Queensland Rail's debt margin for the 2013 DAU

August, 2014

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1. Executive Summary

1.1 Scope of report

The Queensland Competition Authority (QCA or 'the Authority') engaged Incenta Economic Consulting (Incenta) to estimate the debt margin for Queensland Rail at a term of 5 years and a term of 10 years, and for both an assumed credit rating of BBB+, for the 20 business days up to and including 28 June, 2013. In undertaking this estimate the Authority has requested us to apply the methodology that was set out in PricewaterhouseCoopers' (PwC) 2013 report outlining a cost of debt estimation methodology for regulated businesses.[1] We have applied this approach in the current report.

1.2 Cost of debt estimates

PwC recommended that regard be had to two methods for estimating a BBB+ debt risk premium, namely to use econometric techniques to predict the premium for the required term and credit rating (and recommended a specific method for this, which is discussed in the text) and the Bloomberg BBB fair value curve. To estimate a 10 year debt risk premium using Bloomberg data, PwC recommended extrapolating the 7 year Bloomberg BBB fair value curve to 10 years using the 'paired bonds' approach.

The results of our analysis are summarised in Table 1 below. We found that for the 20 business days to 28 June, 2013, (the averaging period) for a term of **10 years**, using both the econometric methodology (linear regression) and the 'paired bonds' methodology to extrapolate the 7 year Bloomberg BBB fair value curve indicated a debt risk premium of **3.02 per cent**. For a term of **5 years** the debt risk premium estimate obtained applying the econometric approach was **2.15 per cent**, whereas the estimate using the Bloomberg BBB fair value curve was **2.60 per cent**. The relativity between these two estimates corresponds with the findings of PwC (2013), whose report recommended that the econometric approach be adopted as the primary debt premium estimation methodology, and expressed reservations about the accuracy of the Bloomberg BBB fair value curve as an indicator of the debt risk premium for a BBB+ credit rating at a term of 5 years.[2]

Table1: Queensland Rail: BBB+ debt risk premium estimates for 20 days to 28 June, 2013 (percentage points) – 5 and 10 year terms to maturity (per cent)

Term	5 years	10 years
Econometric methodology (straight line)	2.15	3.02
'Paired bonds' analysis to extrapolate BBB Bloomberg (BFV) curve		3.02
Bloomberg (BFV) curve	2.60	
Risk free rate	2.98	3.58

Source: Bloomberg, and Incenta analysis

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[1] PwC (June, 2013) *A cost of debt estimation methodology for businesses regulated by the Queensland Competition Authority*.

[2] See PwC (June, 2013), pp.67-72. PwC found that for the 20 days to 28 November, 2012, the debt risk premium estimated using the econometric approach was 257 basis points, while the corresponding estimate using the Bloomberg fair value curve was 300 basis points.

During the 20 day averaging period the risk free rate estimated by interpolating the yields of the closest Commonwealth Government bonds (CGS yields) on either side of the 5 year term to maturity was 2.98 per cent.

2.   Cost of debt estimate

2.1   Introduction

As discussed above, we have applied the econometric methodology recommended by PwC (2103) in its advice to the Authority. PwC recommended that the econometric estimation approach be the primary methodology used to estimate the cost of debt:[3]

> *In summary, we consider that the domestic bonds regression approach is best able to satisfy the Authority's requirement for a methodology that provides a debt risk premium estimate for a range of terms and credit ratings.*

PwC also recommended that regard also be had to the Bloomberg fair value curve, but with one qualification:[4]

> *We also recommend that where possible, reference should be made to the Bloomberg FVC, and that extrapolations of the Bloomberg FVC be undertaken using the 'paired bonds' analysis approach. This provides a relatively low cost independent alternative view (albeit one that is not transparent). As we have seen, in recent times the extrapolated Bloomberg curve has been a reasonable estimator of the 10 year BBB+ curve, but not necessarily a good estimator of the debt risk premium for other terms (e.g. the 5 year term) for the BBB+ credit rating band, or for all terms in the A credit rating band (where the Bloomberg curve appears to be a better estimator of the A- curve).*

In other words, while PwC considered the 'paired bonds' extrapolation of the 7 year Bloomberg fair value curve to provide a reasonable estimate of the debt risk premium for a BBB+ credit rating at a term of 10 years, at a term of 5 years it expressed reservations about the accuracy of the Bloomberg BBB fair value curve as an indicator of the debt risk premium for a 5 year BBB+ corporate bond.

In calculating the debt risk premium at terms to maturity of 5 and 10 years, we estimated the risk free rate to be 2.98 per cent and 3.58 per cent respectively. These estimates were derived by calculating the average of the annualised interpolated yields of the two closest 5 and 10 year Commonwealth Government bonds maturing on either side of the respective target terms to maturity.[5]

2.2   Econometric analysis

2.2.1   Methodology

To estimate the debt risk premium of a BBB+ rated bond, the econometric methodology recommended by PwC (2013) requires the following steps:[6]

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[3]   PwC (June, 2013), p.72.
[4]   PwC (June, 2013), p.72.
[5]   Data for the Commonwealth Government bond yields was obtained from the Reserve Bank of Australia website.
[6]   PwC (June, 2013), p.66.

- Assemble Australian corporate bond data with remaining terms to maturity in excess of 1 year for the credit rating of interest and the two credit rating bands on either side, using the average (where possible), of Bloomberg and UBS data for fixed and floating rate debt.

- Test for potential staleness of the bond yield data using the Quandt-Andrews break point test for the 6 months prior to the averaging period.

- Test whether the weighting of different credit rating observations (and their term to maturity distribution) is likely to reflect the credit rating function being estimated.

- Using the Schwartz Information Criterion test, assess which functional form is most efficient during the averaging period and over the longer term (e.g. the last 2 years) with daily overlapping regressions (i.e. adding an observation for the next day and dropping off the last day).

- Make a judgement about which functional form has performed well on average and in the current period (PwC found that the linear functional form performs relatively well, preserves degrees of freedom in econometric analysis and is simple to apply and understand).

As required under the PwC methodology, we established a sample of 72 bonds that were drawn from the BBB, BBB+ and A- credit rating bands. We applied the Quandt-Andrews break point test for the 6 months prior to the averaging period, and found that all bonds in the sample had a statistically significant break in that period, which indicated that bond staleness was not likely to be material. As agreed with the Authority, we did not apply the Schwartz Information Criterion test to assess functional form, but rather applied a linear functional form as this was PwC's preferred approach based on the tests it undertook. We found that half of the sample (36 bonds) were rated A-, while 24 bonds were rated BBB and 12 were rated BBB-. Although this indicated a slight bias in favour of A- bonds, we do not consider that the extent of this bias is likely to be material.

2.2.2   Results of econometric methodology

The results of the straight-line regression analysis are shown in Table 2 below. Applying all 72 bond observations we found a highly statistically significant relationship between term and the debt risk premium.[7] The fitted equation had an adjusted r-square of 0.351 and implied a debt risk premium of 2.15 per cent at a term of 5 years, and 3.02 per cent at a term of 10 years. The PwC report also reported regression results excluding Dalrymple Bay Coal Terminal (DBCT) bonds, as there had been previous discussion about the appropriateness of their inclusion (since they had been credit wrapped AAA rated bonds prior to the global financial crisis and had been downgraded). The second equation in Table 2 shows that the exclusion of the DBCT bonds has only a marginal effect on the predicted 5 and 10 year debt risk premiums.

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[7]   Both the intercept and the slope coefficient are statistically significant at better than the 1 per cent confidence level.

Table 2: Queensland Rail: Debt risk premium estimates for 20 days to 28 June, 2013 applying the econometric methodology (straight line regression)

Sample	Intercept	Slope coeff.	$\overline{R}^2$	DRP (5 years)	DRP (10 years)
All observations (N=70)	1.284	0.174	0.351	2.15	3.02
T-statistics	(10.121)	(6.281)			
Without DBCT bonds (N=68)	1.244	0.173	0.313	2.11	2.98
T-statistics	(9.349)	(5.614)			

Source: Bloomberg, and Incenta analysis

2.3   Bloomberg fair value curve

Bloomberg publishes a 5 year fair value curve, albeit for the broad BBB rating class (i.e., drawing upon bond observations with BBB-, BBB and BBB+ credit ratings). However, the longest term for the BBB credit rating band published by Bloomberg is 7 years, so there is a need to extrapolate this value to 10 years to estimate the cost of debt for a term of 10 years.

2.3.1   Bloomberg fair value curve at a term of 5 years

For the 20 business days to 28 June, 2013 we found that the 5 year Bloomberg fair value curve (BFV) implied a debt risk premium of **260 basis points**. The Bloomberg 5 year debt risk premium estimate of 260 basis points is materially higher than the 215 basis points estimated by linear regression for a BBB+ credit rating. The PwC (2013) report also found a similar differential (in both magnitude and direction) to be the case during its averaging period in November, 2012, and commented that at 5 years the Bloomberg fair value curve was somewhat higher than the BBB+ regression estimate at that term.[8]

2.3.2   Debt risk premium at 10 years estimated by paired bonds analysis

'Paired bonds' methodology

As noted above, it is necessary to extrapolate the Bloomberg 7 year BBB debt risk premium to 10 years in order to estimate a 10 year cost of debt, and the PwC report recommended that this be achieved by applying the 'paired bonds' approach. The paired bonds approach was first applied by the Australian Energy Regulator in the Powerlink and Aurora Energy decisions, and has been applied in many decisions since then.[9] To estimate the debt risk premium of a BBB+ rated bond, the 'paired bonds' methodology chooses bonds based on the following criteria:

- The paired bonds are in the credit rating bands of A-, BBB+ or BBB;

- The longer dated bond has a term to maturity that is close to 10 years;

- The shorter dated bond has a term to maturity that is closest to the longest term of the Bloomberg fairs value curve (i.e. 7 years); and

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[8]   See PwC (June, 2013), p.67. PwC found that for the 20 days to 28 November, 2012, the debt risk premium estimated using the econometric approach was 257 basis points, while the corresponding estimate using the Bloomberg fair value curve was 300 basis points.

[9]   AER (April, 2012) *Final Decision – Powerlink Transmission determination 2012-13 to 2016-17*; and AER (April, 2012), *Final Distribution Determination, Aurora Energy Pty Ltd 2012-13 to 2016-17*.

- The match is between a pair of fixed coupon bonds, or a pair of floating rate bonds.

The 'paired bonds' methodology does not necessarily require a large number of bond pairs, since the choice of pairs of bonds issued by the same company holds constant the other company specific factors that might influence the debt risk premium, and isolates the term component. That is, by holding constant the company specific factors, the only factor that will have an influence on the debt risk premium of a bond is its term. Applying these criteria we obtained yield data for pairs of bonds from the following companies: CBA Property Fund (rated A-); GPT (rated A-); and Sydney Airport (rated BBB).

Results of paired bonds analysis

In Table 3 we show how we derived an estimate of the BBB+ debt risk premium for the 20 business days to 28 June, 2013, based on the 'paired bonds' methodology. Based on the debt risk premiums observed for the long and short term bonds of these businesses we calculated the change in debt risk premium in basis points per annum (bppa). The average bppa rise in the debt risk premium was found to be 14 bppa, which was multiplied by 3 to obtain the extrapolation value of 42 basis points. The 42 basis points were added to the observed 261 basis point BBB debt risk premium at 7 years (261 basis points) to obtain the extrapolated 10 year BBB+ debt risk premium estimate of **302 basis points**.

Table 3: Queensland Rail: BBB+ debt risk premium estimates for 20 days to 28 June, 2013, applying the 'paired bonds' methodology (basis points)

Sample	Term of short bond	Term of long bond	DRP of short bond	DRP of short bond	BPPA
CBA Property Fund (A-)	646	946	226	237	4
GPT (A-)	557	913	198	215	5
Sydney Airport (BBB)	502	929	220	360	33
				BPPA average	14
				3 times BPPA	42
				Bloomberg 7 year DRP	261
				Extrapolated 10 year DRP	302

Source: Bloomberg, and Incenta analysis