DBCT 2015 DAU: Review of WACC parameters

Queensland Competition Authority

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INCENTA
ECONOMIC CONSULTING

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1. Executive summary

Background

In June 2015, the Queensland Competition Authority (QCA, or 'the Authority') issued an initial undertaking notice under section 133 of the QCA Act requiring DBCT Management (lessee of the Dalrymple Bay Coal Terminal) to submit to it a Draft Access Undertaking (DAU) with respect to the five year regulatory period commencing in June 2016. DBCT Management's (DBCTM) proposal[1] was accompanied by a supporting report by Frontier Economics (Frontier).[2] The QCA engaged Incenta Economic Consulting (Incenta) to assist it in assessing a number of WACC parameter estimates contained in the DBCTM proposal and Frontier report, as well as subsequent stakeholder submissions (by Vale and the DBCT User Group).

DBCT's asset and equity beta

The QCA's 2006 Access Undertaking for DBCT applied an equity beta of 1.0 in the context of a relatively large capital expenditure program that would materially increase the size of the facility from 56 million tonnes per annum (mtpa) to 85 mtpa, and increase the value of the regulatory asset base (RAB) from $850 million to over $2.2 billion in a short period of time. Originally, the QCA's adviser had recommended an asset beta of 0.35 for DBCT, which converted to an equity beta of 0.67 using the Conine formula (and assuming a debt beta of 0.10 and gamma of 0.5).[3] In a subsequent report, ACG increased its estimate of DBCT's equity beta to 0.8 based on its view that beta estimates for infrastructure had been depressed by the dot-com bubble, the statistical uncertainties of beta estimation, and relativity to electricity distribution and QR Network (now Aurizon Network).[4]

In the 2010 review, which was undertaken against the background of booming world coal prices, the User Group agreed to rolling-over the equity beta of 1.0, which was approved by the QCA (although noting that this was not the QCA's position, and reserving the right to reassess the issue at a future time) as part of a 'package' of arrangements negotiated at the time between DBCTM and terminal users.

DBCTM's submission and the Frontier report

DBCTM's proposal and the Frontier report state an equity beta of 1.0 has been applied in the past two reviews of DBCT's WACC, and in their view an equity beta of 'at least 1.0' is appropriate because of the following factors:

- *Change in the industry environment* – DBCTM states that since the previous reviews the global coal trade has suffered due to a deteriorating coal price, which has fed through to credit rating downgrades in the industry, including a fall in the credit rating of DBCT Finance Pty Ltd from

1 DBCTM (9 October, 2015), *2016 DAU Submission*.
2 Frontier (September, 2015), *The required return on equity for DBCT*, Report prepared for DBCTM Pty Ltd, p.13.
3 ACG (September, 2004), *Dalrymple Bay Coal Terminal – analysis of proxy betas*, Report to Queensland Competition Authority, p.54.
4 ACG (April, 2005), *Dalrymple Bay Coal Terminal – Response to comments on DBCT proxy beta analysis*, Report to Queensland Competition Authority, pp. v-vi.

BBB+ to BBB. According to Frontier, with lower coal prices DBCT's systematic risk will rise because its cash flows are even more sensitive to further price declines.

- *Change in the competitive environment* – Since the last review, DBCTM and Frontier consider DBCT faces competitive threats from alternative ports due to the opening of the Goonyella to Abbot Point Expansion (GAPE) by Aurizon Network, the presence of Hay Point terminal adjacent to DBCT, and the development of Wiggins Island Coal Export Terminal (WICET).

- *Credit rating changes* – Frontier focuses on the credit rating downgrades of Peabody (25 per cent of DBCT throughput) and DBCT Finance Pty Ltd from BBB+ to BBB, concluding that: 'If the risk of first-ranking debt has increased, it must be the case that the risk of residual equity in the same firm has also increased.'[5]

- *Take-or-Pay contracts* – Both DBCTM and Frontier have submitted that DBCT's systematic risk has increased relative to other coal ports (the 'benchmark coal terminal') because the standard term of its take-or-pay contracts has reduced from 10 years to 5 years. Furthermore, DBCT would potentially not be able to socialise losses if enough of its users were to default early in the regulatory period.

- *First principles analysis indicates that energy and water are not comparators for DBCT* – DBCTM relies on Frontier's first principles analysis, which claims that regulated energy and water businesses are not appropriate comparators for DBCT because of: the essential nature of energy services (low income elasticity of demand); a different customer base (large numbers of smaller customers compared with a small number of large customers); a regulatory framework that immunises against customer default; and, greater market power.

- *Appropriate comparators for DBCT are commercial ports* – While Frontier's report states that 'finding an appropriate set of comparators for DBCT has proved a difficult task',[6] it concludes that the appropriate comparators are commercial ports. Frontier criticises the independent expert's report by Grant Samuel for assessing an equity beta range of 0.70 to 0.80 for DBCT merely on the grounds that it is regulated and has a stable cash flow, because Grant Samuel's only comparator was Asciano, which had an equity beta of 1.33 (and which would be 2.92 if geared to 60 per cent). In addition, Frontier notes that the only comparator identified in the 2004-06 DBCT review that is still extant is Port of Tauranga, which has a 60 per cent geared equity beta of 1.24. However, while Grant Samuel noted that the beta it adopted for DBCT 'appears low, none of the other listed ports are regulated and in Grant Samuel's view, the regulated nature of the asset (and the certainty of its cash flows) warrants a lower beta.'[7]

Based on its analysis, Frontier adopts a sample of 16 (mostly) container ports, and finds that the average equity beta is 1.08. It concludes that an equity beta of at least 1.0 is justified for DBCT, because its sample has an average gearing level of 29 per cent compared with DBCT's benchmark 60 per cent gearing.

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5 Frontier (September, 2015), p.13.
6 Frontier (September, 2015), p.20.
7 Grant Samuel (24 September, 2010), *Proposal from Brookfield Infrastructure Partners L.P.*, Appendix 1 – Selection of Discount Rates, p. 10.

DBCT User Group submissions

The QCA received submissions from Vale Australia[8] and the DBCT User Group,[9] which engaged PricewaterhouseCoopers (PwC)[10] to provide an opinion on DBCT's WACC parameters.

While agreeing that the international coal market conditions have deteriorated since the last review in 2010, the User Group's submission challenges DBCTM's view that this has had a material impact on the systematic risk of DBCT. The price of coal is only relevant to DBCT insofar as a lower price would potentially cause customer bankruptcy, and more important from DBCT's perspective is the future outlook for coal shipments. Hence, the User Group highlights the forecasts of the Australian Chief Economist in *Resources and Energy Quarterly*, which 'projects Australian metallurgical coal exports [DBCT's major throughput] to grow at 2.6% annually from 2016-17 to 2019-20, and similarly, thermal coal exports to increase at an average of 1.8% to 2019-20.'[11]

Both the Vale and the DBCT User Group submissions provide detailed analyses of the DBCTM/Frontier position that DBCT now faces a 'competitive environment'. In rejecting the DBCTM/Frontier position, the users point to a number of factors, including: the relative cost competitiveness of DBCT; the lack of a guarantee that sufficient capacity would be available at other ports at the relevant time, the higher cost of shipment (which is particularly relevant when coal prices are depressed); insufficient below-rail capacity; take-or-pay contracting and DBCT's superior ability to provide blended coal shipments. The users submit that because of these factors DBCT is not subject to any meaningful competitive pressure from other export ports.

PwC notes that complete take-or-pay contract cover and socialisation of any shortfall means that DBCT is wholly insulated from volume risk. PwC disagrees with Frontier's opinion that DBCT now faces competitive pressure, as it would be uneconomic or infeasible for DBCT's User Group to divert its throughput to other coal ports. PwC shows that while the metallurgical coal price has declined since 2012, this has had no effect on the revenues of DBCT. PwC also maintains that in circumstances where earnings are stable into perpetuity, the 'steady state earnings multiple is equal to the reciprocal of the cost of equity.'[12] Noting that the purchase EBITDA multiples of a number of ports over the period from 2010 to 2015 have remained in the band of 17x to 27x, PwC considers this to be evidence that the DBCT's cost of equity has remained relatively constant despite the fall in coal prices.[13]

PwC compiles a sample of 43 firms from a number of industries, including regulated energy and water, ports and logistics, infrastructure, toll roads and airports. The weighted average of these asset betas is 0.53, with toll roads averaging 0.50. Having presented these asset beta ranges, PwC considers that toll roads provide an upper bound for DBCT, while the 2010 Grant Samuel report's implied estimate of 0.35 (de-levered using the Conine formula) represents a lower bound estimate. PwC then

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8 Vale Australia (24 November, 2015), *DBCT 2015 Draft Access Undertaking (DAU)*

9 DBCT User Group (24 November, 2015), *2015 Draft Amending Access Undertaking – Submission to the Queensland Competition Authority*, p.6.

10 PwC (November, 2015), *Estimating a cost of capital for DBCTM*, Report for DBCT User Group.

11 DBCT User Group (24 November, 2015), p. 6, based on Australian Government (September, 2015), *Resources and Energy Quarterly*.

12 PwC (November, 2015), p.9.

13 This result relies on the well-known proposition that in a steady state, the reciprocal of the Price/Earnings ratio is the cost of equity.

takes the average of these upper and lower bounds to calculate an estimated asset beta of 0.43 for DBCT.

Incenta's responses to stakeholder submissions

We disagree with the DBCTM/Frontier position that the best comparators for DBCT are commercial ports where the vast majority of the cargo is containers and other goods whose traffic (and hence revenue to the port) is sensitive to the economic cycle. We therefore disagree with DBCTM's/Frontier's view that the observed betas for such ports means that DBCT's equity beta should be 'at least 1.0' for a benchmark gearing of 60 per cent. In the main body of this paper we provide our detailed responses to the points made by DBCT stakeholders, as summarised below.

- *Change in the industry environment* – We do not disagree with DBCTM's/Frontier's view that the seaborne coal market has deteriorated significantly over the past three years. The market is being shaped by events in Asia (particularly China and India). However, this has had the effect of forcing a rationalisation of the industry in several exporting countries, and is highlighting the fact that the vast majority of Australian production capacity lies at the lower end of the cost curve. In these circumstances the margins of Australian coal producers have been squeezed, but the outlook is positive, with Australia's Chief Economist and the International Energy Agency forecasting continued growth of coal exports, albeit at lower rates, and Australia's future dominance of seaborne coal trade.

- *Change in the competitive environment* – On this point we agree with the views of the users, who have presented detailed analysis of the factors that ensure DBCT's strong monopoly position compared to shipping through other Queensland ports over the course of the next regulatory period. We also note that DBCT's monopoly position, particularly its significantly lower Terminal Infrastructure Charge (TIC) is also referred to by Standard & Poor's, whose views about DBCT Finance Pty Ltd's downgrade from BBB+ to BBB have been relied upon by DBCTM/Frontier. DBCT is the lowest cost coal terminal in the most efficient coal export industry in the world, which underpins its strong market and financial position. DBCT's volumes have been rising even as the coal price has been falling, are close to capacity, and are expected to stay close to capacity in the foreseeable future.

- *Credit rating changes* – Credit ratings are dependent on the expected timing of cash flows. There is a concern that there would be a cash flow shortfall if a shipper went bankrupt and it was some years before the 'socialisation' aspect of the revenue cap recovered the lost revenue. However, such a scenario is likely to have a relatively minor effect on the equity value of DBCT, whose future revenue stream is (as noted above) secure, and it is movements in this value that would impact systematic risk. While Standard & Poor's has downgraded DBCT Finance Pty Ltd from BBB+ to BBB, and Moody's has downgraded it to a BBB- equivalent credit rating, we do not consider this to be direct evidence that the systematic risk of DBCT has risen materially. DBCT Finance Pty Ltd is a highly geared project finance vehicle (with gearing close to 80 per cent of RAB), and therefore not necessarily indicative of a benchmark 60 per cent geared DBCT.

- *Take-or-Pay contracts* – We note that a large percentage of DBCT's Take-or-Pay contracts are due to expire in the course of the regulatory period, however there are incentives for shippers to renew the expiring contracts. The Standard & Poor's report referred to by DBCTM/Frontier notes that there has been recent capacity trading and considers that if a miner failed to renew its take-or-pay contract that capacity would be taken up by another miner. The DBCT User Group submits

that every DBCT User has strong incentives to renew its take-or-pay contracts. Major mining companies require capacity for future development as they close old mines and develop new ones. Even smaller miners that have closed a mine will renew, as they are more likely to be able to sell the asset with port capacity in place.

- *First principles analysis* – Unlike Frontier, which has undertaken only a qualitative first principles analysis, we examine the 16 ports that Frontier considers to be appropriate comparators for DBCT, and compare them, as well as Westshore Terminals (which was omitted by Frontier but included by PwC) against the financial and operating characteristics of DBCT. We show that Westshore Terminals (Vancouver's coal port) had a relatively low asset beta (0.40 to 0.50) before it adopted a formula that links the terminal charge to the price of coal. We also find a positive correspondence between the Port of Tauranga's asset beta and the proportion of the port's container throughput (a major characteristic of the 16 port sample used by Frontier). We find that DBCT's revenues and EBIT are tied to its RAB, while Westshore Terminal's EBIT has been correlated with the (cyclical) price of coal. Finally, we show that on several financial dimensions DBCT bears a very close resemblance to regulated energy and water businesses and, simultaneously, a material difference to the container ports in Frontier's sample.

- *Appropriate comparators for DBCT* – We conclude that regulated energy and water businesses are more appropriate comparators for DBCT than the 16 predominantly container ports that Frontier relied on. We show that Frontier's focus on Asciano's beta as a comparator for DBCT is misplaced, as it has performed very differently to DBCT during the last decade (and particularly during the Global Financial Crisis). While Frontier dismisses Grant Samuel's opinion on DBCT's equity beta range of 0.70 to 0.80 on the grounds that no reason was provided,[14] as discussed above, the reasons given were that DBCT is regulated and has stable cash flows. We agree with Grant Samuel that these factors will result in a lower asset beta other things being equal. Based on our first principles analysis, we agree with PwC that the asset beta of DBCT is likely to be lower than for toll roads (i.e. we consider DBCT is unlikely to have an asset beta as high as toll roads due to the latter's greater volume risk). However, we are of the view that DBCT is likely to exhibit a level of systematic risk that is similar to regulated energy businesses.

- *Beta linked to EBITDA multiples in trade sales* – We are sceptical that PwC's evidence about the relative stability of EBITDA bid multiples in four trade sales should be considered to be evidence that the asset beta of DBCT has remained stable over the same period. Many factors determine the EBITDA multiples paid in trade sales, and any relative constancy is just as likely to be the outcome of other factors as being due to a stable cost of equity. In any case, the four ports vary markedly in the composition of throughput and growth prospects.

Having reviewed the stakeholder submissions, we do not agree with DBCTM's/Frontier's view that DBCT's equity beta should be 'at least 1.0'. Their view is based on a beta estimate for commercial container ports that are unregulated and are highly sensitive to the economic cycle. Neither are we in full agreement with the approach used by PwC, which averaged an implied 0.35 asset beta estimate based on Grant Samuel's equity beta range (using the Conine formula) and PwC's 0.50 estimate for toll roads to obtain an asset beta estimate of 0.43.[15] As described further below, we think the estimated

[14] Frontier (September, 2015), pp.10-11.

[15] We note that the asset beta implied by Grant Samuel's equity beta range will depend on a range of assumptions about debt beta, gamma, and the averaging approach that is adopted.

asset beta for toll roads provides a value that we are confident would exceed the DBCT asset beta, whereas the implied 0.35 asset beta estimate used by PwC is lower than our best estimate of such a beta.[16]

Incenta's estimate of DBCT's asset and equity beta

We previously analysed the asset and equity beta of Aurizon Network, and recommended an asset beta of 0.41 based on our view that its systematic risk characteristics are closest to regulated energy and water businesses.[17] Our view is that like Aurizon Network, DBCT's asset beta should be expected to be relatively low – in line with the observed betas for regulated energy and water businesses – because of the following similar set of fundamental factors:

- *A regulatory framework that aligns revenue with cost at periodic intervals and that minimises revenue risk during a regulatory period* – DBCT has a RAB, and is provided with a rate of return on these assets that is updated at periodic reviews in line with current market evidence, thereby limiting its exposure to cost risk and interest rate risk. We find that in the past, DBCT's revenues and EBIT have been very closely correlated with its RAB.

- *Underlying economics implying confidence in the recovery of regulated revenues* – DBCT's sound underlying economics means that there is a high degree of confidence that the revenues promised by the regulatory regime will be received, and that investors will not factor in market-based stranded asset risk[18] – this reduction in stranded asset risk is also reduced by the factors noted below:

  - *Surety of long term demand for the service* – Queensland's export coal industry is at the low cost end of the international cost curve due to relatively low cost open-cut mining, relatively short railway routes to the ports, and ports that are well situated relative to the growing demand for coal in developing Asian economies. Both the IEA in the US and Australia's Chief Economist are forecasting continuing growth of Queensland coal exports, and continuing domination of world trade over the next 30 years.

  - *All of DBCT's traffic is under long term take-or-pay contracts* – While DBCT has fewer customers, and a less diverse mix of customers than the typical regulated energy or water business, all of its contracted capacity is based on take-or-pay contracts. While the average term of these contracts is shorter than those of Aurizon Network, and many are due to expire during the coming regulatory period:

    - The short and long term prospects of metallurgical coal mines operating in the Goonyella system are strong given their relatively favourable position on the international cost curve;

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16 While we agree with the principle that was applied by Grant Samuel - that DBCT's systematic risk is reflective of regulated utilities – we obtain a slightly higher empirical estimate of the asset beta of regulated utilities, which is likely due to our much larger sample and different / longer estimation period.

17 Incenta (September, 2015), *Aurizon Network 2014 DAU – response to submissions on WACC*, Report to Queensland Competition Authority, p.22.

18 That is, the QCA consistently assesses mine life and demand factors, and makes adjustments to regulatory depreciation policy as required to mitigate asset stranding risks.

- As elaborated in the main body of this report, the current users have no viable alternative to shipping through DBCT; and
- A portion of the capacity represented by the contracts expiring over the next 5 years is subject to 10 to 15 year take-or pay contracts with Aurizon Network for railing to DBCT; hence

We expect that the users' take-or-pay contracts will be renewed.

– *Socialisation* - The socialisation framework that operates at DBCT for existing capacity implies that any shortfalls in revenue are to be shared among remaining shippers. As long as there is no viable or cost effective alternative to shipping through DBCT, this means that stranding risk is low.

These factors form part of our first principles analysis, which indicates that of the industries reviewed, DBCT exhibits characteristics that are more closely aligned to regulated energy and water businesses than to container ports, rail or coal companies, which are all much more sensitive to the economic cycle.

We examined a similar set of industries to the ones we reviewed when estimating the beta of Aurizon Network, except that we expanded the port sample to include the 16 ports identified by Frontier (which it adopted from the Grant Samuel report), and added Westshore Terminals to that group. In Table ES.1 we show the asset beta estimates for these industries based on raw Bloomberg betas estimated with 10 years of monthly observations (120 observations) de-geared by the Conine formula (debt beta of 0.12) using a long term estimate of the effective tax rate.

Table ES.1: Bloomberg asset betas – 10 years of monthly observations to June 2015 (effective tax rates)

	N	Average asset beta	Median asset beta
Regulated water	7	0.36	0.35
Regulated energy	68	0.37	0.36
Toll roads	7	0.50	0.54
Ports	17	0.91	1.00
Class 1 railroads	7	0.92	1.01
Coal	8	1.07	1.16

Source: Bloomberg, Incenta analysis

Regulated energy and water businesses are found to have relatively similar asset beta estimates of between 0.35 and 0.37 (i.e. respectively the median of regulated water and average of regulated energy). At the other end of the spectrum are coal companies with an asset beta of 1.07/1.16 (average/median) – they are sensitive to the movements in the coal price through the cycle (with volume fluctuating less). The asset betas of container ports (average/median of 0.91/1.0) and Class 1 railroads are very similar (average/median of 0.92/1.01), and both are sensitive to fluctuations in the volume of traded goods. At 0.50/0.54 (average/median), toll roads have a materially lower asset beta than ports, Class 1 railroads, and coal companies. We consider it unlikely that DBCT's asset beta would be as low as 0.35, or as high as 0.54 (which implies equity betas of 0.65 and 1.08 respectively).

Having reviewed the empirical evidence, we consider that an asset beta point estimate of 0.40 is appropriate for DBCT, based on the Conine formula and a debt beta of 0.12. As outlined above, we consider that DBCT shares many of the systematic risk characteristics of regulated energy and water networks. While the current Bloomberg beta evidence for regulated energy and water businesses displayed in Table ES.1 is between 0.35 and 0.37, in our previous review of Aurizon Network's asset beta we found that alternative beta estimation methods (using statutory rather than effective tax rates and countering the 'end of month effect' by running simulated month estimates) resulted in estimates for the regulated energy and water industries that were 1 to 3 points higher. Hence, our preferred asset beta estimate for DBCT is 0.40, which converts to a point equity beta estimate of 0.76 at a benchmark gearing level of 60 per cent. Our view is that this estimate is appropriate since it is:

- Lower than the toll roads asset beta estimate of 0.50/0.54, which we consider to have higher systematic risk than DBCT because the tolls for toll roads are generally prescribed (often as the outcome of an initial tendering process), are not subject to periodic regulatory review, are therefore subjected to more cyclical economic activity than DBCT, and are also subject to more asset stranding risk;

- Consistent with the estimated asset beta of 0.41 (equity beta of 0.73 at 55 per cent gearing) that we assessed for Aurizon Network, which we consider to have very similar systematic risk characteristics to DBCT;[19] and

- Consistent with the implied asset beta of 0.415 (equity beta of 0.8) applied by the QCA's adviser ACG in 2005. ACG considered a 60 per cent geared equity beta of 0.8 to be appropriate for DBCT if it is not engaged in a material capacity expansion, but that a higher asset beta would be justified in the event of a significant capacity expansion. This influenced the QCA to adopt an equity beta of 1.0 in 2005, because a large capacity expansion (from 56 Mtpa to 85 Mtpa) was being planned by DBCTM. In ACG's words:[20]

  > *We [ACG] consider that an equity beta of 0.80 (with 60% gearing) would, other things being equal, provide a sufficient return to attract continued investment in the existing capacity of DBCT, or a small incremental capacity growth that was fully contracted. A significant increase in investment (in the order of 40% to 50%) would probably require a higher return.*

Capital structure and credit rating

Capital structure

Previous reviews of DBCT have applied a 60 per cent benchmark capital structure to DBCT, and this has been proposed by both DBCTM and the User Group/PwC. We consider that DBCT shares many characteristics with regulated energy and water businesses, and that a 60 per cent benchmark gearing level has been almost universally applied in those industries by Australian regulators. While DBCT's actual gearing is considerably higher, at close to 80 per cent of RAB, this is under a project finance structure that includes features (such as equity lock up if certain ratios are breached) that are not

19 Incenta (September, 2015), *Aurizon Network 2014 DAU – response to submissions on WACC*, Report for Queensland Competition Authority, p.22.

20 ACG (April, 2005), *Dalrymple Bay Coal Terminal – response to comments on DBCT proxy beta analysis*, Report to Queensland Competition Authority, p. vi.

shared by benchmark corporates. We therefore recommend that the benchmark gearing level continue to be set at 60 per cent.

Credit rating

In the past two reviews a benchmark BBB+ credit rating has been applied to DBCT. However, both DBCTM/Frontier and the User Group/PwC have proposed a benchmark BBB credit rating. A BBB credit rating was applied to DBCT Finance Pty Ltd when it was downgraded from BBB+ to BBB in July 2014. More recently, Moody's has downgraded DBCT Finance Pty Ltd to the equivalent of a BBB- credit rating. However, as noted above, this is a project finance structure that is not typical of a benchmark corporate.

Our approach is to apply the QCA's regulatory model to generate cash flows expected over the next regulatory period for a firm with a benchmark financing structure, and assess the strength of the credit metrics implied by those cash flows. Given that we are performing this analysis prior to the QCA making its decision, we have calculated the outcomes for credit metrics that would flow from a range of potential assumptions about WACC parameters. Based on the scenario analysis we agree with DBCTM/Frontier and the DBCT User Group that DBCT's benchmark credit rating is likely to be BBB at this time. Our conclusion is founded on an assessment that:

- The credit rating agencies are likely to consider a benchmark 60 per cent geared DBCT to have a 'strong' business risk profile and 'significant' financial risk profile, and so be most comparable to the situations of APT Pipelines Pty Ltd and Aurizon Network. In recent credit assessments for these entities, the critical metric for the entities' credit rating was the ratio of FFO to debt. We also infer from these recent assessments that an FFO/debt ratio of approximately nine per cent would be required to achieve and maintain a BBB credit rating, and that 13 per cent would be required for a BBB+ credit rating.

- We forecast DBCT's FFO/Debt ratio under medium and low scenarios for WACC to be 11.8 per cent and 11.5 per cent respectively.[21] This would suggest that a benchmark financed DBCT would have a strong BBB credit rating, but be unlikely to achieve and maintain a BBB+ rating.

However, we consider that the high scenario for WACC (DBCTM's proposal) is more likely to be consistent with a BBB+ credit rating, as it implies an average forecast FFO/Debt ratio of 16.7 per cent.

Term of debt

A 10 year benchmark term of debt at issuance for regulated infrastructure has been a widespread assumption used by Australian regulators. A 10 year term was applied in the previous reviews of DBCT, and is the term proposed by both DBCTM/Frontier and the User Group/PwC. We agree that the evidence suggests that a benchmark debt term of 10 years is appropriate.

Stakeholder submissions on the debt risk premium and our responses

Targeting a BBB benchmark credit rating, DBCTM's submission has applied the PwC (2013) method for estimating the debt risk premium to an indicative averaging period covering the 20 business days

[21] Three scenarios were considered with different WACCs, remediation allowances and depreciation. Details are contained in Chapter 4.

to 21 August 2015. DBCTM's estimate using this approach is 2.32 per cent. This estimate, and the benchmark credit rating of BBB, are accepted by the User Group's adviser, PwC. However, DBCTM's submission also made a number of comments about the PwC (2013) method, which we summarise below, together with our responses:

- *UBS data are difficult for stakeholders to obtain* – DBCTM considers that stakeholders find it difficult to access the UBS data that are required to apply the PwC (2013) method, and even if it was obtained for the averaging period it would not be possible to undertake the staleness of data test ("Quandt-Andrews" test) that PwC applied.

  - *Incenta's response* – We agree that UBS data are less accessible than Bloomberg data, and recommend that future applications of the PwC (2013) method use only Bloomberg data. We do not consider that the staleness of data test needs to be performed every time an estimate of the cost of debt is required. PwC (2013) found that Bloomberg data were not 'stale' and this could be re-tested at reasonable intervals. The RBA's cost of debt estimate is undertaken using the same bond data and the RBA does not undertake any testing for 'staleness' of the data.

- *Required AFMA swap data will no longer be available* – DBCTM submits that in the near future AFMA will no longer be providing the interest swap rate data required to estimate the fixed rate equivalent of UBS floating rate note data.

  - *Incenta's response* – AFMA is only one source of information on interest swap rates, which remain critical interest rates in financial markets. We have been informed by Bloomberg that it does not contemplate discontinuing its publication of swap yields.

- *The PwC (2103) method's simple weighting of credit ratings could result in sample bias* – DBCTM considers that the simple weightings of 1,2 and 3 may hide biases in the data, and the robust approach is to undertake a dummy variable approach (allowing separate estimates for each credit rating band) or a regression only using the single target credit rating data.

  - *Incenta's response* – The PwC method accepts a risk of some bias from inclusion of BBB and A- bonds (when estimating the BBB+ yield) as long as the overall weighting (using the simple system) is close to BBB+ (i.e. close to 2). We consider there is greater potential for bias if only the bonds in the target band are used, as this provides a much smaller sample. Furthermore, we have found that the estimate using the pooled approach is similar to that found by applying a dummy variable approach and also that it is valid to infer that the debt risk premium associated with the pooled sample of BBB, BBB+ and A- bonds will reflect the average credit rating of the sample.[22] We also note that both RBA and Bloomberg use a pooled approach rather than a dummy variable approach or data for a single credit rating band as suggested by DBCTM.

[22] That is, the difference in premium between a BBB+ and an A- bond has been approximately the same as between a BBB and BBB+ bond. See Incenta (September, 2015), *Aurizon Network 2014 DAU – response to submissions on WACC*, pp. 1-3, for estimates in October 2013, and section 5.2.3 below for October 2015 estimates.

Incenta's estimate of the debt risk premium

In accordance with the QCA's approach to cost of debt estimation, we have applied the PwC (2013) econometric method as the primary estimation method,[23] and have also provided estimates from Bloomberg and the RBA, which the QCA has stated that it will use as cross-checks against the primary method.[24]

PwC (2013) econometric method

We began by targeting the BBB+ credit rating band, and following the PwC (2013) method we derived a sample of 78 bonds (70 of which are fixed rate and 8 of which are floating rate bonds) by searching the Bloomberg data base. We commenced with 431 Australian corporate bonds incorporated in Australia with either a Standard & Poor's, Fitch's or Moody's credit rating of BBB to A- (or equivalent). Excluding bonds that did not satisfy the selection criteria, we were left with a sample of 78 bonds that were relatively evenly distributed around the BBB+ credit rating category (29 BBB, 16 BBB+ and 33 A-).

We applied the pooled regression method to the sample of 78 bonds over the 20 day averaging period up to and including 30 October, 2015. The results showed a 10 year BBB+ debt risk premium estimate of 2.51 per cent, but this result included a significant outlier bond (Glencore), which when removed reduces the estimate to 2.48 per cent. We consider the **2.48 per cent** BBB+ debt risk premium to be the better estimate.[25]

Following examination of the deviations from the pooled regression line, which we consider to be the best estimate of a BBB+ yield at each term to maturity, we found that BBB bonds on average were situated 19.8 basis points above the line and A- bonds were situated 16.8 basis points below the line. On average the deviations of the BBB+ rated bonds were practically zero (i.e. the line was a good fit for the BBB+ bonds).

In line with previous estimates of the BBB debt risk premium we added the BBB risk premium, as estimated by the average vertical distance of the BBB bond yield observations from the pooled regression line. This approach provided a 10 year BBB debt risk premium estimate of **2.68 per cent.**[26]

Bloomberg estimate

Since 14 April, 2015, Bloomberg has been publishing daily estimates of the fair value yield for a generic BBB credit rating. This made it a relatively simple exercise to estimate the 10 year BBB yield on BBB debt over the same draft averaging period ending on 30 October 2015. This (annualised) yield was found to be 5.13 per cent, which when subtracting the 10 year Commonwealth bond yield of 2.68 per cent results in an estimated 10 year BBB yield of **2.45 per cent.**

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

24 QCA (August, 2014), *Final decision, Cost of debt estimation methodology*.

25 Using the dummy variable approach we obtained an estimate of 2.41 per cent.

26 Using the dummy variable approach we obtained an estimate of 2.62 per cent.

RBA estimate

The RBA's estimation method is to apply the Gaussian kernel weighting approach, which gives greater weight to bonds that are closer to the target terms of 5, 7 and 10 years. A disadvantage of the RBA's approach is that only estimates at the end of each month are provided. In addition, the effective terms of the RBA's estimates are slightly lower than 10 years, so it is necessary to extrapolate. Therefore, in order to estimate the debt risk premium for the 20 days ending 30 October 2015, it was necessary to estimate the end of October and end of September yields and interpolate within these estimates. To do this we applied the AER's extrapolation and interpolation approaches, which resulted in a 10 year BBB debt risk premium estimate of **2.78 per cent.**

Conclusions

In summary, our conclusions regarding the WACC parameters that the QCA has asked us to review in the context of DBCT's 2015 DAU are as follows:

- *Asset beta* – Our point estimate of the asset beta for DBCT is 0.40. This asset beta applies the same underlying principle as adopted by Grant Samuel (namely, calibrated to a regulated utility). Our estimate is below the asset beta we estimated for tollroads (0.54), which we think is appropriate given that we expect the latter to bear greater systematic risk. The difference between this estimate for DBCT, and our asset beta estimate of 0.41 for Aurizon Network, is immaterial, reflecting the fact that both businesses have very similar systematic risk characteristics. It is also consistent with the implied asset beta of 0.415 that ACG estimated in 2005 for DBCT assuming the absence of a major expansion of the port.

- *Equity beta* – Based on our recommendation about asset betas, and with re-gearing to 60 per cent (as recommended below) using the Conine formula, our point estimate of DBCT's equity beta is 0.76.

- *Capital structure* – We recommend that the benchmark gearing level of 60 per cent be retained for DBCT.

- *Credit rating* – Having reviewed the likely range of DBCT's forward looking credit metrics (in particular the FFO/Debt ratio) we consider it likely that at a benchmark 60 per cent gearing DBCT would attract a BBB credit rating. This is consistent with the submissions of both DBCTM and the User Group.

- *Term of debt* – We recommend the continuation of a 10 year benchmark term of debt for the purpose of estimating a debt margin.

- *Debt risk premium* – Based on the PwC (2013) econometric method, we recommend that a 10 year debt risk premium of **2.68 per cent** be applied for DBCT's benchmark BBB credit rating over the indicative averaging period of 20 days to 30 October, 2015.

2. Background, Terms of Reference and outline of report

2.1 Background

The Queensland Competition Authority (QCA, or 'The Authority') is responsible for the economic regulation of key rail, port and water monopoly infrastructure services, including access to the Dalrymple Bay Coal Terminal (DBCT) at the Port of Hay Point. Under the Third Party Access Regime (Part 5) in the QCA Act, broad obligations are imposed on the access provider. The Act also provides for the QCA to assess and approve access undertakings submitted to it by DBCT.

In June 2015, the QCA issued an initial undertaking notice under section 133 of the QCA Act requiring DBCTM to submit a DAU to it by 21 September 2015, and this was subsequently extended to 19 October 2015. DBCTM's proposal was submitted to the QCA on 12 October 2015. It includes an indicative post-tax nominal vanilla Weighted Average Cost of Capital (WACC), and proposes values for key parameters, including the asset and equity beta, benchmark credit rating and capital structure, and debt risk premium. DBCTM's proposal was accompanied by a report by Frontier Economics, which supports the WACC parameters that DBCTM has submitted. The QCA subsequently appointed Incenta Economic Consulting (Incenta) as expert advisers to assist it in the assessment of the proposals, in particular in relation to a number of firm-specific parameters.

2.2 Terms of Reference

The Terms of Reference the QCA provided to us require us to perform three tasks.

- The first task is to assess DBCTM's submission and supporting documentation in relation to a number of WACC parameters.
- The second task is to provide advice to inform the QCA's determination of appropriate values for the following WACC parameters:
  - Asset beta
  - Benchmark capital structure
  - Equity beta
  - Benchmark credit rating
  - Efficient term of debt
  - Benchmark debt risk premium (i.e. cost of debt less the risk-free rate) for an averaging period consistent with the timing of the report and, at a later date, a re-estimated debt risk premium for an averaging period to be specified by the QCA — including estimates using the 'simple portfolio econometric', BVAL and RBA methods.
- The third task is to respond to stakeholders' comments in relation to the matters outlined above.

2.3 Outline of the report

In order to respond to the above Terms of Reference, we have ordered our analysis to consider three groups of related questions in the following chapters:

- In Chapter 3 we estimate the asset beta and equity beta of DBCT (given the benchmark capital structure assumption).
- In Chapter 4 we assess the benchmark capital structure and the concomitant benchmark credit rating of the regulated entity.
- Chapter 5 assesses the benchmark term of debt and the debt risk premium.

In each of these chapters we first present the analysis and conclusions of DBCTM and comments by other stakeholders, and then comment on the analysis and undertake our own analysis of these issues. Based on this analysis, we then make our own recommendation to the QCA about the relevant parameter(s).

3. DBCT's asset and equity beta

3.1 Background

The QCA's 2005 Final Decision on DBCTM's Draft Access Undertaking for DBCT applied an equity beta of 1.0 in the context of a relatively large capital expenditure program that would almost double the size of the facility to 85 million tonnes and more than double the size of the RAB, from $850 million to $2.2 billion over a short period of time. The QCA's adviser, ACG, advised that while it considered a 60 per cent geared equity beta of 0.80 to be appropriate for DBCT, 'the demand underpinning any significant increment to DBCT's existing capacity may not be as secure as the demand for current capacity,' but did not offer a point estimate of what that might be. After taking account of all factors, the QCA 'determined to accept the equity beta of 1.0 proposed by DBCTM in response to the Authority's draft decision'.

In the 2010 review, which was undertaken against the background of historically high world coal prices, the User Group agreed to rolling-over the equity beta of 1.0, which was conditionally approved by the QCA:[27]

> *In arriving at this agreed position, the Authority accepts that both parties might have been able to mount a case for higher or lower individual components of the cost build-up. The Authority has not, therefore, sought to assess the reasonableness, or otherwise, of the individual cost components.*

The QCA clearly stated that it was not commenting on, or approving the actual constituent parameters (including the equity beta) or level of the WACC that was applied in the agreement between DBCTM and the User Group, but was merely providing conditional approval to the outcome of a commercial negotiation. Hence, the QCA left open the prospect of it undertaking a fresh review of WACC parameters, including beta, at the next review.

3.2 DBCTM's submission and the Frontier report

Both DBCTM's proposal and the Frontier report emphasised that an equity beta of 1.0 has been applied in the past two reviews of DBCT's WACC. In DBCTM's and Frontier's opinion an equity beta of at least 1.0 is appropriate for DBCT, due to the factors outlined below.

Change in the industry environment

DBCTM states that since the previous reviews, the global coal trade has suffered due to a deteriorating coal price, which has fed through to credit rating downgrades of firms in the coal industry, including a fall in the credit rating of DBCT Finance Pty Ltd from BBB+ to BBB. DBCTM notes that 'based on the deteriorating credit quality of DBCT's major customers, the ratings agencies consider there to be a clear and direct link between DBCT's risk profile and the risk of its customer base.'[28] According to DBCTM:[29]

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27 QCA (September, 2010), *Final Decision – Dalrymple Bay Coal Terminal, 2010 Draft Access Undertaking*, p.11.

28 DBCTM (9 October, 2015), p.37.

29 DBCTM (9 October, 2015), p.37.

> *Even if the industry recovers, the conditions that the industry is currently experiencing – and the risks that DBCTM is exposed to – highlight its inherent volatility. As previous reviews have occurred in more buoyant market conditions it is questioned whether the full nature and extent of this volatility was appreciated.*

Frontier, on the other hand, considers that DBCT's systematic risk will rise as coal prices fall, because its cash flows become even more sensitive to further price declines.

Change in the competitive environment

DBCTM and Frontier consider that since the last review of DBCT's WACC, the terminal now faces real competitive threats from alternative ports due to the:

- Opening of the Goonyella to Abbot Point Expansion (GAPE) by Aurizon Network;
- The existing Hay Point terminal adjacent to DBCT; and
- The new Wiggins Island Coal Export Terminal (WICET) development.

DBCTM notes that DBCT's market power has diminished, and this is one of the factors considered by Dr. Martin Lally as part of the first principles analysis of systematic risk.[30]

Credit rating changes

Frontier focuses on the credit rating downgrades of Peabody Energy Corp (25 per cent of DBCT throughput) and DBCT Finance Pty Ltd from BBB+ to BBB in July 2014.[31] By July 2014 global coal prices had been in decline for three years, and Peabody's credit rating was lowered to BB-. Standard & Poor's noted that:[32]

> *The action on Peabody has resulted in the material weakening of DBCT's customers, which has resulted in us lowering the cap on the DBCT rating by one notch to BBB.*

Hence, Frontier concluded that: 'If the risk of first-ranking debt has increased, it must be the case that the risk of residual equity in the same firm has also increased.'[33]

Take-or-Pay contracts

Both DBCTM and Frontier have submitted that DBCT's systematic risk has increased relative to other coal ports in Australia (the 'benchmark coal terminal') because the standard term of its take-or-pay contracts has reduced from 10 years to 5 years. According to DBCTM and Frontier, if enough of DBCT's users were to default early in the regulatory period, DBCT would potentially not be able to socialise its losses, and this increases systematic risk.

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30 Martin Lally (2004), *The cost of capital for regulated entities*, Report prepared for the Queensland Competition Authority.

31 Standard & Poor's (31 July, 2014), *DBCT Update*.

32 Standard & Poor's (31 July, 2014), p.2.

33 Frontier (September, 2015), *The required return on equity for DBCT*, Report prepared for DBCTM Pty Ltd, p.13.

Frontier compares DBCT with the take-or-pay agreements at WICET and Newcastle Coal Infrastructure Group (NCIG), where:[34]

> *… port user agreements require users to extend their contracts every 12 months, so that the contracts always have 10 years maturity. If a user does not extend the contract, their prices will increase… By contrast, DBCT has shorter term contracts and no provision for the regular extension of contract terms. Rather, a DBCT user could simply allow their contract to expire and DBCT would have no more than 12 months' notice. Thus, DBCT faces more risk than these commercial counterparts.*

Frontier also expresses doubts about the potential for socialisation of losses at DBCT in the event of default by a customer,[35] and pointed to Moody's concern about the strength of such protection in the course of its assessment of NCIG:

> *A possible downside scenario is that following a counterparty failure, NCIG is unable to fully socialize the lost revenue as a result of certain of the remaining counterparties – and/or their owners – not having the capacity to fully fund the required increase in tariffs. Such a situation would reduce NCIG's financial flexibility.*

Therefore, according to Frontier, 'one default may cause a spiral of subsequent defaults' that would limit the effectiveness of socialisation provisions in take-or-pay contracts, and furthermore, under DBCT's contracts, as Moody's puts it:[36]

> *…such socialization only occurs from the earlier of (i) the user's scheduled contract termination date, (ii) the assignment of the user's capacity allocation to another party and (iii) the next regulatory reset. We consider this lag to be a potential cause of cash flow volatility.*

Hence, Frontier concludes that 'the risk of DBCT is (other things being equal) greater than that of its peers – particularly if DBCT should suffer a default in the early part of a regulatory period.'

First principles analysis indicates that energy and water are not comparators for DBCT

DBCTM agrees with Frontier's first principles analysis, which proposes that regulated energy and water businesses are not appropriate comparators for DBCT. Frontier's claim is based on the following first principles factors:

- *Income elasticity of demand* – Frontier considers that 'DBCT would have always faced a more elastic demand curve [and therefore had a higher beta] than energy distribution firms, because use of its service is contingent on the profitability of local mines – it is not providing a service that is essential for the physical life of its customers.'[37]

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34 Frontier (September, 2015), p.14.

35 That is, the sharing of capacity take-or-pay obligations among remaining customers in the event of default by one customer of DBCT.

36 Moody's (25 August, 2015), *DBCT Ratings Report*, p.2.

37 Frontier (September, 2015), p.16.

- *The nature of the customer* – Firms (like energy distributors) that service a large number of public customers are expected to have lower betas than firms like DBCT, which serves a small number of corporate customers.

- *Pricing structure* – Frontier states that according to Lally, firms like energy distributors with more fixed revenues are likely to have lower betas, while Frontier considers that 'DBCT's pricing structure is similar to the commercial pricing structure adopted by other ports'.[38]

- *Contract duration* – Frontier notes that 'DBCT is unable to easily increase prises in response to shocks to costs such as wage rates or interest rates, during a regulatory period,'[39] which will increase systematic risk.

- *Regulation* – Frontier states that according to Lally, 'firms with long [regulatory] re-set periods (5 years) are likely to have higher betas than otherwise identical unregulated firms.'

- *Monopoly power* – As discussed above, Frontier considers that since the last determination DBCT's market has 'diminished considerably as the threat of competition is now more pronounced,'[40] and this is expected to result in greater systematic risk.

- *Real options* – Frontier again cites Lally that the option to adopt new products will increase systematic risk, and that energy distribution is at the lower end of the systematic risk spectrum.

- *Operating leverage* – It is noted that Lally placed little weight on this financial characteristic (the ratio of fixed to variable costs) due to mixed empirical evidence.

- *Market weight* – Lally noted that this will not be an important consideration unless the firm comprises more than 5 per cent of the market index, which DBCT does not.

In summary, Frontier's case that energy and water distribution networks are not a reasonable comparator for DBCT rests on the following features of the former relative to the latter:

- The essential nature of energy services (low income elasticity of demand);

- A different customer base (large numbers of smaller customers compared with a small number of large, corporate customers); and

- A regulatory framework that immunises distributors against customer default; and

- Greater market power.

Appropriate comparators for DBCT are commercial ports

Frontier's report states that 'finding an appropriate set of comparators for DBCT has proved a difficult task',[41] but concludes that the most appropriate comparators are commercial ports. Independent expert

38 Frontier (September, 2015), p.17.
39 Frontier (September, 2015), p.17.
40 Frontier (September, 2015), p.17.
41 Frontier (September, 2015), p.20.

Grant Samuel is criticised by Frontier for assessing an equity beta of 0.70 to 0.80 for DBCT merely on the grounds that it is regulated and has a stable cash flow. Frontier notes that:

- Grant Samuel's only comparator was Asciano, which had an equity beta of 1.33 (which would be 2.92 if geared to 60 per cent); and
- The only comparator identified in the 2004-06 DBCT review that is still extant is the Port of Tauranga, which has a 60 per cent geared equity beta of 1.24; and
- Grant Samuel also estimated betas for a number of ports apart from Port of Tauranga.

Frontier considers that while 'none of these firms is a perfect comparator for DBCT, they remain the best available set of comparators.'

Frontier's beta estimate for commercial ports

Frontier estimates betas for Grant Samuel's sample of 16 commercial ports, finding that the average equity beta was1.08. Frontier then concludes that DBCT's equity beta must be at least 1.0 because the average gearing level of the 16 commercial ports was only 29 per cent, compared with DBCT's benchmark 60 per cent gearing.

3.3 User Group submissions

The QCA received submissions from Vale Australia[42] and the DBCT User Group.[43] The latter engaged PricewaterhouseCoopers (PwC)[44] to provide an opinion on DBCT's WACC parameters.

Vale and DBCT User Group submissions

The User Group's submission agrees with DBCTM and Frontier that the international coal market conditions have deteriorated since the last review in 2010. However, the User Group challenges DBCTM's view that this has materially impacted on the systematic risk of DBCT. According to the User Group's submission, the price of coal is only relevant to DBCT insofar as a lower price would potentially cause customer bankruptcy. More important for DBCT is the future outlook for coal shipments, which has been the subject of forecasts made by Australia's Chief Economist that have been published in *Resources and Energy Quarterly*. These forecasts project 'Australian metallurgical coal exports [DBCT's major throughput] to grow at 2.6% annually from 2016-17 to 2019-20, and similarly, thermal coal exports to increase at an average of 1.8% to 2019-20.'[45]

Both the Vale and the DBCT User Group submissions challenged the DBCTM/Frontier position that DBCT now faces a 'competitive environment'. The submissions reject the DBCTM/Frontier position based on a number of factors, including the:

42 Vale Australia (24 November, 2015), *DBCT 2015 Draft Access Undertaking (DAU)*

43 DBCT User Group (24 November, 2015), *2015 Draft Amending Access Undertaking – Submission to the Queensland Competition Authority*, p.6.

44 PwC (November, 2015), *Estimating a cost of capital for DBCTM*, Report for DBCT User Group.

45 DBCT User Group (24 November, 2015), p. 6, based on Australian Government (September, 2015), *Resources and Energy Quarterly*.

- Relative cost competitiveness of DBCT;
- Lack of a guarantee that sufficient capacity at an alternative terminal would be available at the relevant time;
- Higher cost of shipment (which is particularly relevant when coal prices are depressed);
- Insufficient below-rail capacity;
- Take-or-pay contracting; and
- DBCT's superior ability to provide blended coal shipments.

PwC report

PwC's report notes that complete take-or-pay contract cover and socialisation of any shortfall means that DBCT is wholly insulated from volume risk. PwC disagrees with Frontier's opinion that DBCT now faces competitive pressure as it would be uneconomic or infeasible for DBCT's User Group to divert throughput to other coal ports. PwC shows that while the metallurgical coal price has declined since 2012, this has had no effect on the revenues of DBCT, which have remained relatively constant.

PwC's report considers that where earnings are stable into perpetuity, the 'steady state earnings multiple is equal to the reciprocal of the cost of equity.'[46] The report then lists the purchase EBITDA multiples of a number of ports over the period from 2010 to 2015, and notes that these multiples have remained relatively constant in the band of 17x to 27x. PwC believes this to be evidence that the DBCT's cost of equity has also remained relatively constant over the 2010-15 period despite the fall in coal prices.

PwC analyses a sample of 43 firms drawn from a number of industries, including regulated energy and water, ports and logistics, infrastructure, toll roads and airports. The weighted average of these asset betas is found to be 0.53 (toll roads averaged 0.50). PwC considers that the toll roads beta estimate of 0.50 provides an upper bound to a range for DBCT, and adopts the 2010 Grant Samuel report's implied asset beta estimate of 0.35 (de-levering using the Conine formula) as a lower bound.[47] PwC then takes the average of these upper and lower bounds to calculate an estimated asset beta of 0.43 for DBCT.

3.4 Incenta's responses to stakeholder submissions

We disagree with the DBCTM/Frontier position that the best comparators for DBCT are commercial ports where the vast majority of the cargo is containers and other goods that are sensitive to the economic cycle. Hence, we disagree with DBCTM's/Frontier's view that DBCT's equity beta should be 'at least 1.0'. We consider each point in turn.

46 PwC (November, 2015), p.9.

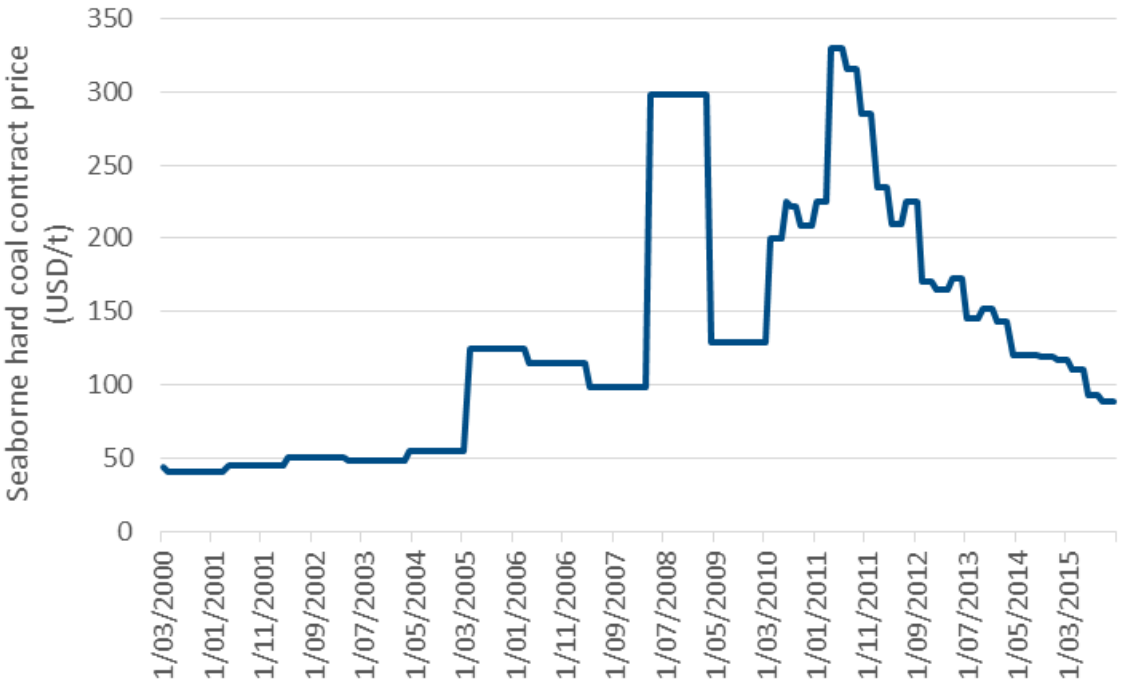
47 We note that the implied de-levered asset beta estimate is sensitive to the assumptions that are made about debt beta, gamma and the averaging approach that is applied.

3.4.1 Change in the industry environment

We agree with DBCTM's/Frontier's view that the seaborne coal market has deteriorated significantly over the past three years. However, we do not agree with DBCTM's/Frontier's conclusion that this deterioration has materially impacted DBCT's asset beta.

It is true that the price of seaborne coal has fallen from the very high levels observed in September 2011 as shown by Frontier's Figure 1, which is sourced from the Australian Chief Economist's *Resources and Energy Quarterly*.[48] However, the wider picture of volatile hard coal prices (in USD) is shown in Figure 3.1 below. While hard coal prices are lower than USD100 at present, in nominal terms they are similar to prices at the time of earlier determinations for DBCT. Seen in this context, it is the period of high prices, particularly during and just after the global financial crisis, which appears to be the anomaly.

Figure 3.1: Seaborne hard coal contract price (USD/tonne)



Source: Bloomberg

The seaborne metallurgical (coking) coal market is being shaped by events in Asia (particularly China and India), while the outlook for steaming coal is also influenced by responses to global warming. Since approximately 85 per cent of DBCT's throughput is metallurgical coal, it is this market that is of primary importance. Two major developments are the current contraction (and future recovery) in

[48] Office of the Chief Economist (September, 2015), *Resources and Energy Quarterly*, p.8.

China's steel production, and the relative growth of India's steel industry and consequent future imports of metallurgical coal.[49]

Australia's Office of the Chief Economist summarises the situation for metallurgical coal exports during DBCT's coming regulatory period as follows:[50]

> *Over the medium term, Australia's production of metallurgical coal is projected to increase at an average annual rate of 2.1 per cent to 215 million tonnes in 2019-20. This will be supported by a number of projects that are scheduled to be completed over the outlook period… Despite price pressures, Australia managed to increase its share of world metallurgical coal exports from 52 per cent in 2013 to 56 per cent in 2014 as higher cost production, particularly in North America, was closed. In 2014-15, Australia's exports of metallurgical coal increased by 3.9 per cent to 188 million tonnes… From 2016-17, Australia's exports of metallurgical coal are projected to increase at an average annual rate of 2.6 per cent to 211 million tonnes in 2019-20.*

Figure 3.2, which is sourced from the US-based International Energy Agency, shows how in recent years metallurgical export capacity has been shifting from the US, Canada, and Indonesia to Australia. While modest growth is projected to 2040, Australian metallurgical coal exports are expected to continue to dominate world trade, and to underwrite the continued economic viability of the existing Australian coal exporting infrastructure including DBCT.

The recent falls in coal prices have highlighted the fact that the vast majority of Australian production capacity lies at the lower end of the cost curve. Bloomberg's specialist coal industry analysts have undertaken an investigation of the current and prospective seaborne trade in both metallurgical and steaming coal. They note that most metallurgical coal suppliers are covering cash costs even at USD93 a tonne, and that 'US producers on the right side of the cost curve will likely lose market share to Australian miners benefiting from cost deflation through currency depreciation.'[51] The Australian dollar acts as a regulator of competitiveness, with high commodity prices raising the Australian dollar (making Australian coal production less competitive), and low commodity prices inducing a fall in the Australian dollar, which makes Australian coal production more competitive.

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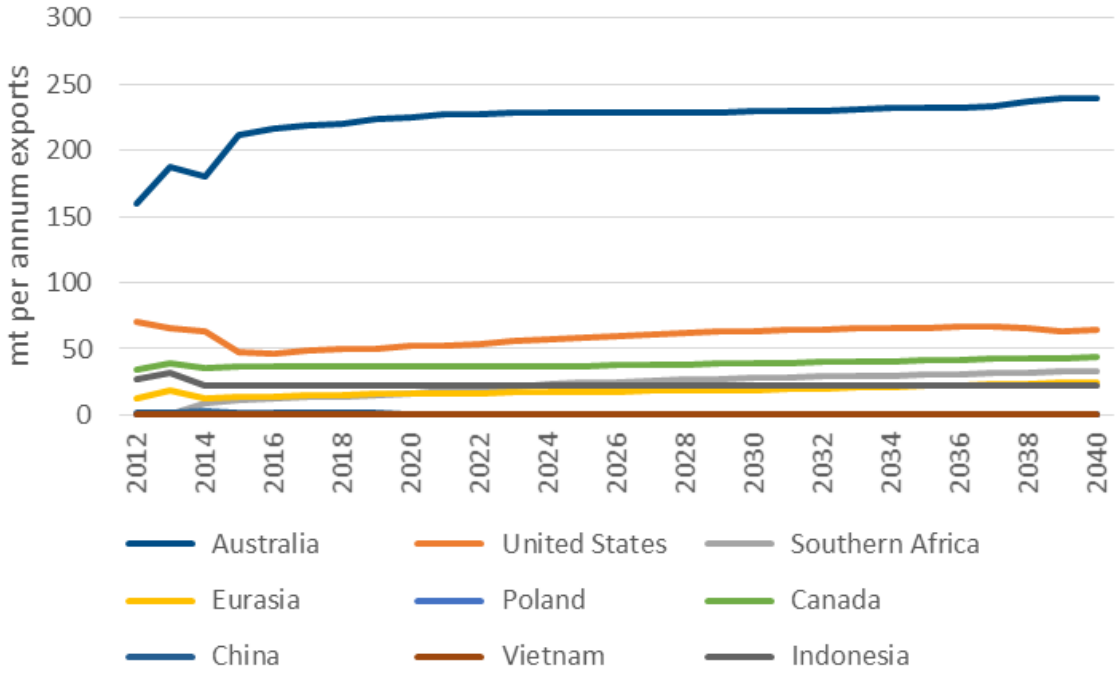
49 Office of the Chief Economist (September, 2015 at page 42) notes that India's imports of metallurgical coal increased by 21 per cent to 51 million tonnes in 2014.

50 Office of the Chief Economist (September, 2015), p.43.

51 Andrew Cosgrove and William Foiles (2 September, 2015), *Met Coal Weakness to Linger to 2017 as Oversupply Reigns Supreme*, Coal Operations Team, Bloomberg Intelligence.

Figure 3.2: Actual and forecast world metallurgical coal exports, 2012-2040



Source: IEA

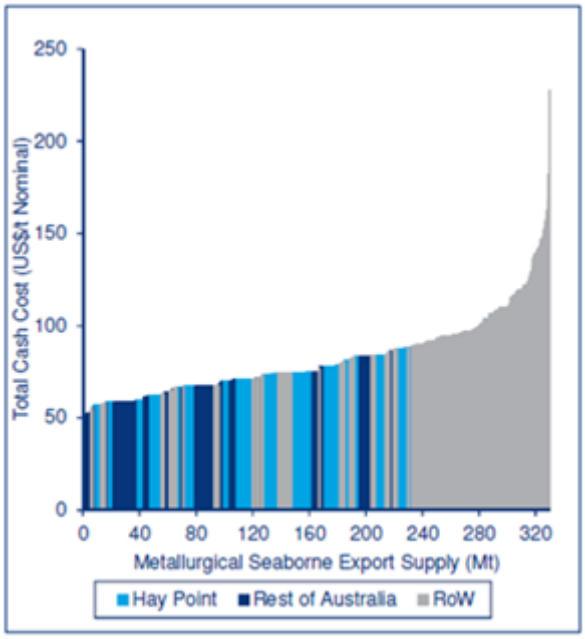
Figure 3.1 below is taken from the Wood Mackenzie report that was commissioned by DBCTM, and defines the 2016 cost curve for global seaborne metallurgical coal exports. The cost curve shown in Figure 3.1 demonstrates the strong international competitiveness of Australia's metallurgical coal industry, and within it the competitiveness of Hay Point (which is comprised of the DBCT terminal and the BMA terminal (BHP Billiton / Mitsubishi Alliance)).

The Wood Mackenzie report concludes:[52]

> *Compared to other global seaborne metallurgical operations, a majority of operations within the Hay Point Catchment are cost competitive and running at positive margins… it is important to note, that since 2012 Australian coal mines have implemented major cost cutting measures to combat the continued weakness in the seaborne export coal market. Costs have fallen due to higher volumes, reductions in employee headcount, better utilisation of mining equipment, a decline in overheads, changes in product qualities, high-cost mine closures, and a move to owner-operator status at some mines.*

[52] Wood Mackenzie (2015), *Shipper Mine Life Analysis*, Report prepared for DBCT Management, p.28.

Figure 3.3: 2016 Global seaborne export metallurgical coal cash costs (nominal USD terms)



Source: Wood Mackenzie (2015), Figure 28, p.30.

In summary, while the current seaborne coal industry outlook is depressed, Australian metallurgical coal production is the most competitive in the world, and the long term outlook is positive, with Australia's Chief Economist and the International Energy Agency forecasting continued growth of coal exports, albeit at lower rates, and expecting Australia to continue to dominate seaborne coal trade in the future. While the fall in coal prices has squeezed the profit margins of Australian producers, their relative competitiveness means that current export volumes are expected to be secure over the coming regulatory period and in the long run.

3.4.2 Change in the competitive environment

As noted above, DBCTM and Frontier have submitted that DBCT now faces competitive pressure, and this will have the effect of increasing systematic risk. However, the users and PwC have presented detailed analysis of the factors that secure DBCT's monopoly position over the course of the next regulatory period. These factors are as follows:[53]

- *DBCT's cost advantage* – Terminal costs at DBCT are lower than at other terminals owing to economies of scale achieved with its nominal capacity of 85 Mtpa.

- *Insufficient uncontracted capacity at other terminals* – Vale states that all capacity at other terminals is contracted with the exception of limited amounts at Wiggins Island Coal Export Terminal (WICET) and Barney Point Coal Terminal in Gladstone. Barney Point is closing down soon, and Vale considers it would be problematic to coordinate a switch from DBCT to other

[53] Vale (24 November, 2015), pp. 4-6.

facilities owing to unavailability of spare capacity and potential overlapping take-or-pay commitments.

- *Superior coal-blending capability at DBCT* – Owing to the size and diversity of its customer base, Vale notes that relative to other terminals DBCT has superior ability to load different coals from different suppliers into the hold of the same vessel. Customers shifting away from DBCT would be likely to lose this ability.

- *Rail cost is higher at alternative terminals* – For mines in the Goonyella system the nearest coal terminal is DBCT, which means that a shift away from DBCT would, according to Vale, require additional rail costs.

- *Restricted spare uncontracted below rail capacity* – Vale considers that an attempt by shippers to shift capacity away from DBCT would run into the problem of lack of spare uncontracted below rail capacity, which requires significant lead time to plan and construct.

- *Lack of above rail infrastructure* - Above rail providers in the Goonyella system operate electrified rolling stock, while the Newlands rail system that services Abbot Point is not electrified. According to Vale, above rail operators would therefore need to purchase new diesel rolling stock to shift current capacity from DBCT to Abbot Point.

- *Capital investment requirements* – Vale notes that rail balloon loops and other rail infrastructure in the Goonyella system have been constructed with the aim of transporting coal to Hay Point (DBCT), and any attempt to switch to alternative ports would require significant capital investment in rail infrastructure.

- *Long term take-or-pay commitments on rail haulage infrastructure* – Apart from the other problems and costs, according to Vale, the opportunity for shippers to switch from DBCT would only arise when long term rail haulage contracts expire (or else early termination fees would need to be paid).

Finally, Vale submits that the adjacent Hay Point facility owned by BMA is not open access multi-user, and there is no evidence that BMA wishes to open the facility to third party access. Vale also notes that DBCTM was considering the development of a new adjacent terminal at Dudgeon Point, but the lowering of coal prices has caused this Brookfield Group project to be suspended:[54]

> *Vale believes it is an extreme contradiction by DBCTM, as part of the Brookfield Group, to suggest that it faces greater risk from competition, and therefore increased asset stranding risk, when the potential competition is from within its own parent group.*

Regarding the potential for current customers of DBCT to switch to shipping to Abbot Point or WICET, as suggested by DBCTM, PwC notes that this would be dependent on excess capacity being available and relative costs being comparable. Since WICET's customers are tied to 10 year take-or-pay contracts, relative to using DBCT's terminal, haulage costs are higher and the Terminal Infrastructure Charge (TIC) is higher at Abbot Point and WICET, PwC concludes that 'neither is

[54] Vale (24 November, 2015), pp. 5-6.

likely to be an attractive option.'[55] We agree with the analysis presented by Vale and PwC in relation to the market power of DBCT, which remains strong.

Consequently, combined with the previous conclusion about the security of production from DBCT's customers or potential customers, we conclude that demand for the terminal services of DBCT will remain secure into the medium to long term.

3.4.3 Credit rating changes

In downgrading DBCT Finance Pty Ltd from BBB+ to BBB in July 2014, Standard & Poor's noted:[56]

> *The rating action reflects the weakened credit quality of DBCT's customers, which was greatly influenced by the recent lowering of the issuer credit ratings on Peabody to 'BB-'. Peabody has contracts for about 25% of DBCT's overall capacity…*
>
> *We note that the contractual and regulatory framework provides some protection against material deterioration of the credit quality of a customer, whereby, at a five-year tariff reset, the revenue previously earned from a defaulted customer is 'socialised' among the customer base by spreading the revenue base across the other performing customers…*
>
> *The 'BBB' issue credit ratings on DBCT remain otherwise supported by our view of the predictable and stable cash flow that DBCT derives through take-or-pay contracts with well-established coal companies…* [they are] *… critical to DBCT's credit quality given that they insulate the group from any volume or operating risks absent a customer default…*
>
> *However, Standard & Poor's Ratings Services opinion of the credit quality of the offtakers, DBCT's aggressive financial structure (which incorporates ongoing refinancing risk), and ultimately the need to maintain the competitiveness of the Queensland basin among global metallurgical coal-producing regions constrain the ratings.*

We observe several relevant points:

- First, credit ratings are concerned with delays in cash, because under debt covenants a delay will trigger default, and in these circumstances the debt holders will take ownership of the assets and pursue the best means of retrieving their investment (which generally means a sale of the business to the highest bidder, but may require a sale of the individual assets). Hence, the 'socialisation' feature is less useful for debt, but is protective of the equity value of the business, because the NPV of the delayed cash flow will not be markedly different from an immediate receipt of the cash.

- Secondly, Standard & Poor's expressed concern that the 'socialisation' mechanism does not recover lost revenue from a defaulting customer is due to the fact that recovery may be achieved after the next revenue reset, therefore it is the strength of the industry that is most important. However, the Australian/Queensland metallurgical coal export industry is the strongest in the world and set to continue its dominance of world trade. In these circumstances, even if individual

[55] PwC (November, 2015), p. 12.

[56] Standard & Poor's (31 July, 2014), *DBCT Finance Pty Ltd. Lowered To 'BBB" On Weakening Of Customers' Credit Quality: Outlook Remains Stable*, p. 2.

coal shippers were to default due to poorer performing operations in other countries (e.g. Peabody), if the Queensland operations have sound economics (i.e. are low down on the international cost curve), those operations will either be sold or restructured as independent entities that would continue operations. In that case, we would not expect the deteriorating credit quality of customers with international operations (like Peabody) to have a material effect on DBCT's asset beta.

- Thirdly, the credit rating being assessed by Standard & Poor's is not reflective of a benchmark firm with 60 per cent benchmark gearing. Instead, Standard & Poor's is assessing a project finance structure (DBCT Finance Pty Ltd),[57] which has a number of specific characteristics, in particular a gearing level of close to 80 per cent, and a set of debt covenants that are more restrictive than those used in standard corporate debt arrangements (for example, provision for a 'cash sweep' if credit ratios breach certain limits). Standard & Poor's has stated that the 'aggressive financial structure' of DBCT Finance Pty Ltd is a factor that constrains the credit rating.[58]

- Fourthly, we note that since Frontier's report was completed, Moody's has downgraded DBCT Finance Pty Ltd further to Baa3 (equivalent to BBB-), citing similar reasons to Standard & Poor's, but also noting that it expects the new QCA determination to provide less revenue owing to the relatively low five year risk free rate, and that 'high financial leverage leaves insufficient cushion at Baa3 rating level to manage deteriorating fundamental risk.'[59]

To reiterate, Frontier considers that:[60]

> *If the risk of first-ranking debt has increased, it must be the case that the risk of residual equity in the same firm has also increased.*

Establishing a direct link between the cost of debt and the cost of equity is fraught with difficulty. This issue was recently pursued at length in the context of the ERA's consideration of the access arrangement for the Goldfields Gas Pipeline. Professor Bruce Grundy, on behalf of Envestra, argued that if with 60 per cent gearing the equity risk premium is not at least 2.66 times the observed debt risk premium, then 'the asset pricing model is underestimating the true return on equity for the firm.'[61] However, Professor Kevin Davis and Associate Professor John Handley refuted Professor Grundy's proposition on grounds that it is based on restrictive assumptions and is not based on well accepted finance theory. The ERA concluded that:[62]

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57 In its 31 July 2014 assessment of DBCT Finance Pty Ltd Standard & Poor's points to *Updated Project Finance Summary Debt Rating Criteria*, 18 September, 2007 for guidance on the criteria it has applied.

58 Standard & Poor's (31 July, 2014), p.3.

59 Moody's Investors Service (23 December, 2015), *Credit Opinion: DBCT Finance Pty Ltd*, Global Credit Research, p. 3.

60 Frontier (September 2015), p.13).

61 Bruce Grundy (30 September, 2010), *The Calculation of the Cost of Capital*, A report for Envestra, p.18.

62 ERA (17 December, 2015) *Draft Decision on Proposed Revisions to the Access Arrangement for the Goldfields Gas Pipeline*, p.444.

> *…the only sure link that one can infer is that the return on debt should generally be lower than the return on equity because debtholders are considered less risky in comparison with equity holders for the same assets (firm).*

In summary, our view is that while there has no doubt been a deterioration of DBCT's customer credit worthiness, part of this deterioration is likely due to over-gearing and margins being squeezed in the international operations of firms like Peabody, that are also operating in the Goonyella system. Neither Standard & Poor's nor Moody's has demonstrated by reference to indicators of international competitiveness that a significant portion of DBCT's customer base is at risk of long term closure due to the current international rationalisation of the metallurgical coal industry. Indeed, Standard & Poor's analysis concludes:[63]

> *In our base case, we have assumed that the region is capable of supporting production beyond 2030…*

This is the same conclusion that we reached in section 3.4.1 above. We consider that since the underlying long term prospects of the Goonyella system's metallurgical coal industry are sound, the current credit rating downgrades of DBCT's customers will not have a material effect on systematic risk.

3.4.4 Take-or-Pay contracts

DBCTM submitted that approximately 75 per cent of DBCT's Take-or-Pay contracts are due to expire in the course of the coming regulatory period.[64] However, as we have shown above, the economic fundamentals of DBCT's Goonyella system remain positive over the coming regulatory period and in the longer term. We noted that coal export volumes at DBCT have been close to capacity and are expected to stay close to capacity for the foreseeable future.

In its opinion on the creditworthiness of DBCT Finance Pty Ltd, Standard & Poor's concluded that it assumes:[65]

> *…the continued renewal of existing take-or-pay contracts and pass through of operating costs to the customers.*

In its Supplementary Submission the User Group focuses attention on Clause 20 of the Standard Access Agreement, which gives the user an evergreen option to extend the term by five year increments, and imposes 'risks of nonrenewal':[66]

- It is 'uneconomic and impractical' to divert coal traffic from DBCT to an alternative port;
- 'As a consequence, every DBCT User has an extremely strong incentive to continue to renew the existing User Agreement for the current life of their mine at the absolute minimum;'

63 Standard & Poor's (31 July, 2014), p. 3.
64 DBCTM (9 October, 2015), p. 38.
65 Standard & Poor's (31 July, 2014), p. 3.
66 DBCT User Group (22 January, 2016), *DBCT User Group – Supplementary Submissions to QCA*, pp.3-4.

- 'Even where mines of a DBCT User have been temporarily closed (as for example Isaac Plains has), the relevant user has continued paying the Terminal access charges with a view to being able sell the mine with port access in place (as recently occurred)';

- Major miners with multiple mines (which describes most DBCT users) require terminal access for future development of their mine portfolios, and will hold on to that access (renew the contract) with a view to utilising the capacity with new mines in future even if the current mine that uses it is being wound down; and

- 'A company without an alternative use for the access would be likely to seek a commercial arrangement for the assignment of its access rights to a third party miner who would utilise those rights, rather than forfeit them by failing to renew a user agreement.'

In other words, whatever the circumstances of individual miners, DBCT's users submit that they have strong incentives to renew their contracts.

Finally, we consider that Frontier's emphasis on the strict contract renewal features at WICET and NCIG and longer contract terms is misplaced. The users at WICET and NCIG do not have the security of DBCT's regulatory framework, and this is compensated for by a framework of contracts that lock in the users.

3.4.5 First principles analysis

We disagree with Frontier's first principles analysis for the following reasons:

- First, Frontier's first principles analysis is wholly conceptual, in that it compares DBCT with energy transmission and distribution businesses at a high level, and incorporates no empirical testing of its proposition that these industry groups have few or insignificant comparable features;

- Secondly, Frontier then asserts that the 16 commercial ports in its sample (drawn from Grant Samuel's analysis) are the best available comparators for DBCT without undertaking even a high level qualitative first principles analysis of this proposition.

Our approach is to undertake a side-by-side, qualitative and quantitative first principles analysis of DBCT, regulated energy and water businesses, commercial ports and other industries in order to assess which comparator group has systematic risk features that are most similar to DBCT's characteristics. In doing so we find considerable evidence to support the proposition that regulated energy and water businesses are, and commercial ports are not, appropriate comparators for DBCT.

Elasticity of demand

Frontier states that 'DBCT would have always faced a more elastic demand curve [and therefore had a higher beta] than energy distribution firms, because use of its service is contingent on the profitability of local mines – it is not providing a service that is essential for the physical life of its customers.'[67] However, Frontier provides no evidence for its opinion. Our view is that there are significant switching costs and other factors that indicate DBCT has a high degree of monopoly power.

[67] Frontier (September, 2015), p.16.

As shown in Table 3.1 below, there is no connection between contracted capacity and shipments of coal through DBCT and Australian income levels (GDP). This is because the growth in seaborne trade in metallurgical coal is being determined by industrialisation and urbanisation in Asia, and particularly China and India.

Table 3.1: Australia GDP vs DBCT revenue, throughput and contracted capacity (YOY growth)

YOY % growth	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Contracted			4.5%	1.8%	1.4%	10.8%	24.1%	0.6%	0.0%	0.2%	-1.4%	0.0%
Shipments	12.5%	15.9%	-0.5%	-1.4%	-13.1%	9.3%	33.5%	-13.1%	-7.3%	22.4%	8.4%	6.5%
Revenue (actual)			5.7%	17.1%	15.3%	35.0%	30.1%	5.3%	13.5%	1.0%	-1.1%	0.9%
GDP	3.9%	3.0%	2.4%	5.1%	2.9%	1.7%	2.1%	2.5%	3.9%	2.1%	2.7%	1.5%

Source: Bloomberg, DBCT, Incenta analysis. Note: DBCT had material capex growth between 2007-08 and 2009-10 (shaded).

We conclude that based on relative income elasticity of demand, DBCT is likely to be closer to regulated energy and water businesses than to container ports or coal companies.

The nature of the customer

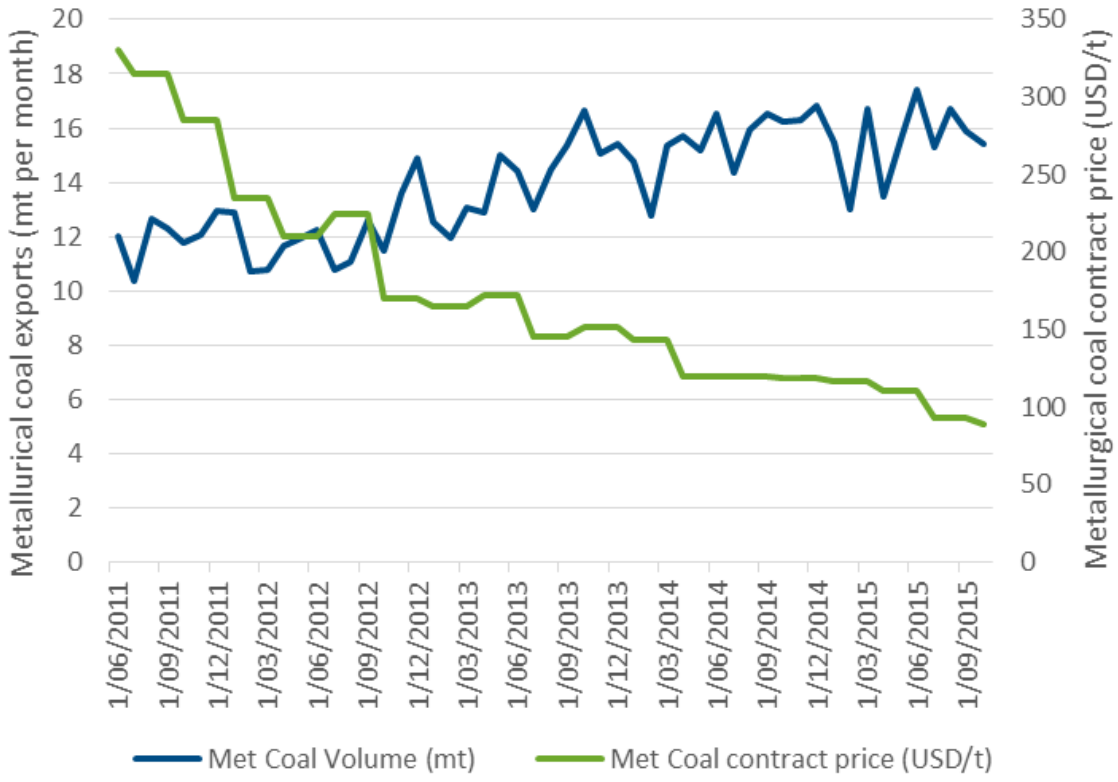
Frontier considers that firms (like energy distributors) that service the public are expected to have lower betas than firms like DBCT, which serves a small number of corporate customers. Therefore DBCT can be expected to have a higher beta than energy distributors. We consider that the fundamental principle behind this factor is not the number of customers *per se*, but whether there is demand sensitivity to changes in market returns or real GDP.

- *Energy and water distribution* - In the case of regulated energy and water distribution the source of demand is important because:
  - Domestic demand is relatively insensitive to market/GDP changes as this consumption is fundamental to the standard of living; but
  - Commercial and industrial consumption of energy and water are likely to be more sensitive to the economic cycle because it depends on the demand for the goods and services that are produced, and many of these are likely to be luxury items that are sensitive to the economic cycle. The betas of water or energy businesses whose customers are primarily commercial/industrial are therefore likely to be higher than the betas of water or energy businesses supplying a large number of domestic customers. While in the case of commercial and industrial customers there is a connection between number of customers and beta, it is the sensitivity to the economic cycle that is key.
- *DBCT* - In the case of DBCT, the number of customers is low, but the question is whether their demand for DBCT's services will be sensitive to the economic cycle:
  - The coal price is sensitive to the economic cycle, and a higher price will cause miners to desire expanded mine production and encouragement of new terminal capacity to be built.
    - However, even if the economic cycle turns against coal miners and the price of coal falls, as long as the miners are at the lower end of the international cost curve, they have an

incentive to continue the shipments as long as they are still making a surplus over cash costs.

- Therefore, despite the small number of customers, shipper demand for DBCT's services is likely to be relatively insensitive to the economic cycle, which indicates a relatively low beta. Furthermore, this shipper insensitivity to the economic cycle is supported by the existence of take-or-pay contracts that impose a cost if shipments are not made. As shown in Figure 3.4 below, Australian exports of metallurgical coal have been at record levels despite the fall in coal contract prices. [68]

Figure 3.4: Australia – metallurgical coal exports vs coal price



Source: Bloomberg Intelligence, ABS

Pricing structure

Frontier notes that according to Lally, firms like energy distributors with more fixed revenues are likely to have lower betas, while Frontier considers that: 'As set out above, DBCT's pricing structure is similar to the commercial pricing structure adopted by other ports'.[69] It is true that DBCT's pricing

68 Andrew Cosgrove and William Foiles (15 October, 2015), *Aussie Met Coal Exports Hover Near Record as Prices Hit New Lows*, Bloomberg Intelligence: Coal Operations Team.

69 Frontier (September, 2015), p.17.

structure has similarities to other ports, but the issue is whether this results in a stable revenue stream. Under DBCT's revenue cap framework, pricing structure has no relevance.[70]

Commercial ports are generally subject to considerable cyclical volume risk, and do not have the cost-based regulatory framework (with revenue cap) and take-or-pay contracts that provide DBCT with a stable revenue stream.

Contract duration and price flexibility

Frontier notes that 'DBCT is unable to easily increase prices in response to shocks to costs such as wage rates or interest rates, during a regulatory period,'[71] which will increase systematic risk. Owing to its operating cost arrangement with DBCT Pty Ltd, DBCT does not suffer the 'shocks to costs' (with respect to wage rates) that Frontier assumes.

DBCT does not require price flexibility to achieve a smooth revenue stream, as this stability is provided by its regulatory framework (see below), which applies a revenue cap. While contracts of existing users will typically expire in the course of a regulatory period, as we have seen there is no practical alternative than to ship through DBCT, and therefore a strong incentive to roll-over contracts. Hence, neither the contract duration nor price flexibility factors will have a material impact on DBCT's systematic risk.

Regulation

Frontier states that according to Lally, 'firms with long [regulatory] re-set periods (5 years) are likely to have higher betas than otherwise identical unregulated firms.' This is not what Lally's (2004) report for the QCA says. Lally's hypothesis was that other things being equal, price regulation would be expected to result in lower systematic risk, but if regulatory re-set periods are longer apart, under price-cap regulation this could expose those regulated firms to more volume risk than if the re-set was undertaken more frequently. Hence, Lally compared regulated firms with longer re-set periods to regulated firms with shorter re-set periods, and did not propose that regulated firms with longer re-set periods have 'higher betas than otherwise identical unregulated firms' as Frontier suggests. Lally's (2004) report stated that:[72]

> *Rosenberg and Guy (1976b, Table 2) find that such [rate of return regulated] industries have amongst the lowest betas after allowing for various firm specific variables. However, as the reset interval increases, the adjustment of the output price so as to preserve the firms' rate of return is increasingly delayed; exposure to macro-economic cost shocks then increases, and this should raise the firm's beta.*

Frontier has not related this factor to DBCT's specific circumstances, where a five year revenue cap framework is applied. In previous analysis we have shown that it is difficult to demonstrate that alternative regulatory approaches (price cap vs revenue cap vs rate of return regulation) will have

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70 Under a price cap regulatory regime, price structure would have some relevance, but would have little effect on beta owing to the interaction between the regulatory framework and take-or-pay contracts.

71 Frontier (September, 2015), p.17.

72 Martin Lally (26 February, 2004), *The cost of capital for regulated entities*, report prepared for the Queensland Competition Authority, p. 81.

materially different impacts on systematic risk.[73] However, Lally's fundamental hypothesis (which draws on the Peltzman hypothesis of income buffering) that other things being equal, a regulated firm will have lower systematic risk, is widely acknowledged.[74]

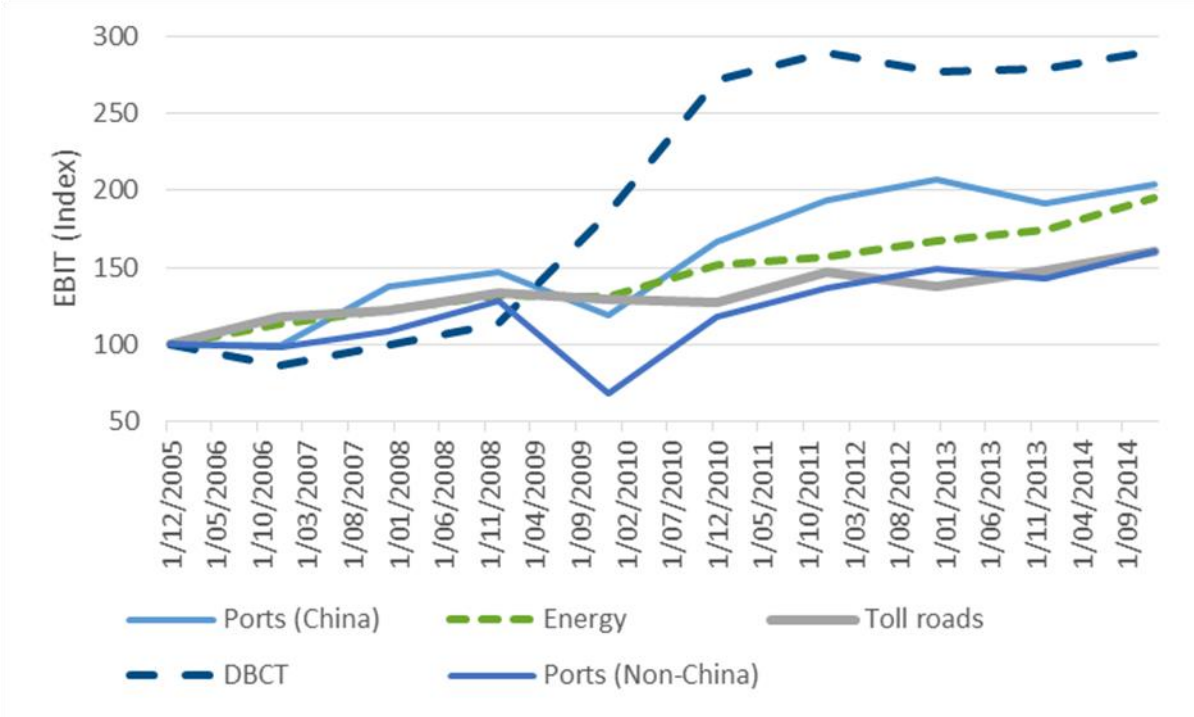
DBCT's cost-based regulation provides it with relatively fixed revenues compared with unregulated commercial ports. During the Global Financial Crisis, when demand for many goods (particularly luxury items) fell materially, DBCT's EBIT rose to a new level in proportion to the capital expenditure that increased its RAB. In Figure 3.5 below, we find that the EBIT performance of both DBCT (apart from its capex related growth) and regulated energy businesses (on average) was relatively stable through the Global Financial Crisis and during the subsequent sovereign debt crisis. On average, toll roads exhibited slightly more sensitivity through these cycles. By contrast the commercial ports in Frontier's sample showed much greater sensitivity to the economic cycle, particularly during the Global Financial Crisis (2008-09). In addition, we find that while the China-based ports in Frontier's sample had more growth than the non-China ports, they exhibited a similar sensitivity to the economic cycle.

Based on its regulatory framework we would expect that other things being equal, DBCT should have a lower asset beta than unregulated firms. We have already noted that independent expert Grant Samuel considered DBCT's regulatory framework the most important feature determining its beta. We consider that from a systematic risk perspective, DBCT's revenue cap regulatory framework makes its asset beta fundamentally the same as regulated energy and water businesses.

[73] Incenta (9 December, 2013), *Review of Regulatory Capital Structure and Asset/Equity Beta for Aurizon Network*, Report for Queensland Competition Authority, pp.17-18.

[74] Sam Peltzman (1976), 'Toward a More General Theory of Regulation', *Journal of Law and Economics*, Vol 19, pp.211-240.

Figure 3.5: Index of EBIT – DBCT vs Ports, Toll roads and Energy



Source: DBCT, Bloomberg and Incenta analysis

Monopoly power

As discussed above, Frontier considers that since the last determination, DBCT's market has 'diminished considerably as the threat of competition is now more pronounced.'[75] Frontier expects this threat of competition to result in greater systematic risk. However, in our earlier discussion of the threat of competition, we drew upon the analysis of Vale, which provides a number of inter-related reasons for why there has been no material change in the threat of competition since the previous DBCT determination. Fundamental among these reasons is the cost of switching from shipment through DBCT, to other more expensive options where sufficient and secure capacity is not readily available. Hence, as long as there is a sufficiently wide cost differential and other impediments to shipment through alternative ports, we consider the monopoly position of DBCT relative to the shippers will remain strong.

Neither does Frontier consider the relative monopoly power of the commercial ports that it proposes as appropriate comparators for DBCT. Commercial ports are subject to greater or lesser degrees of competition from other ports depending on distances and the relative costs of alternative transport networks, including road and rail. Similarly, we consider that DBCT has more market power than a toll road, for which alternatives generally exist. Hence, on the characteristic of market power, we conclude that both DBCT and regulated energy businesses will have more than commercial ports and toll roads.

[75] Frontier (September, 2015), p.17.

Real options

Frontier cites Lally's proposition that the option to adopt new products will increase systematic risk, and that energy distribution is at the lower end of the systematic risk spectrum. However, Frontier does not extend Lally's proposition to DBCT, which similarly has no options to adopt new products. By definition, the regulated activity of DBCT is its coal loading terminal services, and if DBCT were to adopt other regulated or unregulated activities, those activities would be ring-fenced from DBCT's regulated coal loading terminal activity. Therefore, any option that DBCT might have to adopt new products is irrelevant to its regulated asset beta.

Operating leverage

Frontier notes that Lally placed little weight on this financial characteristic (the ratio of fixed to variable costs) due to mixed empirical evidence on the effect on beta. We do not place much weight on the relative operating leverage of DBCT, because operating leverage requires revenue volatility to have an effect, and DBCT's cost-based regulatory framework and take-or-pay contracts reduce its revenue volatility to a minimum. In any case, we consider the operating leverage of DBCT to be relatively low. Under an agreement with DBCT Pty Ltd (owned by a group of users), the majority of operating costs at the port are incurred by the latter, which means that for DBCT both the percentage of operating costs to total asset value, and the inverse of the EBIT margin over revenue are unusually low, and these are considered to be measures of operating leverage.

Market weight

Lally noted that this will not be an important consideration unless the firm comprises more than 5 per cent of the market index, and Frontier considers that this will not relate to DBCT as its weight is less than this. We agree with Frontier on this point.

3.4.6 Appropriate comparators for DBCT

In this section we review potential comparator firms and industries for DBCT, including the 16 ports that Frontier considers to be appropriate comparators for DBCT (which were drawn from the Grant Samuel (2010) expert's report). Grant Samuel adopted an equity beta range of 0.70 to 0.80 for DBCT and considered that while this 'appears low, none of the other listed ports are regulated and in Grant Samuel's view, the regulated nature of the asset (and the certainty of its cash flows) warrants a lower beta.'[76]

Frontier placed particular emphasis on Port of Tauranga and Asciano as comparators for DBCT, since the former is the only remaining comparator that was considered by the QCA in its 2005 final decision on DBCT, and the latter was the only comparator for DBCT that was mentioned in the Grant Samuel (2010) report.

Port of Tauranga

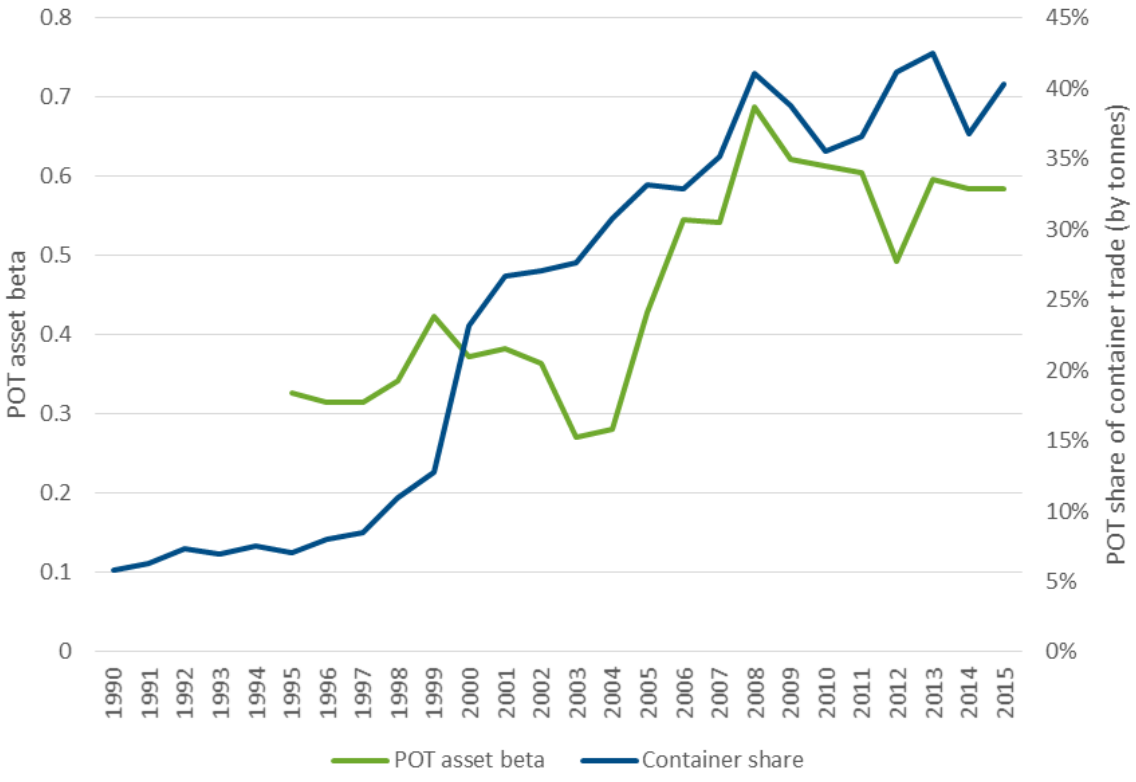
Frontier states that the Conine re-levered equity beta estimate for the Port of Tauranga is 1.24.[77] However, we consider that the Port of Tauranga is no longer an appropriate comparator for DBCT owing to the change in the mix of its cargo traffic since the period when the QCA's initial decision on

[76] Grant Samuel, in Prime Infrastructure (September 2010), *Scheme Booklet*, p. 289
[77] Frontier (September, 2015), p.4.

DBCT's WACC was made (in 2004-05). Prior to that time the Port of Tauranga's traffic was dominated by bulk trade in agricultural products such as wood chips to Asia. We would expect the asset beta of agricultural produce to be much lower than the asset beta for containers, since the former is less tied to the economic cycle or largely independent of it, while the trade in containers is highly dependent on the economic cycle.

Figure 3.6 below shows that the asset beta of the Port of Tauranga has increased together with the proportion of trade (in tonnes) that was accounted for by container trade. While the proportion of container trade was low, the Port of Tauranga's asset beta varied between 0.30 and 0.40, but as the trade in containers became more dominant, the asset beta rose to an average level of approximately 0.60 since the Global Financial Crisis (2008-09).[78]

Figure 3.6: Port of Tauranga – asset beta vs share of container trade



Source: Bloomberg, Port of Tauranga and Incenta analysis

Asciano

Frontier states that the Conine re-levered equity beta estimate for Asciano is 2.92.[79] Bloomberg's description of Asciano's operations is as follows:

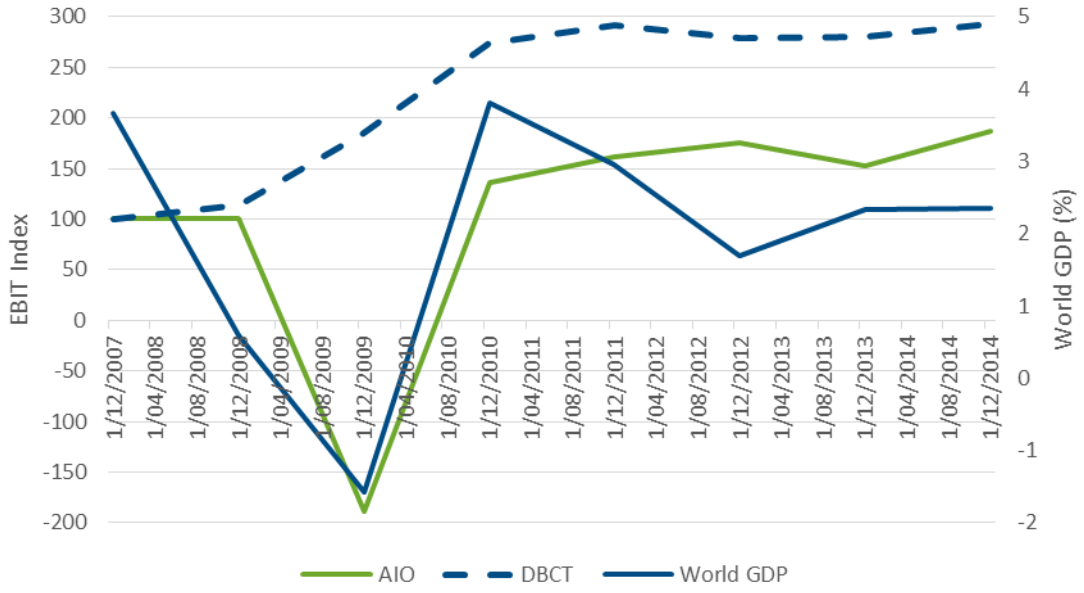
[78] Bloomberg rolling asset betas have been estimated based on delivering the Conine formula, assuming a debt beta of 0.12 and using 60 months of monthly observations (i.e. 5 years).

[79] Frontier (September, 2015), p.4.

Asciano Limited is a provider of essential transport services in the rail and ports and stevedoring industries in Australia and New Zealand. The Company operates container terminals, bulk export port facilities and container and bulk rail haulage services.

While part of Asciano's operations involve railing coal in Queensland and New South Wales (about one-third of Pacific National's fleet is engaged in this activity), this is a small proportion of Asciano's total operations, which include a large component of intermodal transport that is highly sensitive to the economic cycle. The relative degree of sensitivity to the economic cycle can be seen in Figure 3.7 below, which shows the index of Asciano's and DBCT's EBIT against world GDP growth since 2007. The strong downturn in world economic growth in 2008 and 2009 is mirrored by a material reduction in Asciano's EBIT. After a recovery in 2010, world GDP then fell for the next two years, and Asciano's EBIT fell again in 2013. By contrast, as we have seen in Figure 3.3, the EBIT of DBCT has closely tracked DBCT's RAB. During 2008-10 DBCT was in the process of expanding its capacity to 85 Mtpa - its EBIT followed closely, and has been quite stable since the completion of that expansion. Hence, Asciano is clearly not an appropriate comparator for DBCT, which we expect is the reason that Grant Samuel chose to ignore it when assessing DBCT's beta.

Figure 3.7: World GDP growth vs EBIT (DBCT and Asciano)



Source: Bloomberg, DBCT and Incenta analysis

Westshore Terminals

We find it puzzling that Frontier makes no mention of Westshore Terminals (Westshore) as a potential comparator for DBCT, however it was included in the sample of ports identified by PwC.[80] Westshore, which is situated in Vancouver, Canada, is the only stock market listed coal loading port in the world, and in a physical sense is the best port comparator for DBCT. However, Westshore is

[80] See PwC (2015), p.7.

not regulated, but instead undertakes pricing (coal loading rate) negotiations directly with its shipper customers, who are dominated by Teck Resources Limited (formerly Teck Cominco).

Our view is that Westshore was a reasonable comparator for DBCT prior to 1 April 2003. At that date Westshore moved from a system of fixed loading rate charges that were negotiated with its customers, to a system that linked the loading rate to the price of coal in USD. Shortly after the change in pricing policy, a Canadian broker analyst observed that while Westshore was physically a coal port terminal, its financial characteristics meant that it closely resembled a metallurgical coal producer:[81]

> *The nature of Westshore's assets places the company in the bulk material handling and shipping business. However, we believe that, based upon the shipment profile of its existing customer base, combined with the structure of its current loading contracts, Westshore's financial performance more closely mimics that of a metallurgical coal producer as opposed to a direct industry peer.*

Figure 3.8: Westshore Terminals – asset beta vs loading rate (CAD)

Source: Bloomberg, Westshore Terminals Investment Corporation, Euro Pacific Capital Inc.

In Figure 3.8 we observe that up to 2003 the average asset beta of Westshore was approximately 0.43, but after 2003 the asset beta rose to a peak of approximately 1.3 during the global financial crisis as its cash flows mimicked those of coal miners during a period of volatile coal prices. In 2011 Westshore began to switch some of its shipper contracts back to a fixed price basis, and the average

[81] See Kodatsky, Alec, (April, 2005), *Westshore Terminal Income Fund: Going for the coal*, Scotia Capital Report, p.8.

loading rate has been increasing despite the fall in coal prices. The asset beta has been falling to values of between 0.7 and 0.9 in the last two years.

In summary, while Westshore is a very close comparator with DBCT on a physical basis (i.e. it is a coal loading terminal) there are several reasons for rejecting it as an appropriate comparator for DBCT's asset beta, since Westshore:

- Is not regulated, while DBCT is subject to cost-based regulation – as a result, DBCT's cash flow stream has been significantly more stable than Westshore's cash flow;
- Is still exposed to some contracts that are linked to the price of coal, and the market is aware that Westshore could in future negotiate contracts that are linked to the USD price of coal if it considered this to be advantageous; and
- Is dependent on the Canadian coal industry, which is higher up on the international cost curve than the coal mines that DBCT services, and therefore more vulnerable to economic cycles (i.e. Westshore has higher systematic risk due to the greater vulnerability of its shippers).[82]

Characteristics of potential comparator industries

We have examined a number of industries as potential comparators for DBCT: coal mining, rail, container ports, toll roads, regulated energy, and regulated water. The results are summarised in Table 3.2 below. Our conclusion based on this analysis is that DBCT's closest comparator industries are the regulated energy and water industries. While these industries do not share physical similarities with DBCT, it is the financial characteristics of firms and industries that determine their systematic risks. Two very different industries or firms can have the same or similar systematic risks, which will depend on such factors as regulation, contracting, revenue and opex risk, and stranding risk.

82 For an analysis of the vulnerability of the coal operations of Westshore Terminals' major customer, Teck Resources Limited, see Salman Partners (23 October, 2015) *Teck Resources Limited*.

Table 3.2: Financial characteristics of DBCT and potential comparator industries

Industry	Regulation	Contracting	Revenue risk	Opex risk	Stranding risk
Coal mining	None	Volume contracts	Volatile coal price	Depends on world cost curve position	Depends on world cost curve position
Rail	Not constraining	1-3 year contracts	Senstive to economy	High	Potentially on some spurs
Container port	None	n.a.	Senstive to economy	High	Depends on competitor ports
Toll road	Price (without periodic recovery)	n.a.	Less sensitive	Low	Potential by-pass
Regulated energy	Regulated (price/ revenue cap/ cost of service)	n.a.	Less sensitive	Medium	Low
Regulated water	Regulated (price/ revenue cap/ cost of service)	n.a.	Unrelated to economy	Medium	Lowest
DBCT	Revenue cap regulated by QCA	5 year contracts	Unrelated to economy	Very low (opex contract)	Low due to world cost curve position

Source: Incenta analysis

Considering these in turn:

- *Regulation* – The QCA applies revenue cap regulation to DBCT, which reduces the volatility of its cash flows relative to non-regulated industries. Only the energy and water industries are similarly subject to cost-based regulation.

- *Contracting* – DBCT's customers conclude five year take-or-pay contracts, with only the rail industry having contracts that are for one to three year terms. DBCT's contracts contribute to its smooth revenue stream, which makes it more comparable to regulated energy and water firms.

- *Revenue risk* – Due to regulation and its take-or-pay contracts, DBCT's revenue risk is similar to that of regulated energy and water businesses. By contrast, the revenue risk of coal mining firms is very high due to coal price volatility, and the revenues of the commercial ports and rail industries are highly sensitive to the economic cycle (as we have seen with Asciano). The revenues of toll roads are relatively less sensitive to the economic cycle than commercial ports and rail companies, but face relatively greater revenue risk than regulated energy and water companies, and DBCT.

- *Opex risk* – Coal mining companies can have high or low opex risk depending on where they fall on the international coal mining cost curve. We have seen that most Australian coal mines are at the lower end of the cost curve. Rail and container ports tend to have relatively higher opex risk

than toll-roads and regulated energy and water businesses.[83] On this factor DBCT is closer to toll-roads and regulated energy and water businesses than to rail and port businesses.

- *Stranding risk* – For coal mining firms stranding risk is dependent on where they fall on the international cost curve. In Figure 3.3 above we saw that the stranding risk of coal mines delivering to Hay Point (where DBCT is located) is lower than for other countries. Rail businesses that have extensive networks are likely to have relatively low stranding risk except for some spurs that could be related to a specific mining operation, however in these circumstances rail businesses often require the mining firm to underwrite the dedicated spur infrastructure. For ports the development of competing port facilities (and associated rail and road infrastructure) that can cost effectively attract traffic away could result in asset stranding. Toll roads are similarly potentially subject to asset stranding depending on the development of parallel transport corridors/modes. Like the Australian coal mines, DBCT's asset stranding potential is reduced by the favourable positions that these coal mines occupy on the international coal cost curve. While this position could change in the future, so can the position of regulated energy companies whose networks may be vulnerable to technological developments such as in situ solar power/batteries. Hence, regulated water businesses are likely to have the lowest stranding risk among the alternatives considered here.

Based on our first principles analysis, the specific analysis of Port of Tauranga (which, due to growth in its container traffic is now closer to the average commercial port in Frontier's sample of 16 ports), Asciano (a rail/port operator), Westshore Terminals, and taking account of the factors outlined above, we consider that regulated energy and water businesses are the best available comparators for DBCT. That is, we consider the systematic risk of DBCT:

- Will be less than the asset beta of toll roads, because relative to DBCT, toll roads have greater revenue sensitivity (as they are not cost-base regulated and are more sensitive to economic cycles), do not have the protection of take-or-pay contracts, and have similarly low opex risk and stranding risk; and

- Should be assessed by reference to the same principle that was applied in Grant Samuel's 2010 analysis of the systematic risk of DBCT – namely that that the best estimate of DBCT's asset beta is the asset beta for a regulated utility.

3.4.7 Beta linked to EBITDA multiples in trade sales

PwC's report for the User Group provides evidence about the relative stability of EBITDA bid multiples in four trade sales of ports, which is reproduced in Table 3.4 below. Based on the view that 'the steady state earnings multiple is equal to the reciprocal of the cost of equity',[84] PwC concluded that:[85]

83 Chinese listed ports have relatively lower cost risk than non-Chinese ports, but have a similar sensitivity to the economic cycle (i.e. all ports are much more sensitive to the economic cycle than regulated energy and water distribution businesses).

84 PwC (November, 2015), p.14.

85 PwC (November, 2015), p.15.

Multiples of between 25-27 are observed consistently in transactions over the past period, suggesting that the market is not factoring in any material 'port' or 'coal' risk premium in these privatisations.

Table 3.4: Port EBITDA transaction multiples

Port	Date	Multiple
Port of Brisbane	November, 2010	17
Port of Botany/Kembla	April, 2013	25
Port of Newcastle	April, 2014	27
Port of Darwin	October, 2015	25

Source: PwC (November, 2015), p.15.

Our concerns in relation to this aspect of PwC's analysis are that:

- Since they are EBITDA multiples, any inferences must relate to the cost of capital (WACC) rather than the cost of equity;
- The only dedicated (at least to 95 per cent of its throughput) coal port in the sample is Port of Newcastle
- While Port of Brisbane and Port of Botany/Kembla have some coal throughput, they are predominantly container/bulk ports, and Port of Darwin has no coal throughput;
- Many factors determine the EBITDA multiples paid in trade sales, including growth prospects and the number/nature of bidders, and any relative constancy is just as likely to be the outcome of a balance of these factors as being due to a stable cost of equity; and
- In any case, given that the first trade sale multiple (for Port of Brisbane) was 17 and the other two ports with some coal throughput had multiples of 25 to 27 - the relativities suggest (assuming all other factors are constant) that the cost of capital was not constant.[86]

Hence, while we have not seen any evidence to suggest that the market is factoring in 'coal' or 'port' risk as PwC suggests, we do not agree that PwC's EBITDA multiples analysis provides rigorous evidence regarding the asset beta of transport infrastructure associated with Australia's coal export trade.

3.4.8 Conclusion on stakeholder submissions

After reviewing stakeholder submissions, we are not in agreement with DBCTM's/Frontier's view that DBCT's equity beta should be 'at least 1.0'. The DBCTM/Frontier proposal is based on a beta estimate for commercial ports that are largely concerned with container trade or other bulk cargoes that are sensitive to the economic cycle, and are not subject to regulation. Neither are we in full agreement with PwC's (2015) approach, which obtained an asset beta estimate of 0.43 by averaging the implied 0.35 estimate of Grant Samuel and PwC's 0.50 estimate for toll roads. Whilst we agree

[86] We note, however, that we do not consider this to be persuasive evidence that the cost of capital was not constant over the period.

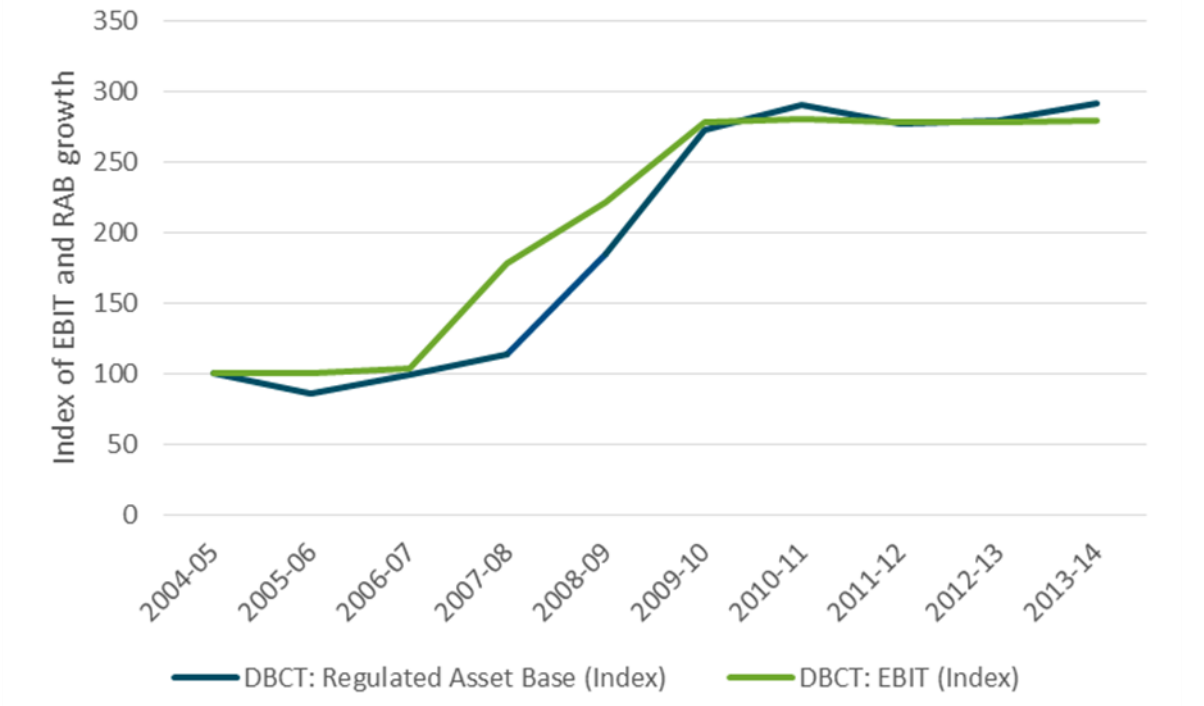
that DBCT's asset beta will be lower than for toll roads, we do not recommend averaging these beta estimates to obtain an estimated asset beta for DBCT since we do not think the values that have been identified by PwC represent a plausible range for the DBCT asset beta. Rather, the values represent two pieces of information that can be drawn upon to assist in estimating the asset beta for DBCT (this is discussed further below).

3.5 Incenta's estimate of DBCT's asset and equity betas

In summary, we expect that like Aurizon Network, DBCT's asset beta should be relatively low because of a similar set of fundamental factors:

- *A regulatory framework that aligns revenue with cost at periodic intervals and that minimises revenue risk during a regulatory period* – DBCT is provided with a rate of return on its regulated asset base (RAB) that is updated at periodic reviews in line with current market evidence. This limits DBCT's exposure to cost risk and interest rate risk. We find that historically, growth in DBCT's EBIT has been very closely correlated with growth in its RAB. As displayed in Figure 3.9 below, DBCT's EBIT has not tracked the price of coal (as shown in Figure 3.1 above), but has instead followed the RAB that increased materially over the 2006 to 2010 period when the capacity increased from 56 Mtpa to 85 Mtpa.

Figure 3.9: DBCT's EBIT vs Regulated Asset Base (Index)



Source: DBCT

- *Underlying economics implying confidence in the recovery of regulated revenues* – DBCT's sound underlying economics means there is a high degree of confidence that the revenues

promised by the regulatory regime will be received by investors, who will not factor in market-based stranded asset risk[87] – stranded asset risk is also reduced by the factors below:

- *Surety of long term demand for the service* – Queensland's export coal industry is at the low cost end of the international cost curve due to relatively low cost of open-cut mining, relatively short railway routes to the ports, and ports that are well situated relative to the growing demand for metallurgical coal in developing Asian economies. Both the IEA in the US and Australia's Chief Economist are forecasting continuing growth of Queensland coal exports, and Australia's continuing domination of world trade up to 2040.

- *All of DBCT's traffic is under long term take-or-pay contracts* – Although DBCT has fewer customers, and a less diverse mix of customers than regulated energy or water businesses, all of its contracted capacity is based on take-or-pay contracts. While the average term of these contracts is lower than those of Aurizon Network and other similar export coal ports, and a material proportion are due to expire during the coming regulatory period, the users are likely not to have a viable alternative other than to export through DBCT, and a portion of this capacity is already subject to 10 to 15 year take-or pay contracts with Aurizon Network for railing to DBCT.

- *Socialisation* - The socialisation framework that operates at DBCT implies that any shortfalls in revenue are to be shared among remaining users after the default of a previous user. As long as there is no viable or cost effective alternative to shipping through DBCT, and the fundamental economics of the users in the Goonyella system are sound, this means that stranding risk is low.

As noted above, DBCT's financial characteristics are more closely aligned to regulated energy and water businesses than to container ports, rail or coal companies, which are all much more sensitive to the economic cycle.

We have examined a similar set of industries to the ones we reviewed when estimating the beta of Aurizon Network, except that our port sample includes the 16 ports identified by Frontier (taken from Grant Samuel), and Westshore Terminals.[88] In Table 3.5 we show the asset beta estimates for these industries based on raw Bloomberg betas estimated with 10 years of monthly observations (120 observations) de-geared by the Conine formula (debt beta of 0.12), and using a long term estimate of the effective tax rate.

87 That is, the QCA consistently assesses mine life and demand factors, and makes adjustments to regulatory depreciation policy as required to mitigate asset stranding risks.

88 Based on assets, we could have included Asciano in the rail industry, because as at 30 June 2015, 56.5 per cent of its assets related to the Pacific National rail operations. However, Grant Samuel and Frontier had Asciano in the ports industry, and leaving the rail group as it is provides a more rigorous estimate for purely rail operations.

Table 3.5: Bloomberg asset betas – 10 years of monthly observations to June 2015 (Conine formula using effective tax rates)

	N	Average asset beta	Median asset beta
Regulated water	7	0.36	0.35
Regulated energy	68	0.37	0.36
Toll roads	7	0.50	0.54
Ports	17	0.91	1.00
Class 1 railroads	7	0.92	1.01
Coal	8	1.07	1.16

Source: Bloomberg, Incenta analysis

Regulated energy and water businesses are found to have a relatively similar asset beta of 0.37/0.36 (average/median) and 0.36/0.35 (average/median) respectively. Coal companies have the highest beta, with an asset beta of 1.07/1.16 (average/median), which is a product of sensitivity to movements in the coal price through the cycle (with lesser fluctuations in volume). Ports and Class 1 railroads have similar asset betas of 0.91/1.0 and 0.92/1.01 (average/median) respectively, as both are sensitive to fluctuations in the volume of traded goods (containers and bulk commodities). However, toll roads, with estimates of 0.50/0.54 (average/median), have a materially lower asset beta than ports, Class 1 railroads, and coal companies.

Having reviewed the empirical evidence, we consider that an asset beta point estimate of 0.40 is appropriate for DBCT, based on the Conine formula and a debt beta of 0.12. As outlined above, we consider that DBCT shares many of the systematic risk characteristics of regulated energy and water networks. While the current Bloomberg beta estimates shown in Table 3.5 for regulated energy and water businesses is in the range of 0.35 to 0.37 (lowest median value to highest average value), in our previous review of Aurizon Network's asset beta we found that alternative beta estimation methods (using statutory rather than effective tax rates and countering the 'end of month effect' by running simulated month estimates) resulted in estimates for the regulated energy and water industries that were 1 to 3 points higher. Hence, our preferred asset beta estimate for DBCT is 0.40, which converts to a point equity beta estimate of 0.76 at a benchmark gearing level of 60 per cent. This estimate is:

- Lower than the toll roads asset beta estimate of 0.50/0.54, which we consider to have higher systematic risk than DBCT because the tolls for toll roads are generally prescribed (often as the outcome of an initial tendering process), are not subject to periodic regulatory review, are therefore subjected to more cyclical economic activity than DBCT, and are also subject to more asset stranding risk;

- Consistent with the estimated asset beta of 0.41 (equity beta of 0.73 at 55% gearing) that we assessed for Aurizon Network, which we consider to have very similar systematic risk characteristics to DBCT;[89] and

- Consistent with the implied asset beta of 0.415 (equity beta of 0.8) applied by the QCA's adviser ACG in 2005. ACG considered an equity beta of 0.8 to be appropriate for DBCT if it is not engaged in a material capacity expansion, but that a higher asset beta would be justified in the

89 Incenta (September, 2015), *Aurizon Network 2014 DAU – response to submissions on WACC*, Report for Queensland Competition Authority, p.22.

event of a significant capacity expansion. This influenced the QCA to adopt an equity beta of 1.0 in 2005, because a large capacity expansion (from 56 Mtpa to 85 Mtpa) was being planned by DBCTM. In ACG's words:[90]

> *We [ACG] consider that an equity beta of 0.80 (with 60% gearing) would, other things being equal, provide a sufficient return to attract continued investment in the existing capacity of DBCT, or a small incremental capacity growth that was fully contracted. A significant increase in investment (in the order of 40% to 50%) would probably require a higher return.*

ACG's concern was centred on the *process* of a material expansion in DBCT's assets (from a capacity of 56 Mtpa to 85 Mtpa). This rapid growth was expected to increase systematic risk during the coming regulatory period (2005 to 2010) owing to the greater asset stranding risk of the new assets, whose ultimate value depended on a significant growth in demand. This higher systematic risk did not relate to the existing assets, which already had proven demand and were covered by take-or-pay contracts. Since the completion of the expansion in 2010, and the subsequent full contractual take-up of the new capacity (i.e. take-or-pay contracts), the expanded DBCT is now in a similar position to the original assets in 2005 (i.e. prior to the expansion). That is, ACG's conclusions on the beta of DBCT's existing assets in 2005 (i.e. a 60 per cent geared equity beta of 0.8) are more relevant to DBCT in 2016 than its recommendations about the systematic risk associated with DBCT's material expansion during the 2005 to 2010 period.

3.6 Conclusions

We conclude that an appropriate asset beta for DBCT is 0.40, which converts to an equity beta of 0.76 given an assumed benchmark gearing level of 60 per cent (and a debt beta of 0.12 using the Conine formula). Re-levering our toll road asset beta estimate would imply an equity beta estimate of 1.08, however we consider it highly unlikely that the equity beta of DBCT would be as high as 1.08. Furthermore, our approach accords with the principle employed by Grant Samuel, namely, that DBCT's systematic risk characteristics reflect those of a regulated utility, which we estimate to have an asset beta of 0.40.[91]

In this chapter, we have reviewed the first principles analysis that was undertaken by DBCTM/Frontier, and found that it concentrates only on attempting to demonstrate that regulated energy and water businesses are not appropriate comparators for DBCT, and does not address the other critical question of whether commercial ports are appropriate comparators for DBCT. Our own analysis finds no evidence to support DBCTM's/Frontier's submission that the asset beta of commercial ports is appropriate to apply to DBCT:

- DBCT is a regulated coal port that is largely insensitive to the economic cycle, while commercial ports (like Class 1 rail businesses) have been shown to be highly sensitive to the economic cycle;

90 ACG (April, 2005), *Dalrymple Bay Coal Terminal – response to comments on DBCT proxy beta analysis*, Report to Queensland Competition Authority, p. vi.

91 Our estimate of the asset beta of a regulated utility is slightly higher than Grant Samuel's implied asset beta. We expect that this is due to our larger sample (75 firms compared with 10 firms) and longer / different beta estimation time period (i.e. we examined a 10 year period to June 2015 and Grant Samuel examined periods of 2 to 5 years up to June 2010).

- Compared with DBCT, commercial ports have higher revenue/volume risk, and greater opex risk; and

- Commercial ports are not geared as highly as DBCT precisely because their sensitivity to the cycle would result in an unacceptably high degree of default risk.

While DBCTM/Frontier submit that an equity beta of 'at least 1.0' is appropriate for DBCT, they are silent on the fact that this implies an asset beta of 'at least 0.5'. DBCTM/Frontier have produced no evidence to support the proposition that DBCT has an asset beta of 0.5 or more.

4. Capital structure and credit rating

4.1 Introduction

In this chapter we consider the issues of benchmark capital structure and benchmark credit rating. The benchmark capital structure is required to re-lever the estimated asset beta to derive the benchmark equity beta. The benchmark capital structure will also be a determinant of the benchmark credit rating, which is necessary to estimate the appropriate benchmark cost of debt. The capital structure is also applied to weight the cost of debt and equity components of the WACC estimate.

4.2 Capital structure

Previous reviews of DBCT have applied a 60 per cent benchmark capital structure to DBCT, and this has been proposed by both DBCTM and the User Group/PwC. A 60 per cent benchmark capital structure has been standard for regulated energy and most water businesses in Australia. We note that Aurizon Network, which is also regulated by the QCA and operates in the same coal export chain as DBCT, has a 55 per cent gearing level applied. One reason for this is the vulnerability of coal exports to inclement weather that can cause flooding and potentially disrupt coal shipments. DBCT is also vulnerable to disruption due to weather; however it has less operating cost risk than Aurizon Network, since the majority of the operations at the port are undertaken by DBCT Pty Ltd (which belongs to a group of users).

The net and gross gearing levels of the industries that were considered in Chapter 3 are shown in Table 4.1 below.[92] It is notable that the industries that we found to have relatively lower systematic risk (toll roads and regulated energy and water) have much higher gearing levels of 40 per cent to 53 per cent relative to the industries with much higher systematic risk (commercial ports, Class 1 railroads and coal). This is due to the greater volatility of cash flows observed in the previous chapter for commercial ports, Class 1 railroads and coal companies. Firms with greater volatility of cash flows cannot support higher gearing levels.

Since DBCT has relatively stable cash flows, we consider that a higher benchmark gearing level is appropriate. In Chapter 3 we concluded on the basis of a first principles analysis that DBCT shares many financial characteristics with regulated energy and water businesses, and consider that a 60 per cent benchmark gearing level is also appropriate for DBCT.

[92] Gross gearing is defined as total short term and long term debt/total short term and long term debt plus market value of equity. Net gearing is similarly defined, but cash is subtracted from the sum of short term and long term debt in both the numerator and denominator. While gross debt is the more appropriate indicator of benchmark gearing, net debt is used to estimate beta. Since cash has a zero beta, the use of a gross debt concept would weight the beta estimate downwards. See ACG (January, 2009), *Commentary on the AER's analysis of gearing levels*, Report to ENA, Grid Australia and APIA, pp.9-10.

Table 4.1: Net and gross gearing levels by industry

Industry	N	Net gearing	Gross gearing
Regulated water	7	37.9%	40.5%
Regulated energy	68	42.8%	44.4%
Toll roads	7	49.3%	52.9%
Ports	17	17.7%	21.3%
Class 1 railroads	7	21.1%	24.7%
Coal	8	21.9%	23.3%

Source: Bloomberg, Incenta analysis

While DBCT's actual gearing is considerably higher than 60 per cent, being close to 80 per cent of RAB in recent years, this has been achieved under a project finance structure that includes special features (such as equity lock up if certain ratios are breached) that are not shared by benchmark corporates. We therefore recommend that the benchmark gearing level continue to be set at 60 per cent.

4.3 Credit rating

In the past two reviews of DBCT's WACC, a benchmark BBB+ credit rating has been applied. However, both DBCTM/Frontier and the User Group/PwC have proposed a benchmark BBB credit rating. Our view is that it is not obvious that a benchmark BBB credit rating should be applied to DBCT, and that the final assessment of this issue requires an analysis of the credit metrics that are implied by the forward looking regulatory model taking account of the proposed regulatory WACC parameters for the 2015 undertaking. This is a different issue from what we have already considered in relation to systematic risk. In that case the issue was whether there has been a material increase in systematic risk owing to falling coal prices. Here the question is: what is the benchmark credit rating of DBCT at a benchmark gearing of 60 per cent?

Moody's and Standard & Poor's views on DBCT Finance Pty Ltd

Standard & Poor's applied a BBB credit rating to DBCT Finance Pty Ltd when it was downgraded from BBB+ in July 2014. However, as noted above, this is a project finance structure that is not typical of a benchmark corporate. As a result, the credit rating of DBCT Finance Pty Ltd is not indicative of the credit rating of a benchmark DBCT corporate entity with benchmark 60 per cent gearing. In December, 2015, Moody's downgraded DBCT Finance Pty Ltd to Baa3 (equivalent to BBB-). Moody's reasoned as follows:[93]

> *DBCT's credit profile is subject to increasing downside risk, a consequence of the financial pressures facing the company's coal mine counterparties from escalating coal mine risks. Conditions in the metallurgical and thermal coal industry remain very weak, stressing coal mining companies, including Peabody, which is a material counterparty for DBCT. We see no alleviation in the pressures facing the coal sector, which translates into an increased probability of DBCT's contracts either not being renewed or subject to early termination.*

93 Moody's Investors Service (23 December, 2015), p2.

> *The company's credit profile is further constrained by the likely reduction in revenues from the next regulatory reset scheduled for July 2016, which reflects the sustained decline in the risk free rate used in the calculation of DBCT's revenue allowance.*
>
> *We believe that DBCT has insufficient financial flexibility under its existing capital structure to accommodate these increasing risks. We expect the company's financial leverage, as measured by the ratio of funds from operations (FFO) to debt, to decline to around 5-6% and interest coverage to drop to the low 2x-region over the next few years.*

Moody's assessment of DBCT's credit risk is more negative than Standard & Poor's, whose rating is based on the following views:[94]

- *We consider the Operations Phase Business Assessment (OPBA) of the project as '3', reflecting a low operating risk and very low market risk…*
- *We assess the market risk as very low [although noting that the revenue socialisation objective might be 'difficult to enforce to the fullest extent because of the potential snowball effect it may have']. In our view this is a long-term risk linked to the continued competitiveness of the Queensland coal basin as we believe DBCT will remain the most competitive export point out of the region. Saying that, we view the current users as replaceable, as evidenced by the continued level of capacity trading as well as the long waiting list for terminal capacity.*

Standard & Poor's applies a positive one-notch adjustment to its preliminary BBB credit rating owing to 'the resilience of the cash flow coverage in [Standard & Poor's] downside scenario', which it attributes to the 'supportive regulatory framework and adequate distribution lock-up provisions.' A negative one-notch adjustment is made by Standard & Poor's for 'the current weak operating conditions in the Queensland coal mining sector.' In July 2015 Standard & Poor's noted that there is trading in capacity rights at DBCT among users, and expressed its view that if a user were to relinquish its capacity, that capacity would be taken up by another user. The Moody's report makes no mention of this important factor.

Credit rating metrics

In our view the best approach to establishing the benchmark credit rating for DBCT is to undertake a forward looking analysis that applies the range of potential WACC parameters for the next regulatory period to obtain a range of credit metrics scenarios. The most important credit metrics are:

- Funds Flow from Operations/Debt (FFO/Debt) ratio; and
- FFO/Interest cover.

Recent credit rating opinions of both Standard & Poor's and Moody's have focused almost exclusively on the FFO/Debt metric, while also reporting the FFO/Interest cover metric. We have also considered three scenarios as described in Table 4.2 below.

94 Standard & Poor's (29 July, 2015), p.3.

Table 4.2: Scenario assumptions

Scenarios:	High	Medium	Low
WACC	7.46%	6.19%	5.84%[a)]
Remaining asset life	25 years	38 years	38 years
Remediation allowance	$12.8 million/year	$5.5 million/year[b)]	$6 million/year[c)]
Capital structure	60%	60%	60%

Source: DBCTM, DBCT User Group, and QCA. Notes: a) 5.84% WACC based on User Group submission; b) This reflects an indicative estimate of the remediation allowance – this allowance has since increased to $5.7 million per annum due to a change in the assumed timing of payments each year; c) This figure assumes the same cost an economic life assumptions used in the medium scenario but applies the DBCT User Group's WACC of 5.84%.

The high scenario is based on DBCTM's submission. Both the medium and low cases have been derived by QCA based on a series of WACC assumptions, including a benchmark BBB cost of debt that includes our debt risk premium recommendation shown in Chapter 5 below. Table 4.3 below displays the resulting forecast credit metrics. The high scenario has an average FFO/Debt cover of 16.7 per cent and FFO/Interest cover of 4.19 times, which are materially higher than the other two scenarios. The medium/low scenarios have an average FFO/Debt of 11.8 per cent/11.5 per cent, with average FFO/Interest cover of 3.22 times/3.06 times.

Table 4.3: DBCT credit metrics by scenario

Credit Metric	Scenario	2016-17	2017-18	2018-19	2019-20	2020-21	Average
FFO/Debt	High	16.0%	16.4%	16.7%	17.0%	17.4%	16.7%
	Medium	11.5%	11.6%	11.7%	11.8%	12.0%	11.8%
	Low	11.2%	11.3%	11.4%	11.5%	11.8%	11.5%
FFO/Interest	High	4.07	4.13	4.19	4.24	4.33	4.19
	Medium	3.06	3.22	3.25	3.26	3.30	3.22
	Low	3.01	3.03	3.05	3.07	3.11	3.06

Source: DBCT, QCA and Incenta analysis

Assessing the benchmark credit rating

When assessing the credit ratings of businesses, Standard & Poor's refers to the risk matrix reproduced in Table 4.4 below. The two key dimensions of risk are the 'business risk profile', which is the outcome of a number of risk factors, and the financial risk profile, which is governed by the level of gearing and relative stability of cash flow.

Table 4.4: Standard & Poor's risk matrix

	Financial Risk Profile					
Business Risk Profile	Minimal	Modest	Intermediate	Significant	Aggressive	Highly leveraged
Excellent	AAA/AA+	AA	A+/A	A-	BBB	BB-/BB+
Strong	AA/AA-	A+/A	A-/BBB+	BBB	BB+	BB
Satisfactory	A/A-	BBB+	BBB/BBB-	BBB-/BB+	BB	B+
Fair	BBB/BBB-	BBB-	BB+	BB	BB-	B+
Weak	BB+	BB+	BB	BB-	B+	B/B-
Vulnerable	BB-	BB-	BB-/B+	B+	B	B-

Source: Standard & Poor's and Incenta analysis

Standard & Poor's assesses regulated energy distribution businesses to have an 'excellent' business profile owing to their strong monopoly position and stable regulatory frameworks. However, when assessing Aurizon Network, the regulated rail business that is in the same coal chain as DBCT, Standard & Poor's applies a 'strong' (i.e. weaker than 'excellent') business risk profile owing to 'exposure to ongoing competitiveness of Queensland coal in global markets'.[95] We consider Standard & Poor's assessment of Aurizon Network to be instructive for an analysis of DBCT's credit risk. Standard & Poor's assesses Aurizon Network to have an 'intermediate' level of financial risk. At 30 June, 2014, Aurizon Network's actual gearing level was approximately 50 per cent, and Standard & Poor's was expecting 'about 40% of total capital expenditures being debt funded in fiscals 2015 and 2016.'[96] By contrast, Standard & Poor's assessed the financial risk of APT Pipelines Ltd to be 'aggressive', which was considered to be 'consistent with APA's gearing target under its capital management policy of 65%-68% debt-to-debt plus equity.'[97]

In the context of these comparators we consider that credit rating agencies would be likely to assess DBCT's benchmark gearing level of 60 per cent of RAB to be 'significant' rather than 'aggressive'. Standard & Poor's has previously alluded to DBCT Finance Pty Ltd's 'aggressive financial structure', which is based on its 'base case' forecast that it 'seeks to maintain a debt to regulated asset base ratio of no greater than 80%.'[98] Similarly, Moody's has stated its opinion that DBCT Finance Pty Ltd 'has insufficient financial flexibility under its existing capital structure to accommodate increasing fundamental risks.'[99] Hence, in Table 4.4 we estimate that the natural placement of DBCT - if, as we expect, it is assessed as having strong business risk, but significant financial risk – is in the BBB credit rating band.

Based on the comparator bounds shown in Table 4.5, our view is that at benchmark 60 per gearing DBCT is likely to attract a BBB credit rating if its FFO/Debt ratio lies between 9 per cent and 13 per cent. This is based on the twin observations that:

- APT Pipeline Ltd (excellent business risk and aggressive financial risk) requires an FFO/Debt ratio of more than 9 per cent for a BBB credit rating; and

- Aurizon Network (strong business risk and intermediate financial risk) would expect a BBB credit rating if its FFO/Debt ratio falls below 13 per cent on a sustained basis.

95 Standard & Poor's (26 May, 2015), *Aurizon Network Pty Ltd*, Ratings Direct, p. 2.
96 Standard & Poor's (26 May, 2015), p.6.
97 Standard & Poor's (20 December, 2015), *APT Pipelines Ltd*, Ratings Direct, p.6.
98 Standard & Poor's (26 May, 2013), *Transaction Update: DBCT Finance Pty Ltd*, Ratings Direct, p.4. Standard & Poor's also notes that while DBCT Finance Pty Ltd's target gearing is 'Debt to RAB at or below 80%', the cash sweep gearing test is a debt to RAB above 85 per cent, and the default debt/RAB is above 90 per cent.
99 Moody's (23 December, 2015), *Credit Opinion: DBCT Finance Pty Ltd*, p.3.

Table 4.5: FFO/Debt – bounds of Standard & Poor's /Moody's risk profiles vs credit ratings

Agency	Business	Business Risk Profile	Financial Risk Profile	BBB-	BBB	BBB+	A-
S&P	Australian Gas Networks	Excellent	Significant		<7%	>8%	>11-12%
S&P	APT Pipelines Ltd	Excellent	Aggressive	<8%	>9%		
S&P	Aurizon Network	Strong	Intermediate		<13%		>20%
Moody's	DBCT Finance Pty Ltd	Strong*	High financial leverage	>7-8%			

Source: Standard & Poor's,[100] Moody's[101] and Incenta analysis

Since both the medium and low (60 per cent geared) scenarios considered above have average FFO/Debt ratios that lie within that band (i.e. 11.8 per cent and 11.5 per cent), we would expect both scenarios to be consistent with a strong BBB credit rating. However, the high scenario proposed by DBCTM (implying a WACC of 7.46 per cent and DBCTM's other proposed revenue positions) has an average forecast FFO/Debt ratio of 16.7 per cent, which is likely to be consistent with a BBB+ credit rating.

4.4 Conclusions

We are in agreement with DBCTM/Frontier that a benchmark gearing level of 60 per cent is appropriate for DBCT. We consider that DBCT's cash flows are stable enough to support a 60 per cent benchmark gearing level, and note that in fact its actual gearing level is closer to 80 per cent of RAB.

We also agree with DBCTM/Frontier and the DBCT User Group that DBCT's benchmark credit rating is likely to be a strong BBB at this time based on likely assessments of its business/financial risk profiles and its forecast FFO/Debt ratio under medium and low scenarios. However, we consider that the high scenario is more likely to be consistent with a BBB+ credit rating.

100 Standard & Poor's (26 May, 2015), *Australian Gas Networks Ltd*, Ratings Direct, p.3, Standard & Poor's (20 December, 2015), pp. 3 and 6, Standard & Poor's (26 May, 2015), *Aurizon Network Pty Ltd*, Ratings Direct, p. 3.

101 Moody's (23 December, 2015), p.3.

5. Term of debt and debt risk premium

5.1 DBCTM's proposals on term of debt and debt risk premium

DBCTM's proposal did not explicitly refer to the term of debt, but applied a 10 year risk free rate of **2.8 per cent** when estimating the cost of debt for its 20 day averaging period ending 21 August, 2015. DBCTM stated that it had applied the QCA's preferred econometric approach, and estimated a debt risk premium of **2.32 per cent** for that averaging period (i.e. its 'placeholder estimate') for a target BBB credit rating (rather than BBB+), as it had submitted that a benchmark BBB+ credit rating should no longer be applied to DBCT. (The PwC report commissioned by the DBCT User Group also provided an indicative debt risk premium of 2.32 per cent for a benchmark credit rating of BBB.) DBCTM also commented at length on a number of issues of concern that it had regarding the PwC (2013) method. The issues identified by DBCTM are considered in turn, followed by our responses to each of them.

5.1.1 UBS data

DBCTM's proposal

DBCTM's submission expressed some concerns about the UBS data that are used as part of the QCA's preferred econometric method. It was held that these data are difficult for stakeholders to access, and even if they can – as DBCTM has – it may not necessarily have the 6 months of previous daily data required to apply the Quandt-Andrews test in order to establish whether the data are 'stale'.

DBCTM also noted that while some submissions to the Western Australia Economic Regulation Authority's (ERA) WACC guidelines investigation considered that using UBS data could increase the size of the bond sample, the ERA had opted for only relying on Bloomberg data.

Incenta's response

In the past, while UBS bond data has not been as readily accessible to stakeholders as Bloomberg data (albeit upon payment of a subscription fee to Bloomberg), we expected that any regulated business that is an issuer of bonds would have immediate access, and observed that some other stakeholders had obtained access to it. Recently there has been a material change in UBS's policy with respect to the distribution of its daily term sheets containing bond yield data, which are now provided only to a restricted audience. In this circumstance we agree with DBCTM, and consider that future estimation of the cost of debt using the PwC (2013) method should rely solely on Bloomberg data. We also note that Bloomberg provides current and historical fixed yield equivalents for floating rate notes on a daily basis, which allows the PwC (2013) method to be applied using both fixed and floating rate bonds.[102]

With respect to the test for bond staleness, we note that PwC (2013) undertook this test recently and found that Bloomberg's bond yield data is not 'stale'. That is, it appeared that all the bonds had had a material adjustment in the previous six month period that appeared to indicate that prices and yields had been re-adjusted to new information rather than being left to maintain the same relationship to

[102] Since the bond filtering process that is used to select the sample of fixed rate bonds and floating rate notes has always been based on Bloomberg bonds, all floating rate notes used in the analysis have been available from Bloomberg.

some underlying benchmark. Like the question of the linear function regression assumption, this is a matter that is best left for periodic reviews to see if these assumptions should continue. Hence, we do not agree with DBCTM that it 'cannot fully replicate the QCA's methodology at this time.'[103] Furthermore, the RBA method relies on Bloomberg bond yield data and does not apply any staleness tests.

5.1.2 Swap rate data

DBCTM's proposal

DBCTM has submitted that while UBS data includes floating rate note data, 'in order to calculate the fixed rate equivalent yield on floating rate bonds, the use of long-term interest rate swap data must be used along with the traded spread of the bond.' According to DBCTM the publicly available swap data currently provided by the Australian Financial Markets Association (AFMA) will be discontinued after 31 December, 2015. AFMA has advised DBCTM that this is due to concerns about the quality of data, since it is being provided by only the four big banks (NAB, Westpac, CBA and ANZ). DBCTM submitted that:[104]

> *Real-time interest rate swap data is also available through swap dealer screens such as Bloomberg, but the same data issuance problem would still arise as there is data available from less than ten providers.*

As a result, DBCT 'questioned how the QCA intends to apply its methodology in its current form going forward'.

Incenta's response

As noted above, due to a recent more restrictive UBS policy on the distribution of its daily term sheets, we recommend that in future Bloomberg's floating rate note data be used to estimate equivalent fixed rate bond yields for the 20 day averaging period. With respect to the future availability of Bloomberg's swap data, we have spoken with Bloomberg and have been assured that there are no plans to discontinue the service, which is seen as fundamental to its offering of financial markets data. The Bloomberg system itself notes in relation to its Australian dollar denominated interest rate swap curve (Bloomberg ID: YCSW0001 Index) that 'pricing for the long-end terms are a best bid/ask composite from latest quotes and the sources include both banks and brokers.'

We would add that DBCTM's concerns that having data sources from less than ten providers renders the resulting consensus unrepresentative are misplaced. If that were the case then DBCTM (and the RBA) could also not rely on Bloomberg bond yield data, all of which relies on far less than ten institutional data providers. In summary, we do not consider that AFMA's decision to discontinue publication of its swap curve data is in any way critical to the estimation of fixed rate equivalents of floating rate note trading margins.

103 DBCTM (9 October, 2015), p.44.
104 DBCTM (9 October, 2015), p. 44.

5.1.3 Sample composition

DBCTM's proposal

DBCTM's submission considered that the PwC (2013) method's expansion of the bond sample by the inclusion of bonds rated from BBB to A-, while improving the robustness of estimates, also has its own problems. According to DBCTM, the PwC method's test for bias[105] assumes that credit ratings are 'cardinal' (i.e. the 'distance' between credit ratings are numerically measurable) rather than 'ordinal' (i.e. the 'distance' between credit ratings cannot be measured), when credit rating agencies state that they are actually ordinal (i.e. it can only be said that one credit rating is higher/lower than another).

Hence, DBCTM considers that the PwC method's application of a simple weighting system such as 1 for A- bonds, 2 for BBB+ bonds and 3 for BBB bonds 'assumes that changes in bond spreads attributable to credit rating are equidistant over the range of credit ratings,' but this 'is not true in practice'. According to DBCTM, using the neighbouring credit ratings, as the PwC method does, increases sample size:[106]

> *However, this will put the sample at risk of bias to one credit rating or another depending on the relative count of the number of bonds in each credit rating category.*

Hence, according to DBCTM, 'there is a need to test for sample bias in a more robust way, by either:[107]

- *Using a statistical method to correctly weight the credit ratings, such as placing an indicator variable within the regression framework to allow for the different credit ratings to be taken into account when calculation takes place; or*

- *Running the regression on only the target rating if there is sufficient sample size to do so.*

DBCTM also commented about the RBA and Bloomberg fair value yield sources, noting that one reason the QCA has preferred the econometric approach is that it allows for an estimate of the debt risk premium for the BBB+ credit rating band, while the other two sources only publish an estimate of the broader BBB credit rating band.[108] However, DBCTM viewed this claimed advantage to be irrelevant to its own situation, since it considered that it had robustly demonstrated that DBCT's current benchmark credit rating should be BBB rather than BBB+.

If the issues noted above, particularly the sample bias issue, could not be resolved it was concluded that:

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105 As explained below, DBCTM's concern with 'bias' is that the debt risk premium appropriate to one or another credit rating on either side of a target credit rating will weigh disproportionately on the debt risk premium estimate, and cause it to be too high or too low relative to the true debt risk premium for the target credit rating.

106 DBCTM (9 October, 2015), p. 45.

107 DBCTM (9 October, 2015), p. 45.

108 DBCTM (9 October, 2015), p. 46.

DBCT questions the benefit of using a complex econometric model that cannot be readily replicated over publicly available third-party estimates from the RBA and Bloomberg.

Incenta's response

The question of whether the PwC simple weighting system is likely to create bias was considered in detail by Incenta in response to submissions by Aurizon Network.[109] The issue at stake was whether it can be inferred validly that the debt risk premium that is estimated from a pooled sample across the BBB, BBB+ and A- credit rating categories would reflect the average credit rating of the sample. As DBCTM has pointed out, the implicit assumption behind such an inference is that the difference in the debt risk premium between a bond with a BBB and BBB+ credit rating is approximately the same as the difference between bonds with a BBB+ and A- credit rating. In our response to Aurizon Network we tested empirically whether this condition held within our data set, and in our analysis of the October 2015 averaging period we did in fact find that the average bond spread between BBB and the pooled sample, and the average bond spread between A- and the pooled sample, are approximately equidistant. In addition, in Table 5.2 below, we find that the pooled sample is on average approximately equivalent to BBB+ if simple weightings are applied. Accordingly, we think it is valid to infer that the debt risk premium generated by the sample regression can be interpreted as a BBB+ debt risk premium.

However, in relation to DBCTM's suggestion that the RBA or Bloomberg fair value curves be used instead, we observe that these curves are also based on a pooling of bonds across credit ratings (in this case, BBB-, BBB and BBB+). While labelled as BBB, they are not an estimate of the debt risk premium for a BBB bond *per se*. Accordingly, in order for the RBA and Bloomberg debt risk premia to be interpreted, then an assumption needs to be made about the spacing of the yields between a BBB-, BBB and BBB+ bond. Thus, DBCTM's suggestion that the RBA or Bloomberg curves be used suffers from the same issue that DBCTM claims to exist with the PwC method. However, as with the earlier discussion around the PwC method, in our view, it is reasonable to assume that the debt risk premium is approximately symmetric each side of BBB (as it is around BBB+), and so infer that the debt risk premium reflects a bond with the average credit rating of the sample. In the analysis presented below we also note that both the RBA and Bloomberg bond samples were approximately BBB in October 2015 based on the application of PwC's weighting approach.

With respect to the two approaches that DBCTM suggests should be applied, we note that when the number of bond observations in single credit risk bands is relatively low, the second approach (i.e. regression using only the observations in a single credit rating band) will deliver estimates that are less precise and more likely to be affected by outliers. Nonetheless, we have undertaken the analysis suggested by DBCTM as a cross check of our results, and find that by conducting a regression that includes only the bonds in the BBB credit rating band the estimated 10 year debt risk premium is 12 basis points higher than the value we derive using the regression on the pooled sample.[110] The difference is not statistically significant and is not, in any event, in our view, material. The pooled sample result provides us with greater comfort owing to the greater sample size.

We expect that the first alternative approach suggested by DBCTM, which is to 'correctly weight the credit ratings, such as placing an indicator variable within the regression framework to allow for the

[109] Incenta (September, 2015), *QCA: Aurizon Network 2014 DAU – response to submissions on WACC*, pp.29-30.

[110] This result is reported in section 5.2.3 below.

different credit ratings to be taken into account when calculation takes place,' is the method that was previously applied by Aurizon Network in its submission to the QCA. This approach was to put dummy variables into the pooled equation to obtain a direct estimate of the debt risk premium for the different credit ratings. Using the dummy variable approach we obtain a 10 year BBB debt risk premium estimate that is 6 basis points lower than the estimate obtained using the PwC method's pooled regression approach.[111] Again, the difference is neither material nor statistically significant.

5.2 Incenta's estimates of DBCT's benchmark term of debt and debt risk premium

5.2.1 Introduction

The QCA has recently published final decisions relating to the estimation of a benchmark cost of debt:

- QCA (August, 2014), *Final decision, Cost of debt estimation methodology*; and
- QCA (April, 2015), *Final decision, Trailing average cost of debt*.

In the earlier report the QCA decided to adopt the PwC (2013) estimation method[112] as its primary method for estimating the cost of debt, although also cross-checking the estimate against the extrapolated Bloomberg, and Reserve Bank of Australia's (RBA) estimates. In the latter report the QCA examined the advantages and disadvantages of the trailing average cost of debt estimation method, and decided to retain the 'on the day' approach that it has applied consistently up to this time.

Based on the advice of Dr Martin Lally, in previous regulatory decisions the QCA has applied a cost of debt estimation method that requires determination of the efficient term of the risk-free rate and the debt premium. Under this approach, applied 'on the day', it is assumed that a benchmark firm would:[113]

- Issue debt with a term that is consistent with prudent financial management, and incur transaction costs associated with issuing this debt; and
- A rational regulated entity would incur transaction costs to use interest rate swaps to convert the base interest rate element of its cost of debt from the raw term to a term that matches the length of the regulatory period, which would ordinarily reduce its cost of debt.

If a sufficiently deep market for credit default swaps was available, a rational regulated entity would also be expected to use credit default swaps (incurring additional transaction costs) to convert the debt margin component of its cost of debt from the raw term to the term matching the length of the regulatory period. However, it has been found that the market lacks sufficient liquidity for large regulated businesses to align their margin cost to the term of the regulatory period.

111 This result is reported in section 5.2.3 below.

112 PwC (June, 2013), *A cost of debt methodology for businesses regulated by the Queensland Competition Authority*, report prepared for the Queensland Competition Authority.

113 Lally, M. (27 April, 2010), *The appropriate term for the risk free rate and the debt margin.*

Given this context, our terms of reference require us to estimate the appropriate benchmark term of debt to apply to DBCT, and the benchmark debt risk premium for the appropriate benchmark credit rating. We now turn to the questions of the debt term, and debt risk premium at the benchmark term of debt.

5.2.2 Benchmark term of debt

It is our view that the benchmark term of debt should remain at 10 years, which is consistent with the QCA's previous practice and the practice of Australian regulators generally. In its recent decision on the trailing average approach, the QCA discussed the issue of refinancing risk, which faces utility businesses that carry larger proportions of debt in their capital structure than the average business. This risk can be managed by issuing longer term debt, by staggering the issuance, and by diversifying the sources of debt. The QCA noted that PwC's analysis had indicated that a 10 year term of debt at issuance was observed among Australian regulated energy firms:[114]

> *Empirical evidence indicates that Australian listed, regulated energy firms have a weighted average term of debt at issuance of 10.2 years for the three principal types of debt listed above (PwC, 2013:20, Table 2.7).*[115]

We consider that the weight of evidence suggests a 10 year debt term at issuance is appropriate for relatively highly geared regulated infrastructure businesses like DBCT.

5.2.3 Benchmark debt risk premium

Framework for the analysis

The cost of debt estimation method devised by PwC (2013) is based on the proposition that it is necessary to establish as large a sample of bonds as possible, subject to certain constraints that are applied in order to achieve a consistent set of bond yields for the credit rating. The selection criteria for bonds to be included in the sample are fixed or floating rate corporate bonds with:

- Australian issuance by an Australian entity;
- Investment grade credit rating by Standard & Poor's (Incenta has relaxed this requirement to 'having an investment grade credit rating from at least one of Standard & Poor's, Moody's or Fitch' in order to obtain a larger sample of bonds);
- The issuing entity is not a financial entity;
- The corporate bond is senior (i.e. not subordinated);
- Standard corporate bonds without special features such as call options attached;
- A term to maturity greater than one year; and
- Yields reported by either Bloomberg or UBS.

114 QCA (April, 2015), p.8.
115 That is, for domestic bonds, domestic bank debt and international bonds.

When estimating the debt risk premium of a benchmark BBB+ bond, the PwC (2013) method requires that bonds from the following credit rating bands (i.e. the target band plus the neighbouring rating on each side of the target band), which satisfy the above criteria, are chosen so that a pooled regression can be applied:

- BBB
- BBB+
- A-

On 14 April, 2015, Bloomberg launched a new fair value curve based on a proprietary method that uses BVAL yields. In addition, the number of bonds reporting BGNs (Bloomberg Generic Yield), which Bloomberg used previously to estimate its fair value curve, has decreased. Hence, in order to maximise the number of bond yield observations it is now necessary to focus on the BVAL yields published by Bloomberg. As noted above, we include all bonds that are rated by at least one of Standard & Poor's, Moody's or Fitch and also satisfy other criteria.[116] If the bond is rated by two agencies we adopt the Bloomberg composite rating, and if only one credit rating is available, we adopt that rating. Bloomberg's convention is to apply the lower credit rating. That is, a bond that is rated Ba1 (equivalent to BB+) by Moody's, but BBB- by Standard & Poor's, will obtain a non-investment grade rating.

Deriving the bond sample

Table 5.1 below shows how we derived the bond sample of 78 bonds from an original group of 431 bonds that had ratings (by S&P, Moody's or Fitch) of BBB to A-. Most of the exclusion categories shown in the table are self-explanatory, and in line with the criteria that have already been outlined above. However, the exclusion of one bond whose Bloomberg consensus credit rating is not BBB to A- requires explanation.

In the case of Incitec Pivot's bond maturing on 21 February 2019, S&P and Fitch have both applied a BBB credit rating, while Moody's applied a Baa3 (BBB- equivalent) credit rating, and the Bloomberg composite credit rating has become BBB-. We have therefore excluded this bond from the analysis. Where there is only one credit rating, and Bloomberg has not adopted a consensus rating, we have applied the credit rating of the single agency.

[116] We note that Bloomberg also includes in its sample bonds that are rated by only one credit rating agency (i.e. bonds that do not have a Bloomberg composite credit rating).

Table 5.1: Derivation of bond sample

No. of bonds		Selection criteria applied:
431		Corporate bonds incorprated in Australia with either an S&P, Fitch or Moody's credit rating of BBB to A- (or equivalent)
	227	Less, bonds that do not have "AU" ISIN
204		
	7	Less, bonds not in AUD currency
197		
	26	Less, bonds with maturity of less than 1 year
171		
	56	Less, bonds that have optionality or don't mature at a specified date
115		
	2	Less, bonds that are not senior
113		
	30	Less bonds whose issuers are financial institutions
83		
	2	Less, bonds that are inflation linked
81		
	1	Less bond whose Bloomberg consensus rating is not BBB to A-
80		
	3	Less, bonds with insufficient or no fixed rate Bloomberg yield data or UBS floating rate note data
77		
	1	Plus, an additional bond that was cross-referenced from Bloomberg BACMBBB index
78		**Final sample of bonds rated BBB to A-**

Source: Bloomberg and Incenta analysis. Note: 'AU' ISIN refers to the bond's International Securities Identification Number, and the 'AU' prefix refers to a bond issued in Australia.

In Table 5.2 below we show some characteristics of the 78 selected bonds (and the full sample is listed in Appendix A.1.2). The first point to note is that the BBB+ credit rating band, making up 21 per cent of the total, is relatively small compared with the other two credit rating bands. We know from experience that a sample of 16 BBB+ bonds is too small by itself to provide a reliable estimate of the BBB+ debt risk premium at 10 years. The logic of the PwC (2013) estimation method is to obtain a pooled regression estimate, using BBB+ bonds as well as the bonds on either side of the BBB+ credit rating band (BBB and A-).

Including BBB and A- bonds increases the sample size from 16 to 78, which is likely to result in a more dependable estimate of the 10 year BBB+ debt risk premium. We also note that the distribution of the bonds on either side of the BBB+ credit rating band is relatively balanced, with 37 per cent being rated BBB, and 42 per cent being A-. While this might create a small bias in the direction of A- (i.e. a lower estimate), the average term to maturity of the BBB bonds (4.8 years) is slightly greater than that of A- bonds (4.2 years), which might be expected to result in a small offsetting bias in the direction of BBB (i.e. a higher estimate). Assuming values of 3 for BBB-, 2 for BBB+ and 1 for A-, the sample obtains a weighted average value of 1.95, which is very close to BBB+.[117] We therefore consider that any net bias resulting from the composition of the Incenta sample is likely to be relatively immaterial.

[117] For comparison, the sample that the RBA uses to estimate a broad BBB bond yield obtains a value of 1.87 relative to a BBB bond being weighted at 2.0.

Table 5.2: Characteristics of the selected bond sample

Credit rating band	Number of bonds	Per cent	Average term to maturity (years)
BBB	29	37%	4.8
BBB+	16	21%	3.8
A-	33	42%	4.2
Total	78	100%	4.3

Source: Bloomberg

Econometric estimate

The QCA's cost of debt approach recommends that a linear form regression be applied to the debt risk premiums calculated for the pooled sample of bonds.[118] The QCA notes that PwC (2013) found the linear form was superior to other possible functional forms, but noted that this assumption should be periodically reviewed. As this assumption has been recently reviewed, we have applied a linear regression.

In keeping with the PwC (2013) method we obtained fixed rate bond yields from Bloomberg and both fixed and floating rate bond yields from UBS, and where there were two yield estimates available we averaged them.[119] The raw yields were annualised, and our estimate of the risk free rate for the specific term to maturity on each day was subtracted to obtain the debt risk premium for that day. The day and term to maturity specific risk free rate was interpolated from risk free rate estimates that were in turn interpolated from the nearest Commonwealth Government bonds on either side of the maturity dates in question based on RBA data.

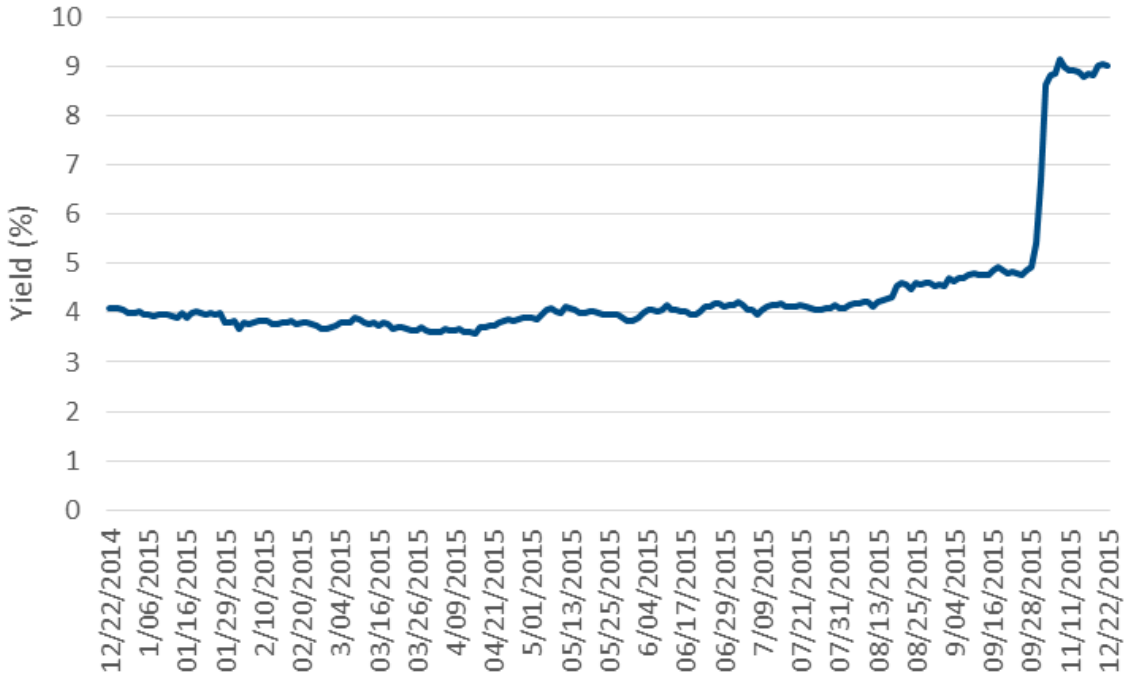
In consultation with the QCA we chose an indicative averaging period that encompasses the 20 days from 2 October, 2015 to 30 October, 2015 inclusive. Observing the distribution of debt risk premiums we noticed that the debt risk premium of one bond, Glencore Australia Holdings (BBB, maturing on 19 September, 2019), was significantly higher than all the other observations.[120] Closer examination, as displayed in Figure 5.1, showed that the spike in Glencore's yield came in September 2015, after the firm had lost 43 per cent of its equity value in the previous quarter due to liquidity and credit risk concerns (i.e. potential downgrading to sub-investment grade).

118 QCA (August, 2014), p. ii.

119 As noted above, due to recent restrictions on UBS's distribution policy, we have recommended that future applications of the PwC (2013) method be undertaken using only Bloomberg data.

120 The BBB-rated Glencore bond had a debt risk premium of 7.42 per cent, compared with an average debt risk premium of 1.96 per cent for the BBB credit rating band excluding Glencore, and was more than twice as high as the next highest BBB-rated bond (Sydney Airport Finance, with a debt risk premium of 3.26 per cent).

Figure 5.1: Yield on Glencore bond



Source: Bloomberg

Investment bank J.P. Morgan Cazenove has questioned the market's reaction to Glencore's financial situation, noting that Credit Default Swap pricing had risen from approximately 300 basis points to 840 basis points, which was higher than its previous peak during the Global Financial Crisis.[121] Given the particular circumstances of Glencore, we decided to estimate the debt risk premium regression with and without it.[122] The results are shown in Table 5.3 below.

Table 5.3: Results of regression analysis estimating debt risk premium for 20 days to 30 October 2015

	Intercept	T-Statistic	Term coefficient	T-Statistic	Adj. R-squared	Predicted DRP at 10 years
All bonds, N = 78	1.203	5.867	0.130	3.015	0.095	2.51%
Excluding Glencore, N = 77	1.092	12.456	0.139	7.521	0.422	2.48%

Source: Bloomberg, UBS and Incenta analysis

We found that including the Glencore bond obtained an estimated 10 year pooled regression estimate of 2.51 per cent, while excluding this bond resulted in a slightly lower estimate of 2.48 per cent. The fact that these estimates are relatively close is due to the large number of observations (77 and 78),

121 J.P. Morgan Cazenove (30 September, 2015), *Glencore PLC: Giving credit where credit is due – Glencore is undervalued on fundamentals,* p. 2.

122 In previous analyses applying the PwC (2013) method, we have separated DBCT Finance bonds because they were rated BBB+. However, in July 2014 DBCT Finance Pty Ltd was re-rated to BBB.

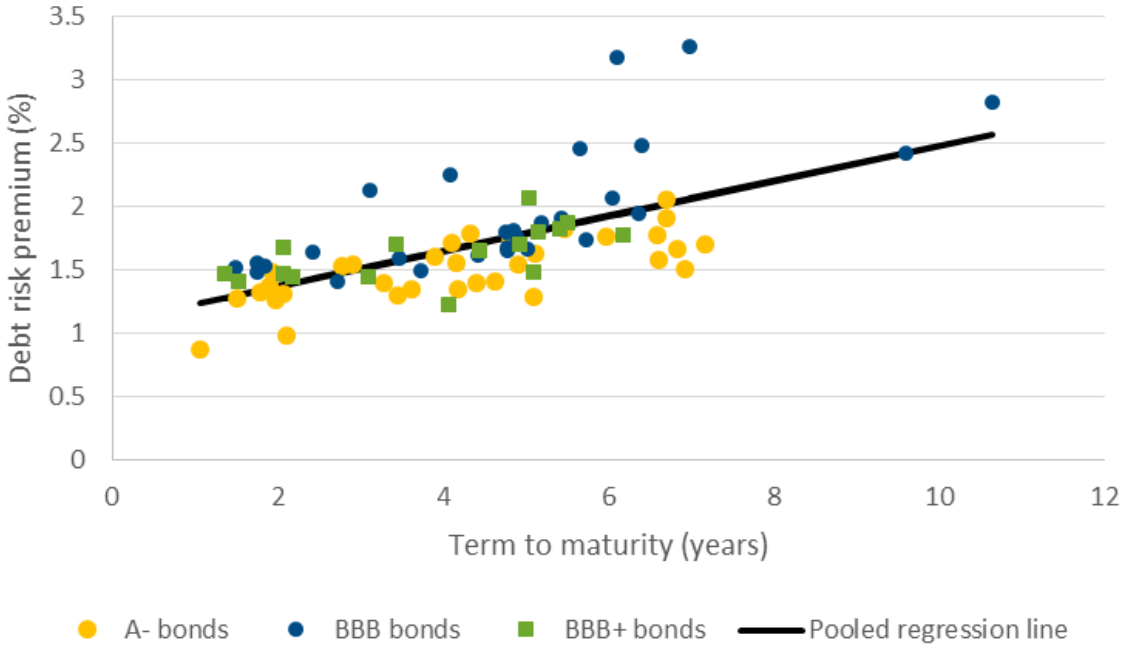
and the Glencore bond being at a term of 3.9 years, which is relatively close to the average term to maturity of the whole sample, which is 4.3 years.

For reasons discussed above, it is clear the Glencore bond is an outlier and Incenta's view is that it is appropriate to exclude it. We therefore consider the **2.48 per cent** pooled regression estimate that excludes Glencore to be a better estimate of the 10 year BBB+ debt risk premium than 2.51 per cent. The average deviations (residuals) from the pooled regression line excluding the Glencore bond were as follows:

- For the 28 BBB bonds (i.e. excluding Glencore) — 19.8 basis points;
- For the 16 BBB+ bonds — was 0.1 of a basis point (i.e. practically zero); and
- For the 33 A- bonds — 16.8 basis points.

In other words, relative to the A- and BBB bonds on either side of them, the 16 BBB+ bonds were on average approximately half way between them. A visual representation of these relativities is presented in Figure 5.2 below. Based on this information, our estimate of a 10 year BBB debt risk premium is 2.68 per cent (2.48 per cent plus a 0.20 per cent BBB premium obtained by rounding up the 19.8 basis point average differential between the 28 BBB bonds and the pooled regression line).

Figure 5.2: Pooled regression line and scatter of debt risk premiums (20 days to 30 October, 2015)



Source: Bloomberg, UBS, RBA, Incenta analysis

In addition, we tested what the resulting estimated debt risk premiums would have been, had we applied linear regression to each of the three credit ratings individually, and applying a dummy variables approach. Using these approaches the estimated debt risk premiums for the three credit ratings were as displayed in Table 5.4 below.

Table 5.4: BBB debt risk premium estimate at 10 years using dummy variables, pooled regression and individual regressions (20 days to 30 October, 2015)

Number of bonds	Credit rating / approach	Dummy Variables	Pooled regression	Individual regression
28	BBB	2.62%	2.68%	2.8%
16	BBB+	2.41%	2.48%	2.12%
33	A-	2.24%	2.31%	2.10%

Source: Bloomberg, UBS and Incenta analysis.

Using individual regression, the 2.8 per cent estimate for BBB is not materially higher than the 2.68 per cent estimate that we obtained applying pooled regression, which in turn is not materially higher than the estimate using dummy variables (2.62 per cent).[123] Since the pooled regression approach is based on 78 bond observations while the former is based on only 28 observations, we have more confidence in the 2.68 per cent estimate. Finding that the 16 BBB+ rated bonds provide an estimated 10 year debt risk premium that is only 2 basis points higher than the stand-alone estimate using the A- rated bonds demonstrates the risk of reliance on smaller bond samples. The dummy variable approach similarly results in a much higher BBB+ debt risk premium estimate at 10 years than the individual regression, although slightly lower than the pooled estimate (i.e. 2.41 per cent compared with 2.48 per cent). For the A- credit rating band the pooled regression is not materially higher than the dummy variable approach (2.32 per cent vs 2.24 per cent), but is materially higher than the individual regression estimate of 2.1 per cent.

Bloomberg BVAL estimate

As noted above, in addition to the PwC (2013) econometric approach, which is viewed as the primary cost of debt estimation method, the QCA considers it prudent to estimate the debt risk premium using Bloomberg data as a cross-check.

Since 14 April, 2015, Bloomberg has provided daily estimates of the fair value yields for Australian corporate bonds rated BBB- to BBB up to a term to maturity of 30 years. We accessed Bloomberg and obtained the yield estimates for the BBB credit rating band (encompassing BBB- to BBB+ bonds) for the 20 days of the draft averaging period ending 30 October, 2015. These yield estimates were then annualised and the average for the period was found to be 5.13 per cent. From this annualised average yield estimate we subtracted the average interpolated annualised daily 10 year Commonwealth Government Securities (CGS) yield of 2.68 per cent, which provided an estimated average debt risk premium of **2.45 per cent**.

The actual methodology that is applied by Bloomberg is proprietary, which is a weakness commented on by the QCA. Our observations of the Bloomberg BBB fair value curve and its constituent yields suggest that it is not regression based. A curve to 30 years is estimated on the basis of data for 22 bonds, where only one bond has a term to maturity beyond 6.6 years (i.e. 9.6 years). It is possible that the position of the curve at 9.6 years may be purposely set to approximate the yield of the longest term bond in the sample, with the shape of the curve beyond that term being governed by the shape (i.e. rise in yield for term) of some reference curve.

[123] The equation using dummy variables was: DRP = 1.347 (14.639) + 0.127Term (7.892) – 0.211BBB+Dummy (-2.491) – 0.373A-Dummy (-5.410), Adj. R square 0.58 (T-statistics in brackets).

We examined the 22 bonds in the Bloomberg sample as at 30 October, 2015. In the first instance we established the average credit rating, where we again assigned the Bloomberg composite credit rating when it was available (in half the cases), and assigned the credit rating of the single credit rating agency when the composite rating was not available. We found that by assigning values to each of the credit ratings observed, an average credit rating of BBB was indicated.[124] Hence, we consider that a BBB credit rating was targeted by Bloomberg.

Only 13 of the 22 bonds in Bloomberg's bond sample appeared in our sample, with the reasons for exclusion from our sample being:

- 2 bonds excluded because they matured within a year;
- 1 bond excluded because it is a financial institution;
- 6 bonds excluded because their credit rating fell outside the BBB to A- credit rating bands (i.e. were BBB- or BB+).

While Bloomberg applied a significantly smaller sample size (22 bonds), and included only 13 of the 78 bonds used in our sample, the 2.45 per cent estimate of the 10 year BBB debt risk premium was 3 basis points lower than the 2.48 per cent 10 year BBB+ estimate derived using the PwC (2013) econometric method. This appears anomalous, since our estimate of a 10 year BBB debt risk premium is 2.68 per cent, as discussed above. We expect that this is caused by Bloomberg's use of a different and much smaller sample, and a different estimation method. We prefer our sample because it is larger, and includes a larger proportion of longer dated bonds that improve the debt risk premium estimate at a term of 10 years.

RBA estimate

The QCA's preferred cost of debt method also refers to the RBA's BBB estimate as an additional cross-check to the PwC (2013) econometric estimate. The RBA's fair value yields are available on a monthly basis since January 2005 for both the broad A and broad BBB credit rating bands.[125] The RBA applies the Gaussian kernel weighting method, which gives greater weight to bonds that are closest to its target terms (in particular the 5, 7 and 10 year terms). However, while the method targets cost of debt estimates for a 10-year term to maturity, it consistently produces estimates for an effective term of approximately 9 years, which is an under-estimate of the 10 year cost of debt.[126] Another problem with the RBA method is its tendency at times to imply a negative debt risk premium between 7 and 10 years.[127]

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124 We found an average credit rating of exactly 2 when credit ratings were assigned values of 1 for BBB+, 2 for BBB, 3 for BBB- and 4 for BB+ (one of the bonds had a Bloomberg composite BB+ credit rating since it was rated by two agencies and Bloomberg's convention is to apply the lower rating as the composite rating in such cases).

125 Ivailo Arsov, Matthew Brooks and Mitch Kosev (December Quarter, 2013), 'New Measures of Australian Corporate Credit Spreads', *Bulletin*, pp. 15-26.

126 As noted by Ivailo Arsov, Matthew Brooks and Mitch Kosev (December Quarter, 2013), p.23, 'this reflects the dearth of issuance of bonds with tenors of 10 years or more.'

127 A negative debt risk premium between 7 and 10 years is not consistent with the results of numerous empirical tests. Particularly worrisome is the fact that in recent years the RBA method has implied a

The Australian Energy Regulator (AER) has adopted the RBA method for estimating a 10 year BBB yield, which it averages with the Bloomberg BBB yield to produce its own estimate. Recognising the under-estimation problem, the AER engaged Associate Professor Martin Lally to advise on the appropriate extrapolation method.[128] Lally recommended a linear extrapolation of the debt risk premium component of the cost of debt based on the effective tenors of both the 'seven' and 'ten' year values.

In both September and October 2015 the RBA method included 85 broad BBB band bond observations. We checked the specific credit rating of each bond in the RBA sample as at October 2015, and found that on average it is reasonably reflective of a BBB credit rating.[129]

We applied the method of extrapolating the RBA data for the last business days of September and October, as recommended by the AER, and interpolated these observations for the 20 business days from 2 October to 30 October. We then annualised the resulting yields, averaged the results, and subtracted the respective annualised average Commonwealth bond yield for the averaging period. This resulted in an estimated 10 year BBB yield of **2.78 per cent**.

Conclusion on debt risk premium

Our results are summarised in Table 5.5 below. It is our view that the best estimate of the 10 year BBB+ debt risk premium is 2.48 per cent, which is the estimate we obtained by applying the PwC (2013) econometric method in a pooled regression using 77 BBB, BBB+ and A- bond observations (i.e. omitting the Glencore observation).

At a benchmark BBB credit rating, we consider **2.68 per cent** to be the best estimate of DBCT's 10 year debt risk premium. This is 11 basis points below the RBA estimate and 23 basis points above Bloomberg's estimate of a 10 year BBB debt risk premium. The 33 basis points differential between the RBA's estimate of the 10 year BBB debt risk premium, and the Bloomberg's 10 year BBB debt risk premium estimate is material. Our view of these cross-checks is that while the RBA's estimate of a 10 year BBB debt risk premium is reasonably close to the PwC(2013) estimate, the Bloomberg BBB estimate appears to be too low.

Table 5.5: Summary of debt risk premium estimates, 20 days to 30 October, 2015

Target credit rating	BBB	Difference to PwC(2103)
RBA method	2.78%	0.10%
PwC (2013) method	2.68%	
Bloomberg method	2.45%	-0.23%

Source: RBA, Bloomberg, PwC(2013), Incenta analysis

negative 7-10 year debt risk premium at the same time that analysis of paired bonds over the same terms has shown that the debt risk premium holding other factors constant has been upward sloping.

128 Lally, Martin (20 November, 2014), *Implementation issues for the cost of debt*, Capital Financial Consultants Ltd.

129 As noted above, we found that the weighted average value of the RBA sample was 1.87, when a BBB bond's value is defined as 2.0.

5.3 Conclusion on benchmark term of debt and debt risk premium

In summary, our conclusions regarding the above parameters that the QCA has asked us to review in the context of DBCT's 2015 DAU are as follows:

Term of debt

We recommend the continuation of a 10 year benchmark term of debt for the purpose of estimating a debt margin, as the weight of empirical evidence and regulatory precedent support this number.

Debt risk premium

In accordance with the QCA's cost of debt estimation approach we have estimated the cost of debt for an indicative averaging period of 20 days to 30 October, 2015 using the primary PwC (2013) econometric method. Based on this method we recommend a 10 year debt risk premium of **2.68 per cent** at a benchmark BBB credit rating.

The QCA's cost of debt approach also requires estimation of the 10 year debt risk premium using the extrapolated RBA and Bloomberg BVAL sources as a cross-check. For the same averaging period and benchmark credit rating of BBB, these sources imply debt risk premiums of **2.78 per cent** and **2.45 per cent** respectively.

A.1.1 Description of port comparator companies

Name	Ticker	Market Index	Company description
Asciano	AIO AU Equity	AS51 Index	Asciano Limited is a provider of essential transport services in the rail and ports and stevedoring industries in Australia and New Zealand. The Company operates container terminals, bulk export port facilities and container and bulk rail haulage services.
Bintulu Port Holdings	BPH MK Equity	FBMKLCI Index	Bintulu Port Holdings Berhad is an investment holding company. The Company, through its subsidiaries, provides port services at Bintulu Port, Sarawak.
China Merchants Holdings International	144 HK Equity	HSI Index	China Merchants Holdings International Company Limited, through its subsidiaries and associated companies, operates container and cargo terminals, port transportation, and airport cargo handling. The Company also manufactures containers, paint, and trailers as well as operates toll road, shipping, property, and dealing securities businesses.
Cosco Pacific Ltd	1199 HK Equity	HSI Index	COSCO Pacific Limited, through its subsidiaries, provides shipping container leasing services worldwide. The Company also operates container terminals and provides container handling, storage, transportation and management services, as well as depot handling and stevedoring services.
Dalian Port PDA Co Ltd	2880 HK equity	HSI Index	Dalian Port (PDA) Company Limited provides international and domestic cargo handling, transportation, transit, warehousing and other port operations and logistics services. The Company also provides oil and liquid chemicals terminal and related logistics services, tugging, pilotage, cargo handling and information technology services.
DP World Ltd	DPW DU Equity	DFMGI Index	DP World Ltd is a global operator of container and marine terminals. The Company operates marine terminals across six continents, and generates its core revenues from handling cargo containers. DP World was founded in 1972, and operates out of its global headquarters in Dubai, United Arab Emirates.
Eurokai GMBH & Co KGaA	EUK3 GR Equity	DAX Index	Eurokai GmbH & Co. KGaA operates container handling facilities, primarily in continental Europe. The Company operates container terminals in Bremerhaven, Hamburg, La Spezia and Gioia Tauro in Italy, and Lisbon. Eurokai is also active in sea container transportation between

			terminals, repair and storage of containers and distribution and storage of goods.
Forth Ports Ltd	FPT LN Equity	UKX Index	Forth Ports PLC provides port services. The Company provides port, cargo handling, and facilities services including property letting and development. Forth also manages commercial ports and specialized marine terminals for oil and gas and manages an area of navigable waters. Forth Ports extends services throughout the world.
Hamburger Hafen Und Logistik	HHFA GR Equity	DAX Index	Hamburger Hafen und Logistik AG (HHLA) provides services to the port in the European North Range. The Company's container terminals, transport systems, and logistic services provide a network between overseas port and European hinterland.
Lyttelton Port Co Ltd	LPC NZ Equity	NZSE50FG Index	Lyttelton Port Company Limited operates and maintains the facilities of the Port of Lyttelton for use by shipping lines, exporters and importers. The Company manages the port facility, land, buildings, berth structures and provides marine and utility services. The Company also offers cargo handling of containers and coal.
Port of Tauranga Ltd	POT NZ Equity	NZSE50FG Index	Port of Tauranga Limited activities include the provision of wharf facilities, back up land for the storage and transit of import and export cargo, berthage, cranes, tug and pilotage services for exporters, importers and shipping companies and the leasing of land and buildings. The Group also operates a container terminal and has bulk cargo marshalling operations.
Shanghai Intl Port Group Co Ltd	600018 CH Equity	SHCOMP Index	Shanghai International Port (Group) Co., Ltd is a holding company that owns interests in container and port service companies.
Shenzen Chiwan Whark Holdings	200022 CH Equity	SHCOMP Index	Shenzhen Chiwan Wharf Holdings Ltd. operates the Chiwan Port in Shenzhen. The Company handles, warehouses, and transports containers and bulk and general cargoes.
Tianjin Port Co Ltd	600717 CH Equity	SHCOMP Index	Tianjin Port Co., Ltd. operates the Tianjin Port and provides related services including loading and unloading, storage, and transportation services. The Company also acts as a freight transportation agency.
Tianjin Port DVLP HLDGS Ltd	3382 HK Equity	HSI Index	Tianjin Port Development Holdings Limited operates container terminals in China. The company provides container handling operations, stacking and warehousing services and non-containerized cargo services.

Xiamen International Port	3378 HK Equity	HSI Index	Xiamen International Port Company Ltd. offers shipping port services. The Company loads, unloads, and stores shipping containers, loads and unloads general cargo, and offers shipping agency, tallying, tugboat berthing and unberthing, and other port related services. Xiamen International also manufactures building materials.
Westshore Terminals Investment Corp	WTE CT Equity	SPTSX	Westshore Terminals Investment Corp. operates a coal storage and loading terminal in British Colombia, Canada.

A.1.2 Bond sample used for econometric method

ISIN	Name	Date of Maturity	S&P Rating	Fitch Rating	Moody's Rating	Bloomberg Composite Rating	Incenta Rating
AU3CB0185478	WESFARMERS LTD	4/11/2016	A-	n/a	A3	A-	A-
AU3CB0147833	DEXUS FINANCE PTY LTD	21/04/2017	A-	n/a	A3	A-	A-
AU3CB0199867	QIC SHOPPING CENTRE FUND	27/07/2017	A-	n/a	n/a	NR	A-
AU3CB0191260	ETSA UTILITIES FINANCE	7/09/2017	A-	n/a	n/a	NR	A-
AU3CB0145696	AUSNET SERVICES HOLDINGS	25/09/2017	A-	A-	A3	A-	A-
AU3FN0017331	ETSA UTILITIES FINANCE	9/10/2017	A-	n/a	n/a	NR	A-
AU3CB0201739	GPT WHOLESALE SHOP CENTRE	13/11/2017	A-	n/a	n/a	NR	A-
AU3CB0202216	ABB FINANCE AUSTRALIA	22/11/2017	A-	A-	A2	A-	A-
AU3CB0204584	QIC SHOPPING CENTRE FUND	25/07/2018	A-	n/a	n/a	NR	A-
AU3CB0199065	DEXUS FINANCE PTY LTD	10/09/2018	A-	n/a	A3	A-	A-
AU3CB0189009	GENERAL PROPERTY TRUST	24/01/2019	A-	n/a	A3	A-	A-
AU3CB0192128	WESFARMERS LTD	28/03/2019	A-	n/a	A3	A-	A-
AU3CB0221257	BWP TRUST	27/05/2019	A-	n/a	n/a	NR	A-
AU3CB0213247	STOCKLAND TRUST	6/09/2019	A-	n/a	n/a	NR	A-
AU3CB0216166	QIC SHOPPING CENTRE FUND	20/11/2019	A-	n/a	n/a	NR	A-
AU3CB0202901	DEXUS CPA TRUST	13/12/2019	A-	n/a	A3	A-	A-
AU3CB0203057	NOVION PROPERTY GROUP	19/12/2019	A-	n/a	n/a	NR	A-
AU3CB0205201	AUSNET SERVICES HOLDINGS	14/02/2020	A-	n/a	A3	A-	A-
AU3CB0206134	WESFARMERS LTD	12/03/2020	A-	n/a	A3	A-	A-
AU3CB0209468	AUSTRALIA PACIFIC AIRPOR	4/06/2020	A-	n/a	A3	A-	A-
AU3CB0231827	FBG TREASURY AUSTRALIA LTD	7/08/2020	A-	n/a	A3	A-	A-
AU3CB0223899	GENERAL PROPERTY TRUST	11/09/2020	A-	n/a	n/a	NR	A-
AU3FN0027496	WESFARMERS LTD	18/11/2020	A-	n/a	A3	NR	A-
AU3CB0164820	STOCKLAND TRUST	25/11/2020	A-	n/a	n/a	NR	A-
AU3CB0173482	AUSNET SERVICES HOLDINGS	1/04/2021	A-	n/a	A3	A-	A-
AU3CB0224509	AMP CAPITAL WHOLESALE OF	7/10/2021	A-	n/a	n/a	NR	A-
AU3CB0229672	GPT WHL OFFICE FD NO1	18/05/2022	A-	n/a	n/a	NR	A-
AU3CB0194413	NEW ZEALAND MILK PTY LTD	23/05/2022	A-	A	n/a	A-	A-
AU3CB0195980	AUSNET SERVICES HOLDINGS	28/06/2022	A-	n/a	A3	A-	A-
AU3CB0195972	AUSNET SERVICES HOLDINGS	28/06/2022	A-	n/a	A3	A-	A-
AU3CB0198075	GENERAL PROPERTY TRUST	16/08/2022	A-	n/a	A3	A-	A-
AU3CB0232692	AUSTRALIA PACIFIC AIRPORT	15/09/2022	A-	n/a	A3	A-	A-
AU3CB0202919	DEXUS CPA TRUST	13/12/2022	A-	n/a	A3	A-	A-
AU3CB0224129	GLENCORE AUST HOLDINGS P	19/09/2019	BBB	n/a	n/a	NR	BBB
AU3FN0001251	SYDNEY AIRPORT FINANCE	11/10/2022	BBB	n/a	Baa2	NR	BBB
AU300BBIF042	DBCT FINANCE PTY LTD	9/06/2026	BBB	n/a	Baa2	NR	BBB
AU3FN0001244	SYDNEY AIRPORT FINANCE	20/11/2021	BBB	n/a	Baa2	NR	BBB
AU3CB0229680	ASCIANO FINANCE LTD	19/05/2025	BBB	n/a	Baa2	BBB	BBB
AU3CB0228070	DOWNER GROUP FINANCE PTY	11/03/2022	n/a	BBB	n/a	NR	BBB
AU300BBIF034	DBCT FINANCE PTY LTD	9/06/2021	BBB	n/a	Baa2	NR	BBB
AU3CB0225233	AGL ENERGY LTD	5/11/2021	BBB	n/a	n/a	NR	BBB
AU3CB0227635	CONNECTEAST FINANCE PTY	25/02/2022	n/a	n/a	Baa2	NR	BBB

ISIN	Name	Date of Maturity	S&P Rating	Fitch Rating	Moody's Rating	Bloomberg Composite Rating	Incenta Rating
AU3CB0225324	CROWN GROUP FINANCE LTD	18/11/2019	BBB	n/a	Baa2	BBB	BBB
AU3CB0219681	PERTH AIRPORT PTY LTD	25/03/2021	BBB	n/a	Baa2	BBB	BBB
AU3CB0217347	GLOBAL SWITCH PROP AU	23/12/2020	BBB	BBB+	n/a	BBB	BBB
AU3CB0209229	DOWNER GROUP FINANCE PTY	29/11/2018	n/a	BBB	n/a	NR	BBB
AU3CB0222271	QPH FINANCE CO PTY LTD	7/07/2021	BBB	n/a	n/a	NR	BBB
AU3CB0221687	ALE DIRECT PROPERTY TRUS	20/08/2020	n/a	n/a	Baa2	NR	BBB
AU3CB0155133	APT PIPELINES LTD	22/07/2020	BBB	n/a	Baa2	BBB	BBB
AU3CB0212967	CONNECTEAST FINANCE PTY	2/09/2020	n/a	n/a	Baa2	NR	BBB
AU3CB0214823	BRISBANE AIRPORT CORP LTD	21/10/2020	BBB	n/a	Baa2	BBB	BBB
AU3CB0211415	PERTH AIRPORT PTY LTD	23/07/2020	BBB	n/a	Baa2	BBB	BBB
AU3CB0211647	QPH FINANCE CO PTY LTD	29/07/2020	BBB	n/a	n/a	NR	BBB
AU3CB0228286	HOLCIM FINANCE AUSTRALIA	19/03/2020	BBB	BBB	Baa2	BBB	BBB
AU3CB0200111	HOLCIM FINANCE AUSTRALIA	4/04/2019	BBB	BBB	Baa2	BBB	BBB
AU3CB0206803	GAIF BOND ISSUER P/L	20/03/2018	BBB	n/a	n/a	NR	BBB
AU3CB0173201	BRISBANE AIRPORT CORP LT	9/07/2019	BBB	n/a	Baa2	BBB	BBB
AU3CB0196848	CROWN GROUP FINANCE LTD	18/07/2017	BBB	n/a	Baa2	BBB	BBB
AU3CB0221679	ALE DIRECT PROPERTY TRUS	20/08/2017	n/a	n/a	Baa2	NR	BBB
AU3CB0192599	UNITED ENERGY DISTRIBUTI	11/04/2017	BBB	n/a	Baa2	BBB	BBB
AU3CB0196699	HOLCIM FINANCE AUSTRALIA	18/07/2017	BBB	BBB	Baa2	BBB	BBB
AU3CB0176485	SYDNEY AIRPORT FINANCE	6/07/2018	BBB	n/a	Baa2	BBB	BBB
AU3CB0190122	SGSP AUSTRAL ASSETS PTY	21/02/2017	BBB+	n/a	A3	BBB+	BBB+
AU3CB0193274	VICTORIA POWER NETWORKS	27/04/2017	BBB+	n/a	n/a	NR	BBB+
AU3CB0201515	INVESTA OFFICE FUND	7/11/2017	BBB+	n/a	n/a	NR	BBB+
AU300TFC0090	TRANSURBAN FINANCE CMPNY	10/11/2017	BBB+	A-	Baa1	NR	BBB+
AU3CB0202422	MIRVAC GROUP FINANCE LTD	18/12/2017	BBB+	n/a	n/a	NR	BBB+
AU3CB0186385	CALTEX AUSTRALIA LTD	23/11/2018	BBB+	n/a	n/a	NR	BBB+
AU3CB0191815	WOOLWORTHS LIMITED	21/03/2019	BBB+	n/a	Baa1	BBB+	BBB+
AU3CB0201747	COCA-COLA AMATIL LTD	13/11/2019	BBB+	BBB+	A3	BBB+	BBB+
AU3FN0018354	SGSP AUSTRAL ASSETS PTY	25/03/2020	BBB+	n/a	A3	NR	BBB+
AU3CB0214534	MIRVAC GROUP FINANCE LTD	18/09/2020	BBB+	n/a	n/a	NR	BBB+
AU3CB0215119	AURIZON NETWORK PTY LTD	28/10/2020	BBB+	n/a	Baa1	BBB+	BBB+
AU3CB0229565	WESFARMERS LTD	18/11/2020	A-	BBB+	A3	BBB+	BBB+
AU3CB0216968	AQUASURE FINANCE PTY LTD	9/12/2020	BBB+	A-	n/a	BBB+	BBB+
AU3CB0219194	SGSP AUSTRALIA ASSETS	12/03/2021	BBB+	n/a	A3	BBB+	BBB+
AU3CB0228989	SHOPPING CTR AU PRPTY RT	20/04/2021	n/a	n/a	Baa1	NR	BBB+
AU3CB0226264	AUST GAS NETWORK VIC 3 P	17/12/2021	n/a	n/a	Baa1	NR	BBB+