ESQUANT
Statistical Consulting

Addendum to ESQUANT report: Estimating the yield on a benchmark corporate bond. Further analysis of third party indicator series.

A REVIEW OF THE EVIDENCE WITH REFERENCE TO THE MEASUREMENT PERUIOD FOR UNITED ENERGY.

ESQUANT STATISTICAL CONSULTING

3 February 2016

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2 Executive summary

2.1 Results from ESQUANT analysis of yield curves and third party indicator series

In its recent report prepared for United Energy, ESQUANT Statistical Consulting derived a cost of debt estimate of 5.722% for an averaging period from 13th November to 10th December 2015[1]. The result was commensurate with a 10-year tenor and was produced using an empirically estimated Nelson-Siegel yield curve.

A robust regression method was applied in the particular instance. The standard error of the estimated yield at 10 years was comparatively low, at 0.076%. ESQUANT reported that the result, which was expressed on a semi-annual basis, was the best estimate of the 10-year yield. The value was amenable for use as an input into various transition scenarios for the rate of return on debt.

The Nelson-Siegel yield curve was fitted with separate intercept terms for bonds in the BBB-, BBB, and BBB+ credit rating categories. The estimated 10-year yield represents a weighted average of the results obtained for bonds in each of the three sub-groups. The weights were evaluated as the shares of the bonds in each of the sub-groups expressed as a proportion of the total number of bonds in the overall BBB band. The relevant data sample was comprised of the bonds actually used in the regression.

The estimate of 5.722% was obtained by running a regression on corporate bonds that were issued by firms which do not operate in the financial sector. The sub-sample of observations contained both Australian dollar bonds and bonds denominated in foreign currencies (specifically, US dollars, British pounds, and Euros).

To corroborate the evidence from the empirical estimation of yield curves, ESQUANT also examined aggregate measures of credit spreads produced by third party data service providers.

The Bloomberg BVAL BBB rated curve produced a 10-year yield of 5.5440 per cent over the third averaging period for United Energy (13th November to 10th December, 2015), while the BBBAUD series from Thomson Reuters showed that the 10-year yield was 5.8528 per cent. An arithmetic average of the two results delivered a 10-year yield of 5.6984 per cent.

The RBA does not prepare daily measures of corporate credit spreads, and its outputs are only available for the penultimate or final business day of the month[2]. At the time at which the ESQUANT (2016) report was being written, the published results from RBA Table F3 were current as at 30th November 2015. The output for 31st December 2015 had not been produced.

Accordingly, the results from the RBA replication model (originally developed by CEG, and then updated by ESQUANT) were used in place of the published series. The RBA replication model is configured to produce daily results, and the model had been populated with bond data up to 11th December 2015. Thus,

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[1] ESQUANT (2016), Estimating the yield on a benchmark corporate bond in January 2015, June/July 2015, and November/December 2015: Analysis to support the transition to a trailing average rate of return on debt. A submission prepared for United Energy to accompany United Energy's Revised Regulatory Proposal. ESQUANT Statistical Consulting, 5th January 2016.

[2] RBA, Table F3, Aggregate Measures of Australian Corporate Bond Spreads and Yields: Non-Financial Corporate (NFC) Bonds. Reserve Bank of Australia.

daily results were available in respect of the averaging period for United Energy. The 10-year yield from the RBA replication model, when extrapolated using the SA Power Networks method was 5.5275 per cent.

An arithmetic average of the two third party indicator series, and of the extrapolated yield from the RBA replication model, delivered a 10-year yield of 5.6414 per cent. This value, expressed on a semi-annual basis, was transformed into an annual equivalent rate, producing a 10-year yield of 5.7210 per cent.

2.2 Incorporating the published results from RBA Table F3

This short report provides analysis which is supplementary to that in ESQUANT (2016). The purpose of the current report is to make full use of the published series of corporate credit spreads and yields that have been prepared by the RBA. The results from RBA Table F3 have been factored in for 30th October, 30th November, and 31st December 2015.

3 Extrapolation of the spreads to swap from the Reserve Bank of Australia series

3.1 Tabulating the results from the Lally (2014a) and SAPN extrapolation methods

The Gaussian kernel smoothing method that is applied by the RBA produces results for corporate credit spreads which have an effective tenor of less than 10 years. Therefore, extrapolation is needed in order to ensure that the outputs are commensurate with a ten year remaining term to maturity.

In the Lally (2014a) report on implementation issues, two alternative, but closely related methods were presented for extrapolating the corporate credit spreads from RBA Table F3. The results from the application of those methods to data from 30th October 2015 are presented in Table 3.1 below.

The first variant of the Lally (2014a) method makes use of both CGS yields and swap rates. Reference should be made to the part of Table 3.1 which describes the “Lally correction using CGS yields and swap rates”. Lally (2014a) has previously indicated that he favors the use of a method which draws upon CGS yields. The second variant of the Lally extrapolation technique makes use of swap rates only, and is more straightforward to apply. Reference should be made to the bottom rows of the Table which describe the “Lally correction using swap rates only”. The second variant of the Lally extrapolation approach has been adopted by the AER.

The result from the application of the second variant of the Lally (2014a) method is a 10-year yield of 5.378%. The calculation model that is used by the AER also makes use of the second variant of the Lally (2014a) method, and produces a 10-year yield of 5.381%. The AER result differs by a small margin because the AER makes use of the 10-year swap rates that are implied by the actual results from RBA Table F3. In effect, the AER infers a 10-year swap rate by taking the difference between the 10-year yield and the 10-year spread-to-swap.

In contrast, the figures in Table 3.1 draw upon swap rates from a source that can be cited more readily. The calculations shown in the table are transparent because reliance has been placed explicitly on the Bloomberg ADSWAP series. Historical, end-of-day data on Australian dollar interest rate swaps can be sourced from Bloomberg.

Table 3.1: Application of Lally extrapolation methods to the results from RBA Table F3, aggregate measures of Australian corporate bond spreads and yields. Data from 30th October 2015.

Formula	Component series or variable	Source	Units	
10e	Effective tenor for 10-years	RBA Table F3, BBB rated	years	9.11
7e	Effective tenor for 7-years	RBA Table F3, BBB rated	years	6.60
a	RBA Gaussian-kernel 10-year estimate	10-year target tenor	per cent	5.39%
b	RBA Gaussian-kernel 7-year estimate	7-year target tenor	per cent	5.15%
c	CGS yields, 10-year tenor	RBA Table F16 interpolated	per cent	2.644%
d	CGS yields, 7-year tenor	RBA Table F16 interpolated	per cent	2.338%
e; CGS (10e)	CGS yields, 9.11-year tenor	RBA Table F16 interpolated	per cent	2.583%
f; CGS (7e)	CGS yields, 6.60-year tenor	RBA Table F16 interpolated	per cent	2.283%
g	Swap (10)	ADSWAP10 Curncy	per cent	2.914%
h	Swap (7)	ADSWAP7 Curncy	per cent	2.639%
i	Swap (10e); for 9.11 years	Swap rates interpolated	per cent	2.837%
j	Swap (7e); for 6.60 years	Swap rates interpolated	per cent	2.590%
k=a-g+i	Lally claim about RBA (10e)	A swap adjusted yield	per cent	5.313%
l=b-h+j	Lally claim about RBA (7e)	A swap adjusted yield	per cent	5.100%
m=k-e	Lally DRP(10e)		per cent	2.731%
n=l-f	Lally DRP(7e)		per cent	2.818%
	Lally correction using CGS yields and swap rates:			
o = k+c-e+((m-n)/(10e-7e))*(10-10e)	**Lally RBA(10hat); pages 39-40 of Lally (2014a)**	Implementation Issues for the Cost of Debt, Martin Lally, 20th November 2014.	per cent	**5.344%**
delta = o-a/(10-10e)	Increment per annum		bppa	-5.178
(o-g)*10000	Implied spread to swap of the value for RBA(10hat)	Derived	basis points	243.01
	Lally correction using swap rates only:			
p	Spread to swap at 10-years	RBA Table F3, and derived	basis points	247.62
q	Spread to swap at 7-years	RBA Table F3, and derived	basis points	251.06
r = (p-q)/(10e-7e)	Increment per annum		bppa	-1.371
s = g+(p/100)+(10-10e)*(r/100)	**Lally "corrected" yield at 10-years**	AER method	per cent	**5.378%**

Formula	Component series or variable	Source	Units	
gain10 = (s-a)*10000	"Gain" from extrapolation at 10-years (b.p.)	AER method	basis points	-1.220
(s-g)*10000	Implied spread to swap of the Lally "corrected" yield at 10-years	AER method	basis points	246.40
t = h+(q/100)+(7-7e)*(r/100)	**Lally "corrected" yield at 7-years**	AER method	per cent	**5.145%**
gain7 = (t-b)*10000	"Gain" from extrapolation at 7-years (b.p.)	AER method	basis points	-0.548

Source: ESQUANT analysis. Results from RBA Table F3, Aggregate Corporate Measures of Bond Spreads and Yields, and from Table F16, Indicative Mid-Rates of Selected Commonwealth Government Securities. Swap rates from Bloomberg ADSWAP series.

Table 3.2 presents comparable analysis to that shown in Table 3.1. However, the results and calculations pertain to 30th November 2015.

As is apparent from the numbers presented in the second part of Table 3.2, the second variant of the Lally extrapolation technique causes yields to fall over the range of effective tenors from 9.16 years to 10 years. This is a similar outcome to that recorded in Table 3.1. The estimated 10-year yield is shown to be 5.511%. In the AER calculation model, the estimated 10-year yield on 30th November 2015 is worked out to be an almost identical value of 5.510%.

Table 3.2: Application of Lally extrapolation methods to the results from RBA Table F3, aggregate measures of Australian corporate bond spreads and yields. Data from 30th November 2015.

Formula	Component series or variable	Source	Units	
10e	Effective tenor for 10-years	RBA Table F3, BBB rated	years	9.16
7e	Effective tenor for 7-years	RBA Table F3, BBB rated	years	6.59
a	RBA Gaussian-kernel 10-year estimate	10-year target tenor	per cent	5.53%
b	RBA Gaussian-kernel 7-year estimate	7-year target tenor	per cent	5.36%
c	CGS yields, 10-year tenor	RBA Table F16 interpolated	per cent	2.895%
d	CGS yields, 7-year tenor	RBA Table F16 interpolated	per cent	2.592%
e; CGS (10e)	CGS yields, 9.16-year tenor	RBA Table F16 interpolated	per cent	2.838%
f; CGS (7e)	CGS yields, 6.59-year tenor	RBA Table F16 interpolated	per cent	2.535%
g	Swap (10)	ADSWAP10 Curncy	per cent	2.975%
h	Swap (7)	ADSWAP7 Curncy	per cent	2.747%
i	Swap (10e); for 9.16 years	Swap rates interpolated	per cent	2.923%

Formula	Component series or variable	Source	Units	
j	Swap (7e); for 6.59 years	Swap rates interpolated	per cent	2.707%
k=a-g+i	Lally claim about RBA (10e)	A swap adjusted yield	per cent	5.479%
l=b-h+j	Lally claim about RBA (7e)	A swap adjusted yield	per cent	5.320%
m=k-e	Lally DRP(10e)		per cent	2.641%
n=l-f	Lally DRP(7e)		per cent	2.785%
	Lally correction using CGS yields and swap rates:			
o = k+c-e+((m-n)/(10e-7e))*(10-10e)	**Lally RBA(10hat); pages 39-40 of Lally (2014a)**	Implementation Issues for the Cost of Debt, Martin Lally, 20th November 2014.	per cent	**5.489%**
delta = o-a/(10-10e)	Increment per annum		bppa	-4.928
(o-g)*10000	Implied spread to swap of the value for RBA(10hat)	Derived	basis points	251.41
	Lally correction using swap rates only:			
p	Spread to swap at 10-years	RBA Table F3, and derived	basis points	255.55
q	Spread to swap at 7-years	RBA Table F3, and derived	basis points	261.31
r = (p-q)/(10e-7e)	Increment per annum		bppa	-2.241
s = g+(p/100)+(10-10e)*(r/100)	**Lally "corrected" yield at 10-years**	AER method	per cent	**5.511%**
gain10 = (s-a)*10000	"Gain" from extrapolation at 10-years (b.p.)	AER method	basis points	-1.883
(s-g)*10000	Implied spread to swap of the Lally "corrected" yield at 10-years	AER method	basis points	253.67
t = h+(q/100)+(7-7e)*(r/100)	**Lally "corrected" yield at 7-years**	AER method	per cent	**5.351%**
gain7 = (t-b)*10000	"Gain" from extrapolation at 7-years (b.p.)	AER method	basis points	-0.919

Source: ESQUANT analysis. Results from RBA Table F3, Aggregate Corporate Measures of Bond Spreads and Yields, and from Table F16, Indicative Mid-Rates of Selected Commonwealth Government Securities. Swap rates from Bloomberg ADSWAP series.

Table 3.3 presents the analytics for 31st December 2015. The numbers show that the first variant of the Lally extrapolation technique has quite a profound effect on the estimated yield at 10-years. The yield is depressed by 10.9 basis points for each one-year unit of effective tenor.

The second variant of the Lally extrapolation technique also causes spreads-to-swap, and therefore yields, to fall. The estimated yield at a 10-year tenor is shown to be 5.454%. Note that in the AER calculation model, the estimated yield at 10-years turns out to be a very similar value, 5.461%. The difference between the two numbers can be attributed to the use of alternative data sources for the historical, end-of-day swap rates.

Table 3.3: Application of Lally extrapolation methods to the results from RBA Table F3, aggregate measures of Australian corporate bond spreads and yields. Data from 31st December 2015.

Formula	Component series or variable	Source	Units	
10e	Effective tenor for 10-years	RBA Table F3, BBB rated	years	9.12
7e	Effective tenor for 7-years	RBA Table F3, BBB rated	years	6.58
a	RBA Gaussian-kernel 10-year estimate	10-year target tenor	per cent	5.51%
b	RBA Gaussian-kernel 7-year estimate	7-year target tenor	per cent	5.42%
c	CGS yields, 10-year tenor	RBA Table F16 interpolated	per cent	2.860%
d	CGS yields, 7-year tenor	RBA Table F16 interpolated	per cent	2.558%
e; CGS (10e)	CGS yields, 9.12-year tenor	RBA Table F16 interpolated	per cent	2.803%
f; CGS (7e)	CGS yields, 6.58-year tenor	RBA Table F16 interpolated	per cent	2.487%
g	Swap (10)	ADSWAP10 Curncy	per cent	3.087%
h	Swap (7)	ADSWAP7 Curncy	per cent	2.835%
i	Swap (10e); for 9.12 years	Swap rates interpolated	per cent	3.018%
j	Swap (7e); for 6.58 years	Swap rates interpolated	per cent	2.786%
k=a-g+i	Lally claim about RBA (10e)	A swap adjusted yield	per cent	5.441%
l=b-h+j	Lally claim about RBA (7e)	A swap adjusted yield	per cent	5.371%
m=k-e	Lally DRP(10e)		per cent	2.639%
n=l-f	Lally DRP(7e)		per cent	2.884%
	Lally correction using CGS yields and swap rates:			
o = k+c-e+((m-n)/(10e-7e))*(10-10e)	**Lally RBA(10hat); pages 39-40 of Lally (2014a)**	Implementation Issues for the Cost of Debt, Martin Lally, 20th November 2014.	per cent	**5.414%**
delta = o-a/(10-10e)	Increment per annum		bppa	-10.931
(o-g)*10000	Implied spread to swap of the value for RBA(10hat)	Derived	basis points	232.70
	Lally correction using swap rates only:			
p	Spread to swap at 10-years	RBA Table F3, and derived	basis points	242.32

Formula	Component series or variable	Source	Units	
q	Spread to swap at 7-years	RBA Table F3, and derived	basis points	258.50
r = (p-q)/(10e-7e)	Increment per annum		bppa	-6.370
s = g+(p/100)+(10-10e)*(r/100)	**Lally "corrected" yield at 10-years**	AER method	per cent	**5.454%**
gain10 = (s-a)*10000	"Gain" from extrapolation at 10-years (b.p.)	AER method	basis points	-5.606
(s-g)*10000	Implied spread to swap of the Lally "corrected" yield at 10-years	AER method	basis points	236.71
t = h+(q/100)+(7-7e)*(r/100)	**Lally "corrected" yield at 7-years**	AER method	per cent	**5.393%**
gain7 = (t-b)*10000	"Gain" from extrapolation at 7-years (b.p.)	AER method	basis points	-2.675

Source: ESQUANT analysis. Results from RBA Table F3, Aggregate Corporate Measures of Bond Spreads and Yields, and from Table F16, Indicative Mid-Rates of Selected Commonwealth Government Securities. Swap rates from Bloomberg ADSWAP series.

Note that in ESQUANT (2016), the Lally extrapolation methods were applied to the results from the CEG RBA replication model. The calculation steps are shown in Appendix Table 3.5 of ESQUANT (2016). The daily results from the model were brought together for the period from 13th November to 10th December. The Gaussian kernel calculations were imposed upon the arithmetic averages of the relevant data series over the period in question. The relevant data series included the Australian dollar equivalent spreads.

3.2 The use of interpolation methods to produce daily values of the spreads to CGS

The AER calculation model applies a linear interpolation method to produce daily results from the end of month values that are reported in Table F3[3]. The variable that is subject to interpolation is the extrapolated value of the 10-year spread to Commonwealth Government Securities (CGS). The arguments for linear interpolation were reviewed and discussed in ESQUANT (2014) and (2016)[4].

A further point to note is that the AER has not considered a "day count" convention to use for its linear interpolation method. Typically, the AER applies its interpolation calculation in respect of working days, while leaving out public holidays and weekends. However, the AER has not been explicit about its day count method, and seems to take an *ad hoc* approach. The AER appears to be guided by whether or not the data is available, for a particular day, from RBA Table F16. Thus, the AER observes the same public holidays that are acknowledged by the Reserve Bank of Australia. Typically, these are national public holidays and state public holidays in NSW. However, because there has been no explicit statement or

[3] AER return on debt model. This was provided with the draft distribution determination for Ausgrid in November 2014.

[4] Diamond, N.T. and Brooks, R. (2014), section 5. ESQUANT (2016), section 2.3.2.

consideration by the AER, then there remains a degree of uncertainty about the use by the regulator of its interpolation approach.

Day count conventions are normally used when calculating either the accrued interest, present value or yield to maturity on fixed income securities. The day count varies according to the type of fixed income instrument. Settlement calendars are available for different countries and for different exchanges on which bonds are traded.

3.3 The application of the SAPN extrapolation method

ESQUANT (2015) investigated the properties of three different extrapolation techniques[5]. A specification for root mean squared error (RMSE) was developed algebraically, and empirical analysis was undertaken to calculate values of the RMSE using the end-of-month data from November 2013 to January 2015.

The SA Power Networks method was found to deliver a lower RMSE than the Lally (2014) method in each of the months that was examined. This was because curves extrapolated by employing the SA Power technique were relatively straight, while the variability was low when compared against the bias. The SAPN method was therefore found to perform better overall.

ESQUANT (2016) showed that when the return on debt is calculated as an average over multiple, consecutive observations, using the RBA measure of corporate bond spreads that has been extrapolated by applying the SAPN method, then the RMSE remains low[6]. The SAPN method performs best, by comparison with the two other extrapolation techniques, as the number of monthly observations increases, up to 60 months.

3.4 Results from the use of the extrapolation methods in conjunction with published values of the spread to swap

The impact on spreads to swap of the Lally (2014a) extrapolation methods and of the SAPN extrapolation technique is summarized below in Table 3.4. The results shown are based on the 20 business days of the third averaging period for United Energy.

The 10-year spread to swap resulting from the use of the SAPN extrapolation technique is 257.72 basis points. In ESQUANT (2016), the comparative figure was shown to be 251.06 basis points[7]. The comparative figure was obtained by applying the SAPN extrapolation technique to the base results from the CEG RBA replication model.

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[5] Diamond, N.T. and Brooks, R. (2015).

[6] ESQUANT (2016), section 2.3.

[7] ESQUANT (2016), Appendix Table 3.6, page 157.

Table 3.4: The impact of the Lally and SAPN extrapolation methods: Results from the United Energy averaging period, 13th November to 10th December 2015

Increment from extrapolation (bppa) and impact on 10-year spread				
		Lally method (swap rates only)	Lally method (swap rates and CGS yields)	SA Power Networks (SAPN) method
	Units			
Spread-to-swap at a 10-year target tenor (effective tenor of 9.15 years). Based on interpolated daily results from RBA Table F3.	basis points	255.63	255.63	255.63
Increment from 9.15 to 10 years, depending upon extrapolation method. (Daily results produced by linear interpolation).	bppa (result standardised to a one-year increment)	-2.511	-8.138	2.460
Resulting 10-year spread	basis points	253.49	248.70	257.72
Resulting 10-year yield	per cent	5.55	5.46	5.59

Source: ESQUANT analysis. The results from RBA Table F3 have been employed. The observations used were from 30/10/2015, 30/11/2015, and 31/12/2015. Under the South Australian Power Networks (SAPN) extrapolation method, a slope is calculated by fitting a straight line through the observed credit spreads and known tenors. Linear interpolation was used to produce daily results and was applied to the spreads to Commonwealth Government Securities (CGS).

4 Summary of outputs from the third party indicator series

4.1 Harnessing the results from the data vendors and information providers

The third party indicator series that were examined by ESQUANT (2016) were the Bloomberg BVAL BBB rated curve, the measures of corporate bond spreads for non-financial corporations from the Reserve Bank of Australia (RBA), and the Thomson Reuters BBB rated corporate credit curve, BBBAUDBMK.

A consideration of the components of the different series has revealed that there is no universal or unambiguous method for selecting a bond sample. The bond samples used by Bloomberg, the RBA and Thomson Reuters (TR) all differ. The most definitive conclusion that can be drawn is that there are advantages to the use of broader samples of bonds.

The BBBAUDBMK credit curve from TR includes some bonds, such as “kangaroo” bonds, for which the issuing entity is not incorporated in Australia. In addition, there are contributing bonds for which the issuing entity is incorporated in Australia, however the country of risk is shown as being a different country. An argument could therefore be mounted that the TR credit curve somehow distinguishes itself from the type of third party indicator series that should be used to measure the return on debt for a benchmark efficient entity[8]. In response to such an allegation, the following points should be noted:

- The BBBAUDBMK credit curve is comprised entirely of Australian dollar denominated bonds.
- Most of the bonds that are used in the make-up of the BBBAUDBMK curve are issued by companies that are incorporated in Australia.
- There is no empirical evidence currently available to suggest that the yields or spreads on Australian dollar bonds, for which the issuing entity is not incorporated in Australia, are systematically different from the yields or spreads on Australian dollar bonds for which the issuing entity is incorporated in Australia.
- Country of incorporation, country of risk, and country of domicile are concepts identified by Bloomberg. Thomson Reuters does not apply identical definitions or interpretations.
- TR has a well-documented process in place for the identification of bonds that are used to develop credit curves. Refer to section 2.3.1 of Appendix A (ESQUANT, 2016).

Table 4.1 below presents a summary of the data from the Bloomberg BVAL curve, and the TR BBBAUD credit curve in respect of the November-December averaging period that was nominated by United Energy. The bond yields are shown on a semi-annual basis.

Table 4.1: Summary of credit spread data over United Energy's measurement period: Bloomberg BVAL BBB rated series and Reuters BBBAUD credit curve.

Averages over the period from 13/11/2015 to 10/12/2015							
Tenor	Units	6	7	8	9	10	15
Bloomberg BVAL BBB yields	per cent	n/a	5.03	5.22	5.41	5.54	5.91
Interpolated end-of-day swap rates from ADSWAP series	per cent	2.68	2.78	2.87	2.95	3.02	3.28
Bloomberg BVAL BBB spreads-to-swap	basis points	n/a	225.45	235.38	245.97	252.71	263.42
Reuters BBBAUDBMK yields	per cent	4.62	4.88	5.18	5.52	5.85	n/a
Reuters BBBAUDBMK spreads-to-swap	basis points	193.79	209.75	231.65	256.67	283.58	n/a

Source: Bloomberg and Thomson Reuters

[8] The benchmark efficient entity is regulated by the Australian Energy Regulator.

The Bloomberg BVAL BBB rated curve provides a 10-year yield of 5.5440 per cent over the reference period, while the BBBAUD series from Thomson Reuters shows that the 10-year yield was 5.8528 per cent. An arithmetic average of the two sets of results delivers a 10-year yield of 5.6984 per cent.

The results from the previous section can also be incorporated into the analysis. An estimate of the extrapolated 10-year yield that is obtained by applying the SAPN extension method to the published results from RBA Table F3 is 5.5941 per cent.

An arithmetic average of the three third party indicator series delivers a 10-year yield of 5.6636 per cent. This value, expressed on a semi-annual basis, can be transformed into an annual equivalent rate, producing a 10-year yield of 5.74 per cent.

The AER has applied an arithmetic mean of two out of three third party indicator series in its recent determinations for regulated energy businesses. The AER method has been given impetus by a theoretical analysis undertaken by Lally (2014a) which attempted to show that combining two data series would assist in bringing down the mean squared error (MSE). However, Lally simply assumed that each of the component data series would be unbiased[9]. Lally (2014a) did not perform empirical analysis.

An average of the published measures provides useful corroborative evidence, at this time, of the results from the application of yield curves and other empirical methods. However, an average of the third party indicator series will not always be optimal. ESQUANT does not provide an unequivocal endorsement of such an approach.

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[9] Lally (2014a), section 2.2, pages 21-22.

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