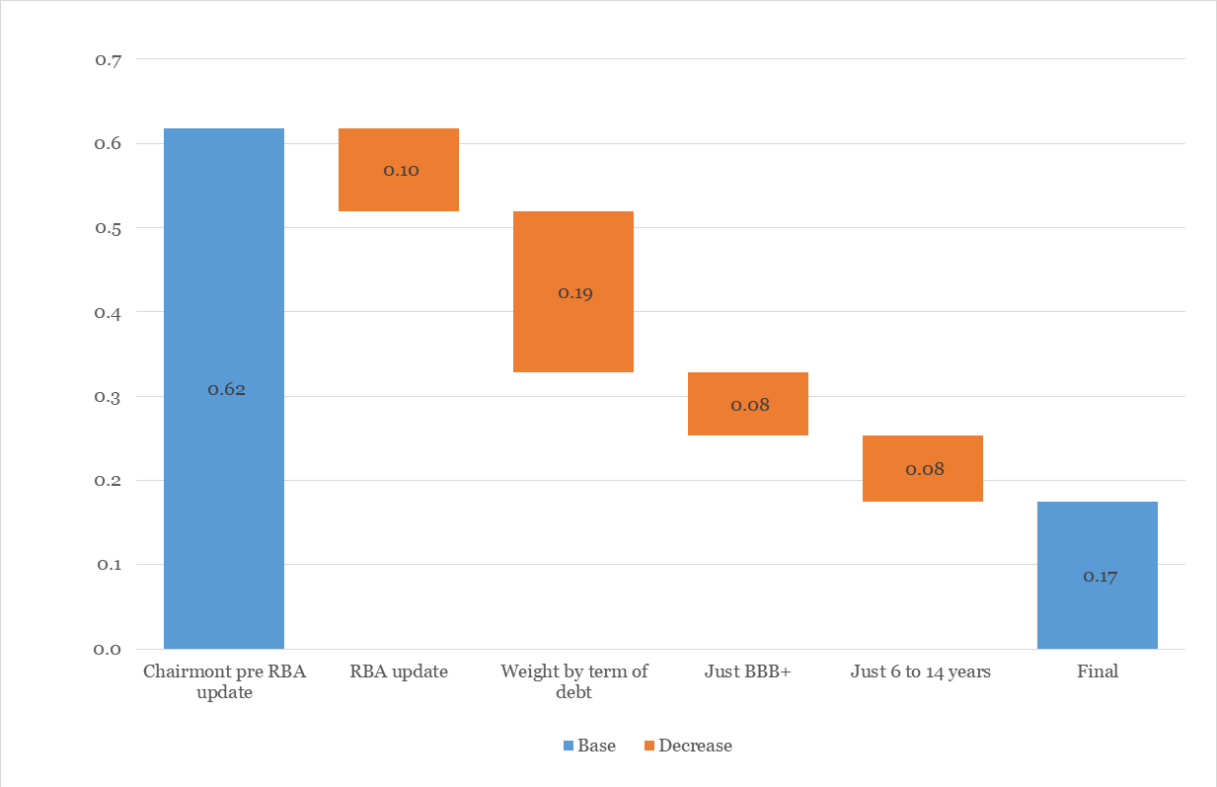
- A 10 bp adjustment for the impact of revised RBA data;
- A 19bp adjustment for the impact of weighting by tenor;
- A 3bp adjustment for the impact of including callable/subordinated debt.
- A 5bp adjustment which is the net effect of including all fees which is comprised of:
  - an around 14.3 bp fall in tenor weighted average spreads due to including upfront fees and undrawn fees (on the assumption that half of the maximum loan amount is undrawn)); less
  - 9.4 bp being the approximate AER allowance for debt raising costs.

Figure 2-3: Cumulative impacts of changes where the "question" being asked is a whole of portfolio question



21. If, instead, the intent is to analyse only debt that is similar to the 10 year BBB benchmark then a different set of adjustments are required that might exclude callable and subordinated debt but would also exclude other instruments. Figure 2-4 illustrates this excluding instruments with credit ratings different to BBB+ and all tenors below 6 years and above 14 years.

Figure 2-4: Cumulative impacts of changes where the "question" being asked is a whether the debt like the benchmark has DRP like the benchmark



2.3 Conclusion

22. In conclusion, a measure of overall 'outperformance' relative to the 10 year benchmark appears to be something less than 30bp and certainly negative if the estimate is performed based on real compensation for the cost of debt. However, we note that this is specific to the 5 year period in question and the instruments issued by the businesses surveyed.

3 Question B. What is the reason for the 25 bp (nominal) difference across the entire sample?

3.1 Does lower average tenor explain the difference?

One possible explanation for the 25bp "outperformance" relative to the 10 year BBB benchmark is that firms tended to issue less debt at lower average maturity than 10 years - which attracts lower credit spreads. However, the tenor weighted average maturity is of debt issued is 9.8 years (i.e., not materially different to 10 years).

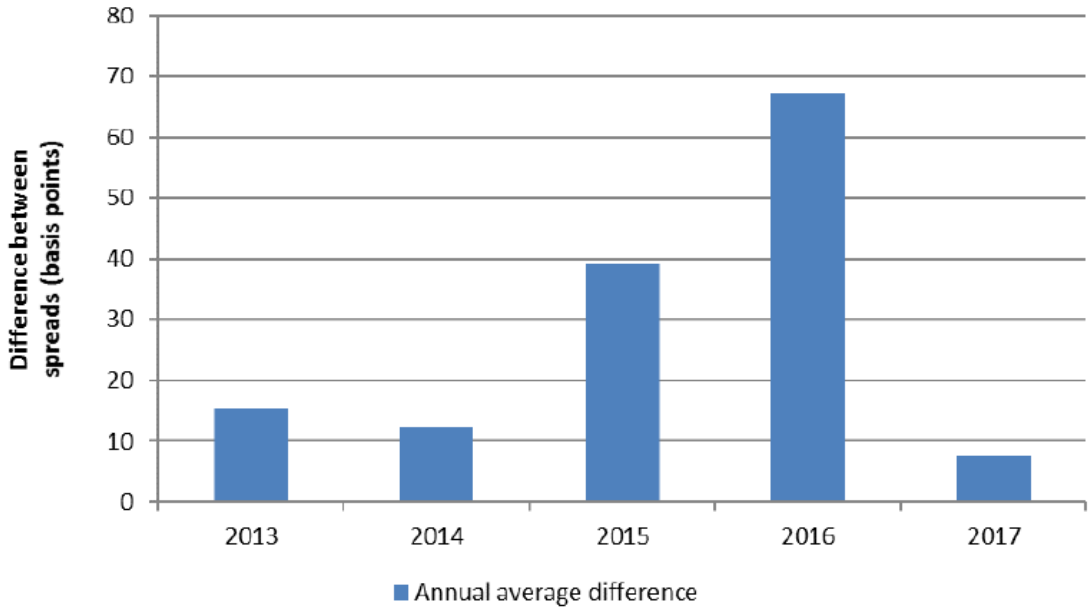
Thus, the average term of debt being different to 10 years does not explain the difference.

3.2 Does matched term 'outperformance' explain the difference?

23. The AER's Figure 3 analysis attempts to assess whether the sample of firms surveyed as a whole are issuing debt at a lower credit spread than the RBA/Bloomberg BBB benchmark curve when matched to the term of the debt.

24. The AER's Figure 3 is reproduced below.

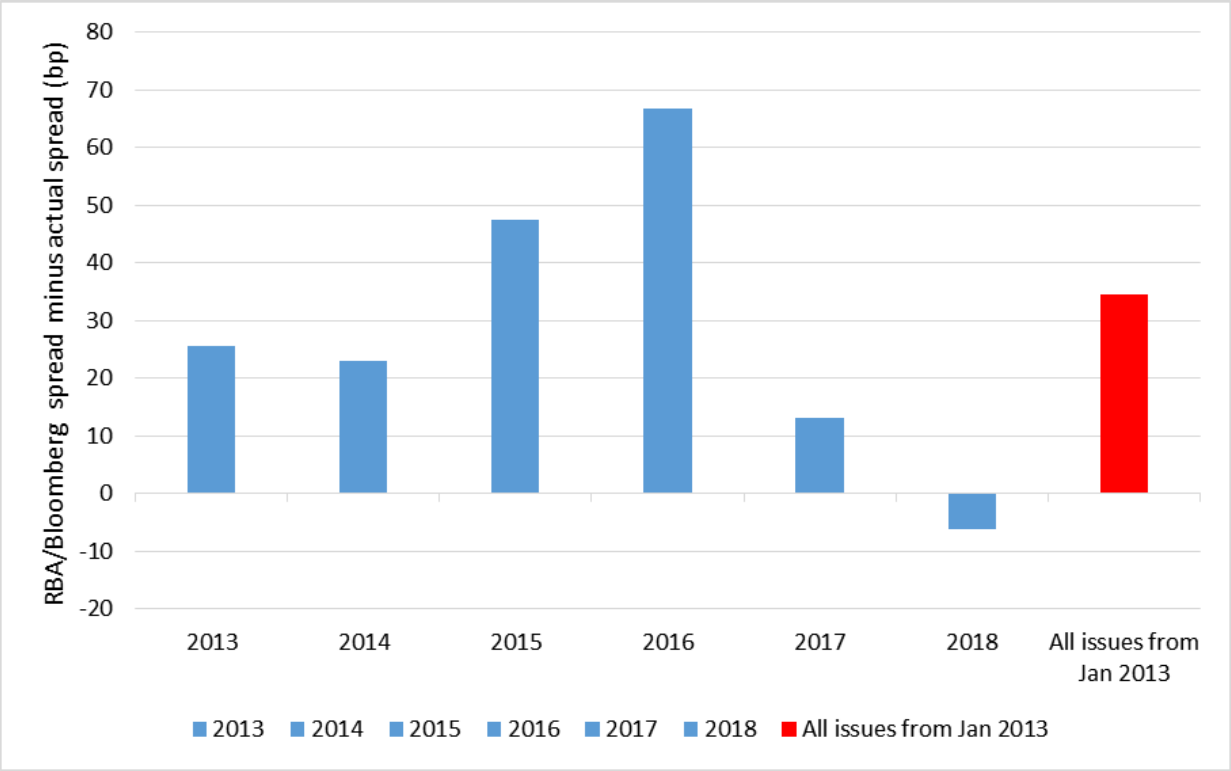
Figure 3 Comparison of spreads on debt instruments against the AER approach (Bloomberg and RBA) BBB estimate at matching term to maturity



Source: AER analysis, Bloomberg, RBA.

25. We have not been able to exactly replicate this Figure. Our best attempt at replication is shown below. Our estimates appear very similar in 2015 and 2016 but are noticeably higher in other years. We also include 2018 (up to 26 February) and the average across the entire sample as additional bars in the chart. The simple average across the entire period is 34 bp. (Note that this replication is based on data pre RBA update and also follows the AER methodology of excluding all bonds with greater than 10 years to maturity from the analysis.)

Figure 3-1: CEG best replication of AER Figure 3

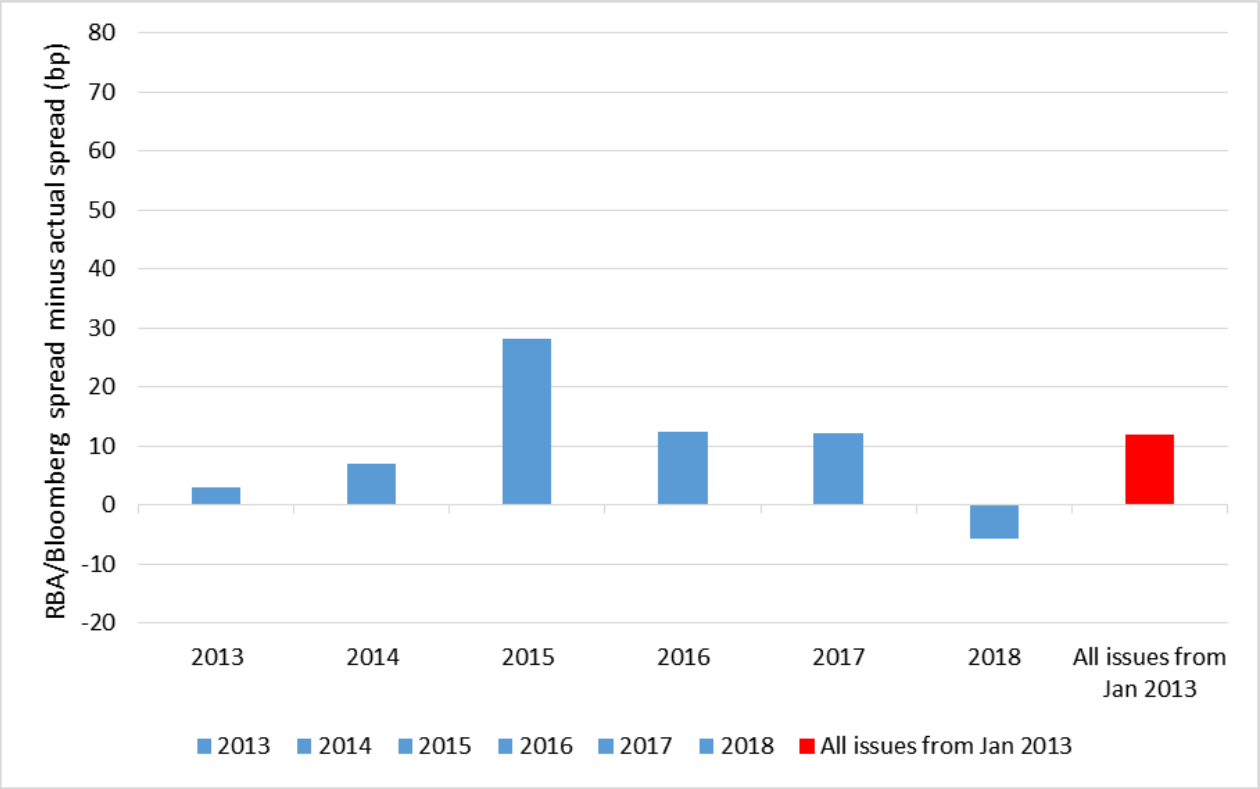


26. However, if we make the following cumulative amendments:

- update for the latest RBA data the estimate falls to 32bp;
- include all fees net of the AER debt raising cost allowance of 9.4 bp then the simple average across all observations more than halves to 15bp (consistent with high effective percentage fees on short term debt);
- extend the sample to include callable/subordinated debt then the simple average falls to 12bp;
- instead of a simple average if we weight by tenor then the average stays more or less constant at 12bp.

27. This final scenario is illustrated below.

Figure 3-2: CEG alternative to AER Figure 3



28. In our view Figure 3-2 is a more accurate estimate of the difference between credit spreads and the matched tenor BBB benchmark curve over the relevant period. Figure 3-2 suggests that there is no material difference between the credit spreads on instruments issued over the last 5 years and the matched term RBA/Bloomberg estimate.

29. In this regard we also note the following quote from Chairmont.

> *The complexity of the relationships is apparent from Graph 5, along with the importance of conducting deeper analysis of the data. For example, the RBA data reports that spreads for 5-year BBB debt (B5) were higher than spreads for 10-year BBB debt (B10) around the beginning of 2016. This is unlikely to be a true reflection of comparable bond pricing, but rather arises from different composition of issuers between the two bond sets at that time.*

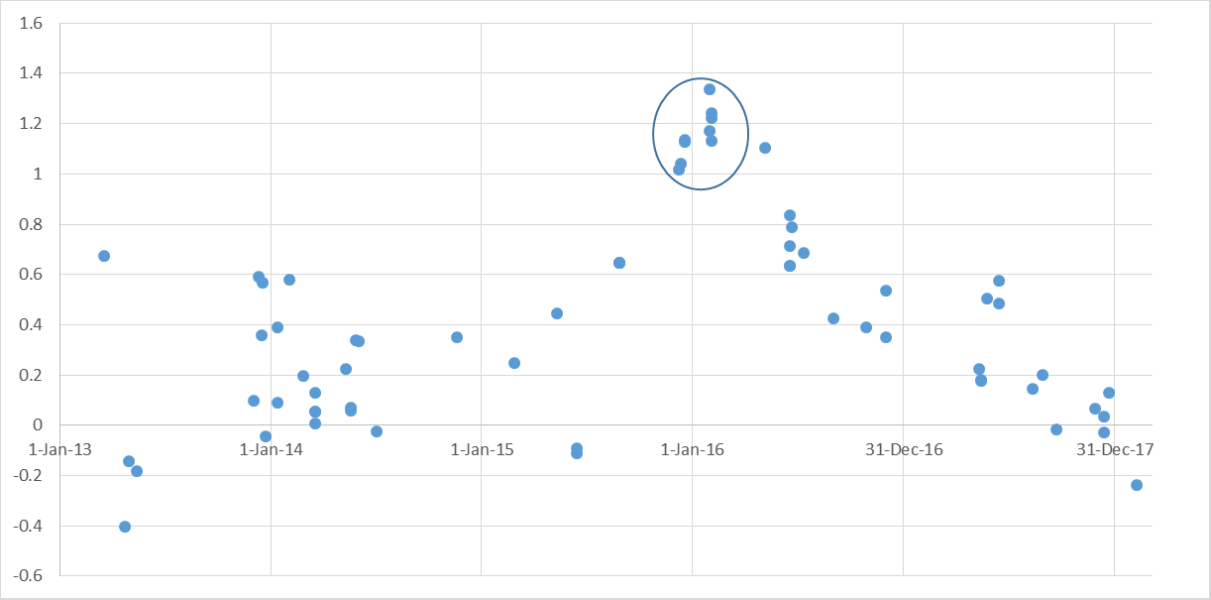
30. In this passage Chairmont notes an anomaly in the RBA data series that justifies a deeper analysis of the data. Specifically, the fact that for a brief period in late 2015 and early 2016 the RBA was reporting elevated 5 year BBB credit spreads such that the 5 year BBB spreads were higher (and materially so) than 10 year credit spreads. In fact, it is also the case that RBA 3 year BBB credit spreads were above 10 year BBB credit spreads in this period. Note that elevated RBA estimates of credit

spreads at 3 and 5 years do not lead to elevated compensation under the AER 10 year benchmark methodology.

31. However, the effect of these anomalously high short tenor estimates of credit spreads is that the AER's Figure 3 and Figure 5 analysis includes short term debt issued by the industry in this period which contributes to a conclusion that the industry issues debt at materially lower spreads than the BBB benchmark. However, in reality, this is due to an anomalously high benchmark at those tenors in this period.

32. This can be analysed by comparing a time series of the difference in actual and term matched BBB debt for 0 to 6 year tenor debt in this period. Figure 3-3 below shows such a time series (where spreads are estimated only including line and commitment fees as per Chairmont's analysis). It can be seen that from 12 December 2015 to 3 February 2016 there were nine debt instruments issued with tenors of between 0 and 6 years. For all of these instruments the RBA/Bloomberg BBB credit spreads was more than 1.0% higher than at matched tenors.

Figure 3-3: RBA/Bloomberg BBB spreads less actual spreads on 0 to 6 year debt instruments (matched tenor comparison)



33. These observations are enclosed by the small circle above. (Note that a wider circle could be drawn to include debts issued in mid June 2018 (which are also influenced by May 2016 RBA estimates that have 3 and 5 year BBB credit spreads essentially equal to 10 year credit spreads.))

34. Removing the observations enclosed by the small circle in Figure 3-3 reduces the simple average of matched tenor differences in our replication of the AER sample

from 32bp to 25bp. That is, more than a fifth of the simple average of matched tenor differences is due to these observations. The impact on our preferred measure is much smaller reducing it from 12 bp to 9 bp.

35. Note also that a 9bp/12 bp difference across the sample is not a very large difference. The average 10 year BBB benchmark credit spread over the period is 200 bp such that a 9/12 bp difference is just 5% of this.

3.2.1 Conclusion

36. It is far from obvious that the 9/12 bp estimate is strong evidence of any real difference between the average industry credit spread and the matched term Bloomberg/RBA BBB estimate.

37. It follows that the 25 bp tenor weighted average difference between observed and 10 year benchmark spreads is not explained by firms issuing debt that is, on average, 25 bp lower than the average of RBA/Bloomberg curves at the same tenor. At best, this explains something like 9/12 bp of the difference.

3.3 Other possible explanations

38. In our view, the most likely explanation is that the sample includes a spread of different terms issued and that it happens to be the case that, over the period analysed and for the debt instruments issued, the relationship between credit spreads and tenor is non-linear. Specifically,

    a. At low tenors (e.g., 5 years and below) credit spreads are materially below those at a 10 year tenor; but

    b. At higher tenors the relationship between tenor the credit spread is less strong;

    c. Consequently, the average (tenor weighted) DRP is slightly less than the 10 year DRP even though the average (tenor weighted) tenor has been almost exactly 10 years.

39. This is illustrated in the figures below which shows a relatively steep relationship between credit spreads and tenor at and below 5 years with an, on average, flatter relationship after that (at least up to 15 years).

Figure 3-4: Credit spreads for Chairmont sample (line and commitment fees only)

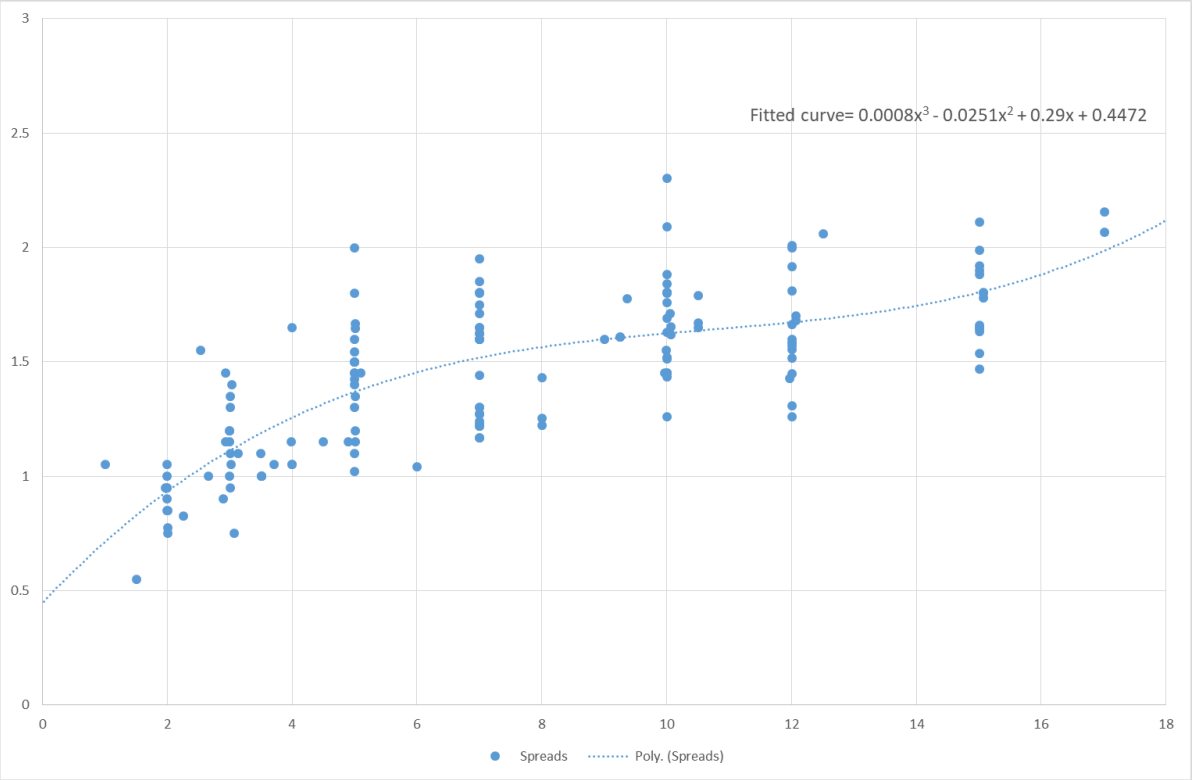
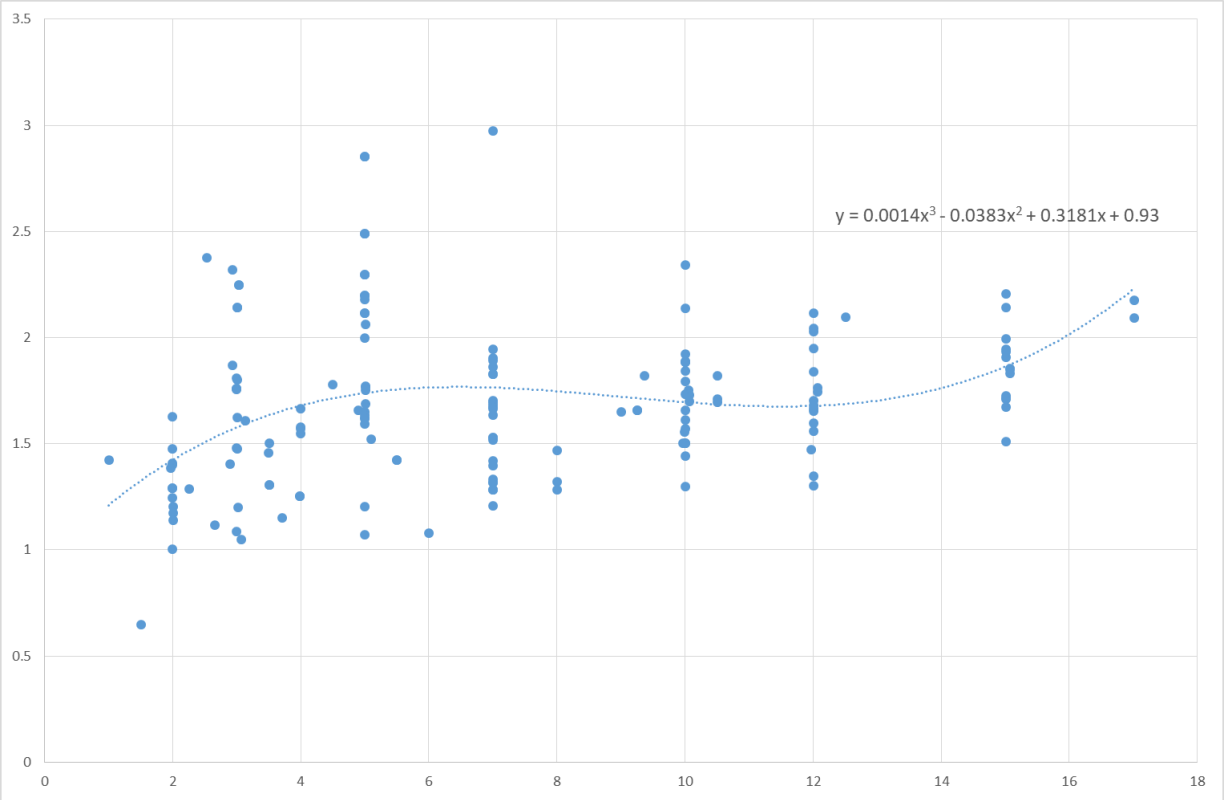


Figure 3-5: Credit spreads for Chairmont sample (all fees)



40. The impact of this is that, even though the tenor weighted average maturity of debt is effectively 10 years the tenor weighted DRP on all debt is less than the DRP on 10 year debt. This is because it is 'dragged down' by the lower credit spreads on debts with less than 5 years maturity and this is not fully offset by higher credit spreads on instruments with longer than 10 years tenor.

41. It appears that it is this non-linearity in DRP in the sample/sample period may be an important explanation for observed 25 bp lower average credit spreads than the 10 year RBA/Bloomberg BBB benchmark.

3.4 Likely continuity

42. It is an open question as to whether this effect is likely to remain in the future. It relies on the industry continuing to issue the spread of tenors described in the above charts and the credit spreads continuing to have the same relationship to tenor.

43. If the observed issuance of short term debt is, in part, a function of recent privatisations and an attempt to align maturity profile to the transition to a trailing average (by newly privatised firms and others) then it may be that the observed rate of issuance of short term debt may be transitory. In this regard it is relevant to note that since 1 January 2016 the tenor weighted average maturity of debt issued has been 10.4 years (compared to 8.8 years before that). The measured

'outperformance' relative to the BBB benchmark in this period is around half that for the full sample period.

Appendix: Calculation of 'all fees'

44. In addition to the line fees and commitment fees that Chairmont included, the businesses also reported the following fees:

- Upfront fees;
- Ongoing fees;
  - Commitment fees;
  - Line fees;
  - Wrapped fees;
  - Fees on undrawn balance (also referred to as fees on uncommitted amount); and
  - Agent fees.

45. Although the AER specified that upfront fees were to be denominated in AUD thousands,[2] while ongoing fees should be denominated in basis points, close scrutiny of the data shows that a number of businesses did not adhere to these units. We therefore manually identified the units used by each business, which is summarised in Table 0-1.

Table 0-1: Fee units used by each business

	Units for upfront fees	Units for ongoing fees
AGN	%	%
Ausgrid	$	Bp
AusNet	$'000	Bp
Citipower/Powercor	$'000	Bp
Endeavour	$'000	$ and %
ElectraNet	$	$ and bp
Jemena	$'000	%
Multinet Gas	$'000	Bp
SA Power Networks	-	Bp
Transgrid	$'000	Bp
United Energy	$'000	%

Source: ENA businesses; CEG analysis

[2] The relevant column headings were "Upfront total (k)" and "Ongoing total (bp)".

46. Using the units shown in Table 0-1 for each business, we then derived the total fee for each instrument as follows:

    i. For costs denominated in upfront values, divide the cost by the amount issued in order to obtain the cost denominated in bp; then

    ii. Divide all upfront fees by the term of debt at issuance in order to obtain the equivalent estimate of fees in bp per annum; and

    iii. Add the upfront fees in bp per annum from step (ii) to the ongoing fees in bp per annum and use this as the estimate of total fees in bp per annum.

47. We note that steps set out in paragraph 46 are likely to underestimate the total fees for two reasons. First, step 46.iii does not take the WACC into account when converting upfront fees to bp per annum, which would have had the effect of raising the estimate of fees.

48. Second, when dividing upfront fees by the term of debt at issuance in step 46.ii, we use the term of debt at issuance as the denominator without taking repayments into account. Had we instead used the term of debt up to repayment date, this would have reduced the denominator for some instruments in step 46.ii, thus increasing the fee estimate for that instrument.

49. In carrying out the steps shown in paragraph 46, we have calculated the fees on the undrawn balance on the assumption that half of the maximum loan amount is drawn. For example, if an instrument lists 50 bp on the undrawn balance, then we simply add 50 bp to the total fee estimate. This is equivalent to assuming that 50% of the amount issued is undrawn.

50. To see this, consider a business that needs to raise $5 million debt but elects to take out a $10 million loan, whereby the additional $5 million serves as a liquidity buffer (at least until it is drawn). Further assume zero upfront fees and ongoing fees equal to 1% on the drawn amount and 0.2% on the undrawn amount. Since 50% of the amount issued is undrawn, the business incurs a cost of 1.2% on the $5 million debt that it needed to raise, which is equal to the estimate obtained from the approach in paragraph 46.

51. When we include all fees in the credit spread we simultaneously add 9.4 bp to the benchmark BBB curve on the basis that the AER makes an allowance of 9.4 bp for debt raising costs. However, we note that this may be a conservative approach because it is not obvious that the businesses have included all of the costs of debt raising in their answers to AER questions (such as costs of maintaining credit ratings and other corporate treasury costs). The estimates also do not include the costs of financial derivative transactions such as are associated with interest rate swaps.