IPART
New South Wales

Independent Pricing and Regulatory Tribunal

Review of Rate of Return under the New South Wales Rail Access Undertaking

Rail Access — Discussion Paper
February 2009

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Invitation for submissions

IPART invites written comment on this document and encourages all interested parties to provide submissions addressing the matters discussed.

Submissions are due by 9 April 2009.

We would prefer to receive them by email <ipart@ipart.nsw.gov.au>.

You can also send comments by fax to (02) 9290 2061, or by mail to:

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1 Introduction

The *NSW Rail Access Undertaking* (Undertaking) requires IPART to review the rate of return that should be applied to regulatory asset base of the Hunter Valley Coal Network every five years.

Schedule 3, section 2.1 states:

> Rate of return means a rate of return in percentage terms approved by IPART for a period of five years to be applied to the average of the opening and closing regulatory asset base.

The revised rate of return is to be applied to the regulatory asset base to yield a return on the rail infrastructure of the coal network for the five years commencing 1 July 2009.

The Hunter Valley Coal Network comprises 37 track sectors with 32 sectors leased to Australian Rail Track Corporation (ARTC) on a 60-year lease from 5 September 2004. RailCorp owns the remaining five sectors.

In previous decisions made under the Undertaking (1999 and 2004), IPART used a real pre-tax weighted average cost of capital (WACC) to determine an appropriate rate of return for applying to the regulatory asset base of the rail infrastructure.

As part of the review process, this discussion paper on the rate of return is being released to seek comments from relevant stakeholders including mine producers, rail operators, access seekers (including potential access seekers) and relevant industry groups. The timetable for the review is as follows:

Table 1.1 Review timetable

Date	Event
19 December 2008	ARTC's submission received
30 January 2009	Public submissions due
27 February	Release of discussion paper on rate of return
1 April	Stakeholder hearing
9 April	Submissions on discussion paper due
Early May	Release of draft report
End May	Submission on draft report due
End June	Release of final report and determination

ARTC has submitted a detailed proposal for the WACC.[1] RailCorp has not chosen to submit a detailed proposal for the WACC, but notes that it would be inappropriate to have different rates of return for it and ARTC.[2]

1 ARTC submission to IPART, *Review of Rate of Return and Remaining Mine Life of Hunter Valley Mines*, 1 December 2008.

2 RailCorp submission to IPART, *NSW Rail Access Undertaking: Review Rate of Return - Review of Remaining Mine Life*, 29 October 2008.

For the NSW Rail Access Undertaking, the WACC is part of the calculation of costs that sets a revenue ceiling for RailCorp and ARTC. The revenue ceiling also includes operating costs and depreciation. The revenue ceiling can be calculated separately for each of the 37 track sectors if required.

Currently, ARTC calculates the revenue ceiling only for those parts of the network for which revenue is approaching the revenue ceiling (the 'constrained network'). This constitutes approximately 80 per cent of the capital base for the parts of the network operated by ARTC. None of the sectors operated by RailCorp are considered to be constrained.[3]

There has been a wide variation in the WACC range that IPART has decided on in its past regulatory decisions including its 2 rail access reviews. This is not surprising given that some parameters are based on market observations and consequently reflect prevailing market conditions. The parameters not determined through direct market observation have largely remained constant. IPART considers that there is considerable merit in maintaining a consistent approach to the cost of capital across regulatory decisions. Such inter-temporal consistency reduces regulatory risk and its associated costs. Hence, there is a presumption that unless an alternative approach to the calculation of a WACC parameter is demonstrated to be clearly superior, the existing approach by IPART should be preferred.

2 Weighted average cost of capital

The WACC aims to provide the operator of regulated assets with a rate of return equivalent to that required by the market to invest in those assets.[4]

Under the WACC framework for the Hunter Valley Coal Network, the overall return on capital is calculated in the following manner:

Return on capital = WACC× average of the opening RAB and closing RAB

The cost of capital is weighted by the return required by the two sources of funding available to a business - equity and debt, and their proportion used by the business. 'Equity' refers to funds raised from the owners of the business, the shareholders. 'Debt' refers to any borrowings of the regulated business.[5]

3 RailCorp, Roll forward of the regulatory asset base, ceiling test, under and overs account, submission to IPART for financial year 2006/07, 2007.

4 In some regulatory reviews, the WACC is also used to discount revenues and costs over the regulatory period to arrive at a net present value.

5 In practice, sources of funding are more complicated that this distinction allows, with various possible forms of debt and equity that take on different parts of the risk of the underlying asset.

Other Australian regulators have also applied the WACC methodology to determine what rate of return should be granted to regulated businesses. IPART intends to use a real pre-tax WACC model for determining the rate of return applying to the Hunter Valley rail infrastructure assets for the five years starting 1 July 2009.

2.1 Pre-tax real WACC or post-tax nominal WACC

The WACC can be calculated before or after tax, and can be expressed in real or nominal terms. Theoretically, the calculation of the WACC as pre-tax or post-tax should have little impact on the revenue outcome for the regulated business, provided the same tax rate is assumed.

In either case, the effective or statutory tax rate may be used. IPART has used the statutory tax rate of 30 per cent in all previous determinations.

IPART proposes to continue to use a pre-tax WACC formulation and the statutory tax rate to determine the rate of return under the Undertaking.

2.2 WACC parameters

There are a number of input parameters to consider in determining an appropriate WACC range. Some of these parameters are directly determined by the market, while others are determined by IPART according to a preferred theoretical approach.

The calculation of the cost of capital under the WACC framework requires the estimation of the following parameters:

1. Parameters determined by financial market data:
   - Risk free rate (R_f)
   - Debt margin ($R_D - R_f$)
   - Adjustment for expected inflation (Π).
2. Parameters determined through other methods:
   - The market risk premium (MRP) ($R_m - R_f$)
   - The correlation between a business's risk and that of the overall market (β_e - equity beta)
   - The level of gearing (D -debt, E - equity)
   - The value of imputation credits (γ - gamma).

The parameters of the WACC are related to each other. For instance, a higher level of gearing implies a higher debt margin and a higher equity beta than would otherwise be the case.

These parameters are combined through the formula below, to give the pre-tax real WACC.

$$WACC = \frac{\left(1 + \left\{ \frac{R_e}{\left[1 - t.(1-\gamma)\right]} . \left(\frac{E}{D+E}\right) + R_d . \left(\frac{E}{D+E}\right) \right\}\right)}{(1+\Pi)} - 1$$

The global financial crisis has led to substantial changes in the operation of debt and equity markets. Some businesses face limited access to financial markets, while others can access financial markets only through intermediated credit or at much higher premiums than was the case over the past few years.

Equity markets have also changed. The value of Australian equity has fallen. Issuing new equity appears to incur a greater premium than was the case over the past few years.

In addition, market volatility has risen, both in debt markets and equity markets.

These changes may impact on the methods that regulators use to estimate the WACC. However, the case for changes would need to be considered very carefully. For example, regulators in Australia have generally used current market data for financial market parameters on the principle that it includes full information on past, current and future market conditions. To take a longer term average or adjust current data in the absence of a clearly identified bias suggests the regulator, or others, know better or have better information not available to the market.

IPART seeks comments on the following

1 Should the global financial crisis change the way regulators estimate the WACC? If so how should this be done? Should any adjustments be temporary?

3 Financial market parameters

Market information determines the value of certain parameters that are used in the calculation of the WACC. These include:

- risk free rate
- debt margin and
- the adjustment for expected inflation.

3.1 Nominal risk free rate

The nominal risk-free rate is used to calculate the return on equity and the return on debt. A risk free asset is not directly observable, a proxy must be chosen for the risk free asset. The yield to maturity on Australian Commonwealth Government Securities (CGS) is generally considered to be the best proxy in the Australian economy. This is because these bonds are essentially default free (government guaranteed returns) with high liquidity and yields that are transparent and published. IPART used CGS in its previous determinations of the rate of return under the Undertaking.

Table 3.1 sets out recent jurisdictional decisions on the risk free rate.

Table 3.1 Jurisdictional decisions on risk free rate

Regulator/year	Decision	Risk free rate proxy	Risk free rate sampling period
AER (2008)	Draft NSW electricity distribution	10-year nominal Commonwealth Government Securities	15 days
ACCC (2008)	Rail Access – Interstate network	As above	20 days
ESC (2008)	Gas	As above	20 days
IPART (2008)	CityRail	As above	20 days
IPART (2008)	Sydney Water	As above	20 days
OTTER (2007)	Electricity	As above	20 days
ESCOSA (2006)	Gas	As above	10 days
QCA (2006)	Gas	As above	20 days

Source: Relevant AER, ESC, ESCOSA, QCA, IPART decisions.

The appropriateness of using CGS yields as a proxy for the risk free rate has recently been subject to debate. NERA suggested that there existed an 'absolute bias' in the nominal CGS yields.[6] This is attributable to increased institutional demand and reduced supply for these securities. The alternative put forward by NERA is to use the yields on corporate bonds adjusted by credit default swap rates (CDS).[7]

The ACCC and AER continue to use CGS as the risk free proxy in recent regulatory decisions. The regulators received advice from the Reserve Bank of Australia (RBA) and Australian Treasury regarding the above claimed 'absolute bias' inherent in the CGS yields. Both the RBA and Australian Treasury did not consider that there is 'absolute bias' in nominal CGS yields.[8] In its recent decision on Australian Rail Track

6 NERA, *Absolute bias in (nominal) Commonwealth Government Securities*, June 2007.

7 NERA, *Absolute bias in (nominal) Commonwealth Government Securities*, June 2007.

8 Debelle, Letter from RBA to Mr Joe Dimasi, 9 August 2007 and Murphy, Letter from the Australian Government to Joe Demasi, 7 August 2007 as quoted in the AER, Issues Paper, Review of WACC parameters for electricity transmission and distribution, August 2008, pp 29-30.

Corporation (ARTC) Access Undertaking – Interstate Rail Network, ACCC has used CGS in estimating the risk free rate. In its recent review of the WACC parameters for electricity transmission and distribution, AER has noted that there is insufficient evidence to move away from the CGS as the measure of the risk free rate.[9] Further submissions on the issue of possible bias in nominal CGS yields have been put to the AER since the statement was released.[10]

Another issue raised in the AER's review was the maturity used for the risk-free rate.[11] AER considered that there was persuasive evidence to move away from the 10 year term typically used to a term that matches the regulatory period.

The final issue involved in calculating the nominal risk free rate is the appropriate sampling period over which the proxy is measured. In theory, the best expectation of future interest rates is the published CGS price on the day that the regulatory determination comes into effect. In practice, regulators have tended to use an average of 10 to 20 days to remove the impact of price fluctuations caused by market volatility.

3.1.1 ARTC's proposal

ARTC proposes to adopt 10 year (nominal) CGS yields averaged over a 20-day period as a proxy for the risk free rate on the basis that:

- the 10 year CGS is typically considered the longest dated liquid bond and represents the most relevant benchmark to apply, and
- a 20-day average is consistent with current regulatory practice aiming to reduce the impact of spike in yields that may occur on the day of valuation.[12]

3.1.2 IPART preliminary thinking

IPART has used nominal CGS yields averaged over 20 days for recent regulatory decisions, as proposed by ARTC. IPART is not inclined to change its view on the determination of the risk free rate unless there is sufficient evidence that there is a better alternative.

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9 AER, *Explanatory Statement: Electricity transmission and distribution network service providers*, Review of the weighted average cost of capital (WACC) parameters, December 2008, pp 97-98.

10 For example, see the NSW Treasury submission on explanatory statement, 28 January 2009, pp 10-11.

11 AER, *Explanatory Statement: Electricity transmission and distribution network service providers*, Review of the weighted average cost of capital (WACC) parameters, December 2008, pp 128-129.

12 ARTC, NSW Rail Access Undertaking, Review of Rate of Return and Remaining Mine Life of Hunter Valley Mines, ARTC Submission for IPART Consultation, December 2008, pp 24 -25.

IPART seeks comments on the following

2 Is there any reason for IPART to depart from ARTC's proposal to use nominal CGS yields averaged over 20 days to determine the risk free rate?

3.2 Debt margin

Debt margin is a premium that is added to the risk free rate of return to calculate the cost of debt. For a regulated business, the debt margin is influenced by the credit worthiness of the firm, the gearing level, the supply and demand of the relevant debt markets at the time the debt is being raised and debt raising costs.

Australian regulators typically assess a debt margin on the assumption that an efficient regulated business seeks to target at a minimum an investment grade credit rating profile of BBB, BBB+ or A. The debt margin is estimated by reference to data on generic debt margins for investment grade rated debt securities of 10-year maturity sourced from CBASpectrum or Bloomberg. An average of debt margins is calculated over 10 to 20 days prior to decision date.

The debt margin and credit rating of a firm will be largely determined by the characteristics of the firm, such as its business risk and level of gearing. A regulated firm does not necessarily operate at the optimal capital structure. For instance, ARTC has much lower levels of debt than reflected in its proposal for a 50 per cent to 55 per cent benchmark gearing level. The actual debt that the regulated company has, if any, will therefore not reflect the debt margin relevant to the benchmark gearing level.

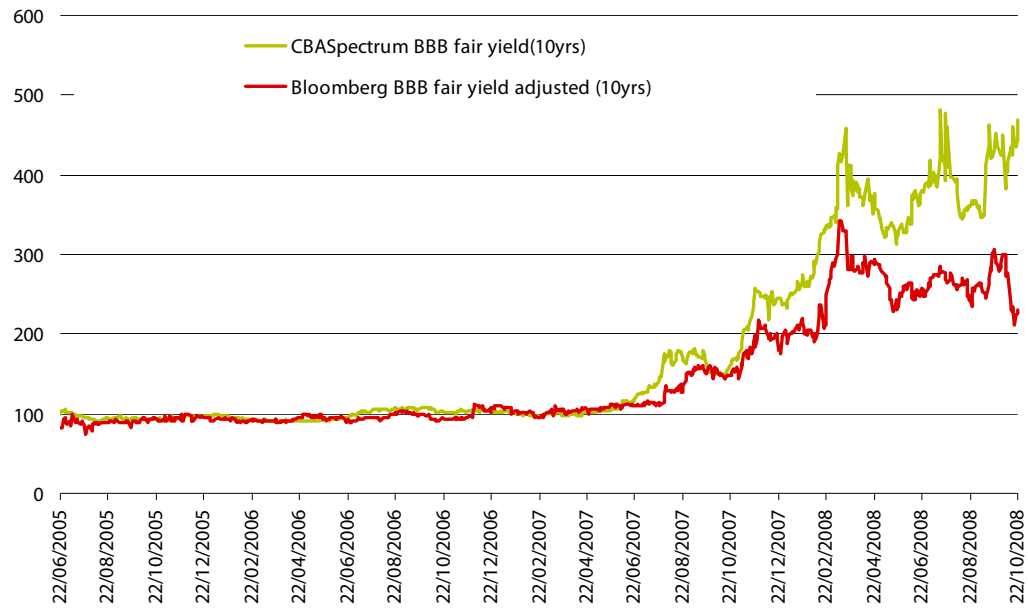
In recent regulatory reviews there have been debates about the appropriate debt margin estimates to use in calculating the debt premium. It has been argued that the data on yields supplied by CBASpectrum are understated relative to their observed yields.[13] In March 2008, the CBASpectrum fair yield curve for BBB bonds (10 years) and the Bloomberg fair yield curve for BBB bonds (10 years) diverged, with estimates from CBASpectrum yielding increasingly higher margins (Figure 3.1). This was contrary to previous arguments that CBASpectrum systematically understated yields, but the size of the discrepancy is of concern.

[13] ActewAGL Supplementary Submission, Estimating the debt margin for ActewAGL, A report for ActewAGL prepared by NERA, February 2004.

The AER had previously used debt margin estimates based on Bloomberg BBB rated fair yields which it considers produce the smallest average error.[14] In its decision on ARTC's Undertaking on its interstate rail network, ACCC followed a similar approach.[15]

The Commonwealth Bank of Australia has also advised IPART in January 2009 that it will no longer provide access to CBASpectrum to non-bank customers. IPART will therefore have to use a different method to determine the debt premium than it has used in the past.

Figure 3.1 Fair yields – CBASpectrum and Bloomberg comparison



Source: Bloomberg and CBA Spectrum.

Table 3.2 summarises the debt margin estimates determined by the Australian regulators in recent regulatory decisions. Recent estimates of the debt margin have been around 3 per cent or 300 basis points.

14 AER, Final Decision: *SP AustNet transmission determination 2008-09 to 2013-14*, January 2008, p 96. As Bloomberg ceased publishing it BBB fair yield for bonds with 9 or 10 year maturities, the 8 year Bloomberg BBB fair yield was extrapolated to replicate a 10 year benchmark BBB yield.

15 ACCC, Final Decision, *Access Undertaking – Interstate Rail Network, Australian Rail Track Corporation*, June 2008.

Table 3.2 Debt margins applied in recent regulatory decisions

Regulator/year	Industry	Methodology	Debt margin[a]
AER (2008)	Draft NSW electricity distribution	Bloomberg BBB fair yield curves and interpolation	3.29%
ACCC (2008)	ARTC interstate rail access	Same as above	3.42%
AER (2008)	Electricity transmission (SP AustNet)	Same as above	2.11%
IPART (2008)	CityRail	CBA Spectrum fair yield and specific bonds	2.78% to 5.88%
IPART (2008)	Sydney Water	Same as above	3 % to 3.56%
ERA (2008)	WestNet (freight)	Same as above	3.02%

a excluding debt raising costs.

Source: Relevant regulators' decisions.

3.2.1 ARTC's proposal

ARTC is of the view that the credit rating of BBB remains appropriate for its Hunter Valley Coal Network business based on a benchmark capital structure of 50 per cent to 55 per cent and given the size of the investment program going forward.

Due to the concerns regarding the historical downward bias observed in CBASpectrum, ARTC on the advice of its consultant, Synergies Economic Consulting (SEC), proposes to adopt the methodology used by AER and ACCC in determining the debt margin. The methodology calculates the debt margin based on a 20-day average of the 8 year Bloomberg BBB bond yield plus the difference between the 8 and 10-year A-rated bond yield. At 28 November 2008, this estimate was 300 basis points (3 per cent). ARTC also proposes to include a debt raising cost of 12.5 basis points in the debt margin.[16]

To support the above recommendation to ARTC, SEC has considered the results of AER's analysis that showed that the interpolated Bloomberg estimates proved the most reliable proxy for the 10-year Bloomberg fair value BBB yield over an 18 month period. Further, there is no new evidence that shows that the fair yield estimates produced by CBA Spectrum are free of any bias.[17]

3.2.2 IPART preliminary thinking

IPART is currently reviewing the methodology that it uses to calculate the debt margins of regulated businesses. As discussed above, CBASpectrum fair yield curves will no longer be available to IPART, requiring IPART to change its methods of estimating the debt premium.

16 ARTC, op cit., 2008, pp 74-76.
17 ARTC, op. cit., 2008, p 75.

Current debt margins using Bloomberg fair yield curves for corporate debt at particular credit ratings are shown in Table 3.3.

Table 3.3 Bloomberg fair yield debt margins

Credit rating	Maturity	Debt margin (basis points)
BBB	8 year	345
A	8 year	280
A	10 year	284

Source: Bloomberg data; 20-day average to 4th of February.

The debt margins on bonds that are issued by companies which IPART considers to represent risks similar to those of regulated utilities are presented in Table 3.4. The lowest yield on these bonds is currently 93 basis points (for AGL) for bonds that mature in 2009. The highest yield is 268 basis points for bonds issued by Snowy Hydro that mature in 2013. The comparator companies are typically utilities that operate in both competitive and regulated monopoly markets. The comparator securities also tend to be close to maturity.

Table 3.4 Debt margins for company bond issuances

Company	Maturity	Credit rating	Debt margin (basis points)
AGL	Sep-09	BBB	93
CitiPower (wrapped)	Feb-10	AAA	113
ElectraNet (wrapped)	Nov-09	AAA	33
GasNet Australia (wrapped)	Mar-09	AAA	92
Snowy Hydro	Feb-13	BBB+	268
Snowy Hydro (wrapped)	Feb-10	AAA	144
SPI Electricity and Gas	Nov-11	A	182

Note: Wrapped bonds are backed by a third party guarantor.

Source: Bloomberg data; 20 day average to 4h of February.

The appropriate set of benchmark corporate bonds and financing facilities to use for the Hunter Valley Coal Network will be considered by IPART in this review.

IPART seeks comments on the following

3 What is the appropriate methodology to estimate the debt margin for the calculation of WACC for the Hunter Valley Coal Network?

4 What allowance should be added to the debt margin for the cost of raising debt?

3.3 Adjusting for expected inflation

IPART uses a real WACC on real regulatory asset base framework, while most market data relates to nominal interest rates. To align the market data and regulatory framework therefore requires either using real interest rate data or adjusting nominal interest rate data for expected inflation.

Until recently, jurisdictional regulators commonly used the Fisher equation to estimate market expectations of inflation from the difference in yields on nominal and indexed Commonwealth Government Securities (CGS).

$\Pi = [(1+r_f)/(1+r_{rf})]-1$

where:

Π is the forecast inflation rate

r_f is the nominal risk-free rate and

r_{rf} is the real risk-free rate.

Concerns have been raised that the real risk-free rate data used in the Fisher equation may be biased so that inflation is overestimated.[18] The bias in the real-risk free rate reflects a lack of supply of indexed CGS (the Commonwealth Government decided to cease issuing indexed bonds in 2003) putting upward pressure on prices and hence downward pressure on yields.

In its recent decisions on SPAusNet and NSW electricity distribution, the AER departed from estimating forecast inflation based on the Fisher equation given the scarcity of the indexed bonds. Instead, AER has adopted the RBA's short term inflation forecasts (first two years) and the mid-point of its target inflation band beyond that for the remaining years of the 10-year period. While AER acknowledges that this is not a market-based approach, it considers that this approach provides consistency and transparency:

> The AER considers that the RBA's inflation forecasts are objective and represent the best estimates of forecast inflation for the purpose of this draft decision. The RBA's statement on monetary policy examines a wide variety of objective data influencing inflation in both the domestic and international financial markets to develop its inflation forecast. The forecast is produced on a regular basis and is publicly available, including supporting analysis and reasoning.[19]

AER's approach was based on RBA and Australian Treasury's advice:

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18 NERA, *Bias in inflation – indexed CGS yields as a proxy for the CAMP risk-free rate,* March 2007; ACG, *Relative bias of inflation indexed CGS yields as a proxy for the CAMP risk-free rate,* July 2007.

19 AER, *Draft Decision - New South Wales distribution determination 2009-10 to 2013-14*, November 2008, p 228.

> Given inflation expectations have been firmly anchored by the Bank's inflation target regime for some time, a rough estimate of a real risk free rate would be the nominal government bond rate less the centre of the inflation target band.[20]
>
> We suggest that (when) working with nominal yields and where a real return is required, making an inflation adjustment based on the mid point of the RBA's 2 to 3 per cent range, is entirely reasonable. Since the independence of the Reserve Bank Board in conducting monetary policy was formalised in March 1966, annual inflation has averaged 2.5 per cent ….. We therefore recommend that the ACCC use the mid point of the RBA's target band for inflation.[21]

IPART has taken a different approach in its recent decisions. It has adjusted the market implied inflation from the Fisher equation downwards by a scarcity premium of 20 basis points. The scarcity premium reflects the divergence between the debt margin on nominal corporate bonds and the debt margin on real corporate bonds.[22]

Table 3.5 summarises the approaches taken by jurisdictional regulators to estimate forecast inflation.

Table 3.5 Estimating forecast inflation methods used by regulators

Regulator/year	Industry	Estimation approach	Forecast
AER (2008)	Draft electricity distribution	Adopted RBA's forecasts for two years and mid-point of RBA target point thereafter and then averaging individual year to derive a forecast of the same term as the nominal risk free rate	2.55%
AER (2008)	SPAusnet electricity transmission	As above	2.59%
ESC (2008)	Gas distribution	Used compound average of actual inflation over the five years prior to the start of the next access period	2.7%
IPART (2008)	CityRail	Fisher equation adjusted downwards by 20 basis points for scarcity premium	2.7%
IPART (2008)	Sydney Water Corp.	As above	3.6%
OTTER (2007)	Electricity distribution	Adopted RBA target inflation band of 2% to 3% and having regard to a range of inflation indicators	2.5%

20 RBA, *Letter to ACCC,* 9August 2007, p. 3 as quoted in IPART, *Review of Prices for Sydney Water Corporation's Water Sewerage, Stormwater and Other Services from 1 July 2008*, June 2008, pp 159-160.

21 Australian Treasury, *The Treasury Bond Yield as a Proxy for the CAPM Risk-free rate*, Letter to the ACCC, 7 August 2007, p 5 as quoted in IPART, *Review of Prices for Sydney Water Corporation's Water Sewerage, Stormwater and Other Services from 1 July 2008*, June 2008, p 160.

22 NERA, *Bias in inflation – indexed CGS yields as a proxy for the CAMP risk-free rate,* March 2007; ACG, *Relative bias of inflation indexed CGS yields as a proxy for the CAMP risk-free rate,* July 2007.

ESCOSA (2006), QCA (2006), ESC (2006), ICRC (2004)	Gas/electricity distribution	Fisher equation	2% to 3% range

Source: relevant decisions of AER, ESC, OTTER, QCA and ICRC.

The NSW Distribution Network Service Providers (DNSPs) in their recent submissions to AER on the 2008 electricity distribution review suggested a different approach. Rather than giving 100 per cent weight to RBA's forecast, they proposed that the regulator should consider the forecasts of different independent forecasters. The DNSPs noted that RBA's forecasts were the highest of all forecasters and concerns were raised that there may be a systematic upward bias in the RBA's estimates.[23]

3.3.1 ARTC's proposal

ARTC recognises the present bias in indexed bond yield and the risk in assuming that the 20 basis points (adjustment for the scarcity premium) will continue to be a reasonable estimate of the bias going forward. ARTC proposes to adopt AER's approach which estimates inflation based on RBA's forecasts for the next two years and the mid-point of the target range for inflation after that. This gives a forecast inflation of 2.73 per cent at that time, although RBA forecasts of inflation have fallen since this figure was calculated.[24]

3.3.2 IPART preliminary thinking

IPART has recently released a discussion paper outlining its thinking on forecast inflation.[25] This paper argues that maintaining a market based approach to adjusting for inflation expectations is appropriate. Using non-market data introduces a wedge between the assumptions underlying the estimate of the cost of capital and interest rates and hedging costs in the market.

The discussion paper outlines changes to IPART's methodology for estimating inflation. IPART proposes to use financial instruments other than government bonds to calculate a market based forecast of inflation. In particular, IPART's discussion paper considers the use of Australian inflation-indexed swaps to calculate an implied inflation curve.

The forecast inflation outcomes under the different approaches are shown in Table 3.6.

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23 Competition Economists Group, *Expected Inflation Estimation Methodology*, Report for Country Energy, April 2008, p 13.

24 ARTC, op. cit., 2008 p 29.

25 IPART, *Adjusting for expected inflation in deriving the cost of capital*, Analysis and Policy Development Discussion Paper, February 2009.

Table 3.6 Inflation outcomes from alternative methods

Method	Estimate (five year average)
Fisher equation based on CGS	1.71%
Fisher equation adjusted for scarcity premium	1.51%
RBA forecasts and mid-point of range	2.45%
Inflation based on indexed swaps	2.31%

Source: IPART calculations, 20 day average to 4th February 2009; Inflation based on indexed swaps as of 4th February 2009, RBA: based on forecasts for year to June 2010 and year to June 2011[26].

IPART seeks stakeholders' views on:

5 Are there other feasible market based methods to estimating forecast inflation?

6 Is it appropriate to use a non-market estimate of forecast inflation for calculating the rate of return?

4 Parameters determined by other methods

4.1 Market risk premium

The market risk premium (MRP) is the expected return over the risk free rate that investors would require for investing in a well diversified portfolio of risky assets. This generally represents the difference between the return on the market portfolio and the return on the risk-free rate ($R_m - Rf$). The MRP is one of the components used to determine the return on equity, which is given by the CAPM formula.

The CAPM formula is: $R_e = R_f + \beta_e \, x \, (R_m - R_f)$,

where:

R_e is the nominal post-tax cost of equity

R_f is the risk-free market rate

β_e is a measure of the correlation between a business's risk and that of the overall market

R_m is the market rate of return.

MRP is an expected return and is not directly observable. It therefore needs to be estimated through proxies. The most common approaches used include estimating

26 RBA, Statement of Monetary Policy, February 2009, p 65.

past actual MRP based on historical excess market return (ex-post), adopting the MRP from surveys of market practitioners or based on forecast of future cash flows (ex-ante).

Estimating the MRP based on historical averages involves several issues. These include:

- how long a time period should be used for estimating the premium
- whether to employ geometric or arithmetic averaging
- which market instrument to use as the measure of the risk-free rate, and
- how to measure the return to the market portfolio.

The appropriate length of estimation period is generally influenced by economic considerations. Longer term data series may be unrepresentative of expectations because of substantial changes in the market but they provide more precise estimates.

Shorter term data series, too may be unrepresentative because they only capture the present stage of business cycle. However, the shorter term data is more likely to be of higher quality as data sources improve over time, therefore providing a more accurate picture of investors' current and near future expectations. Most commonly, the minimum period used to provide estimates is 30 years.[27]

4.1.1 Australian historical MRP

In Australia, past empirical evidence has suggested a MRP range of 6 to 8 per cent reported in various studies and research as set out in Table 4.1.

Table 4.1 Historical MRP in Australia

Source	Period	Risk premium (%)
AGSM- Arithmetic average (including October 1987)	1974 to September 2000	6.2
AGSM- Arithmetic average (excluding October 1987)	1974 to September 2000	7.7
Dimson, Marsh and Staunton (2006)	1900 to 2005	7.8
Gray (2001)	1883 to 2000	7.3
Gray & Officer (2005)	1885 to 2004	7.2
Brailsford et al (2008)	1883 to 2005	6.2, 6.3[a], 6.5[b]

a: imputation credit valued at 50 cents in the dollar **b**: imputation credit at full value

Source: Deloitte Touche Tohmatsu, *Independent Expert Report to Woodside shareholders*, 19 December 2000; Dimson, Marsh & Staunton, *The World Wide Equity Premium: A Small Puzzle, AFA 2008 New Orleans Meetings Paper, EFA 2006 Zurich Meetings Paper*; S Gray, *Issues in Cost of Capital Estimation*, October 2001; S Gray and R R Officer, *A review of the market risk premium and commentary on two recent papers – a report for the Energy Networks Association*, 2005; Brailsford et al, *Re-examination of the historical equity risk premium in Australia,* Accounting and Finance, Vol. 48, Issue 1, 2008, pp. 73-97.

27 S Gray and R R Officer, *A review of the market risk premium and commentary on two recent papers – a report for the Energy Networks Association*, 2005, p 21.

It has been argued that the average market risk premium estimated over a long period of time provides the best estimate of what the market risk premium is likely to be in the future. However, estimates of the average market risk premium can be significantly affected by the choice of start and end dates for the analysis. This can create some difficulties in drawing conclusions about the future market risk premium from the historical data.

For example, major indices of Australian equity values have declined by about 50 per cent from their peak over the past 18 months. The average excess returns provided by the equity market in the past will be lower now than if the average excess returns were estimated 18 months ago. To the extent that a longer historical period provides a better indicator of the MRP, recent equity market changes should be factored into the estimate of the historical MRP, which would generate a lower MRP than the estimates presented in Table 4.1.

4.1.2 Other MRP measures

Other measures that are commonly used to estimate MRP include surveys of market practitioners and the cashflow-based Dividend Growth Model (DGM).

Surveys of market practitioners are often used as a 'cross-check' of reasonableness of MRP estimates by other means. The main difficulty generally involved in using surveys is the lack of replicability of outcomes and it requires careful considerations as to who to survey to avoid biases and how to weigh results of different surveys.

DGM is typically used to value stock by estimating the dividend cash flow of the stock growing at a constant rate in perpetuity. The MRP derived from DGM equals the expected market dividend yield plus expected market dividend growth minus risk free rate. The accuracy of the MRP estimated by DGM mainly depends on the quality of forecast parameters.

4.1.3 Recent regulatory decisions

IPART has used a market risk premium of 5.5 per cent to 6.5 per cent in its recent regulatory decisions on CityRail and Sydney Water Corporation. Other Australian regulators have also tended to use a market risk premium of about 6 per cent.[28]

4.1.4 ARTC's proposal

ARTC proposes a range of 6 to 7 per cent for MRP on the basis that:

- Estimates of MRP in Australia confirm that its value has remained well above 6 per cent.

[28] For instance, AER, Proposed Electricity transmission and distribution network service providers: Statement of the revised WACC parameters (transmission); Statement of regulatory intent on the revised WACC parameters (distribution), December 2008, p vi.

- Studies over various time periods have consistently produced estimates that range from 6 to 8 per cent.
- Analysis undertaken by its consultant (SEC) indicates that the long term average exceeds 7 per cent.

4.1.5 IPART preliminary thinking

IPART and other regulators make decisions on the market risk premium for many of its reviews. At each review it considers whether estimates of the MRP have changed, as well as estimates of the appropriate level of the MRP.

IPART has assessed the market risk premium to be between 5.5 per cent and 6.5 per cent in its recent regulatory decisions.

While ARTC argues that studies present evidence of a historical risk premium of between 6 per cent and 8 per cent, the recent fall in share values will have reduced backward looking estimates of the market risk premium. The impact of the recent fall in equity markets highlights the difficulties in using a backward looking estimate of the MRP, as the risk premium required by the market is unlikely to have fallen in current economic conditions.

IPART seeks comments on the following

7 Is there any reason for IPART to depart from its recent regulatory decisions to adopt a MRP of 5.5 per cent to 6.5 per cent?

4.2 Value of imputation credits (gamma)

Under Australia's dividend imputation system, domestic equity investors receive a tax credit (franking credit) for dividends paid out from after-tax company profit. The franking credit can be offset against the personal tax of equity investors and hence represents additional cash flow to these investors. The value of the imputation credit is represented by 'gamma' (γ).

The cost of capital was first adjusted by Officer to reflect the imputation credit.[29] The value of gamma is the product of two elements:

- the proportion of company tax paid distributed to shareholders as franking credits (distribution rate), and
- the value placed by an investor on one dollar of franking credits (utilisation rate or theta).

The distribution rate was found to be around 71 per cent (Hathaway and Officer 2004).

[29] R R Officer, *The Cost of Capital under an imputation tax system, Accounting and Finance*, 1994, pp 1-17.

A number of empirical studies using different methodologies to estimate the utilisation rate of imputation credits have been undertaken. The results from these studies are shown in Table 4.2.

Table 4.2 Empirical estimates of gamma utilisation rate

Study	Methodology	Value of franking credit	Gamma[a]
Hathaway & Offficer (2004)	Analysis of tax statistics	0.50	0.36
Cannavan, Finn & Gray (2004)	Inference from value of individual share futures (ISF) and low exercise price options (LEPO)	0.50 (pre 45-day rule)	0.36
		0.00 (post 45-day rule)	0.00
Bellamy & Gray (2004)	Dividend drop-off (adjusted), 1995-2002	0.00	0.00
Beggs and Skeels (2006)	Dividend drop-off (1987 – 2000)	0.57	0.41
Feuerherdt, Gray & Hall (2007)	Dividend drop-off, hybrid securities	0.00	0.00
Handley and Mahesawaran (2008)	Analysis of tax statistics	0.81	0.58

a Assumes a distribution rate of 71%.

Source: Hathaway and Officer, *The value of imputation tax credits – Updated 2004*, Capital Research Pty Ltd, November 2004, p 26; Cannavan, Finn and Gray, *The value of dividend imputation tax credits in Australia*, 73 Journal of Financial Economics, 2004, p 192.; Beggs and Skeels, *Market arbitrage of cash dividends and franking credits*, 82 The Economic Record 258, 2006, p 252; SFG, *The impact of franking credits on the cost of capital of Australian companies*, Report prepared for Envestra, Multinet and SP AustNet, October 2007, p 45; Feuerherdt, Gray & Hall, *The Value of Imputation Credits on Australian Hybrid Securities*, International Review of Finance, 2007, p 3; Handley and Mahesawaran, *A measure of the efficacy of the Australian imputation tax system*, The Economic Record, Vol. 84, No. 264, March, 2008, pp 82-94..

Dividend drop-off method

The dividend drop-off method is commonly used to empirically estimate theta. Essentially, the analysis compares the share price before dividend issue (cum div price) with the share price after the dividend issue (ex-div price). The difference in the prices (drop-off) represents the cash value of the dividend and the market value of imputation credit attached to the share.[30] It is widely held that this methodsuffers from statistical problem (multi-collinearity) which makes it difficult to separate the value of cash dividends from the value of imputation credits. As a result, it is difficult to obtain a reliable value for the individual coefficients.

Utilisation of franking credits inferred from derivatives

This methodology essentially compares the difference in the pricing of certain derivative securities and their underlying shares. The 2004 study undertaken by Cannavan et al suggested that equity investors place a very low value on imputation

[30] Beggs and Skeels, *Market arbitrage of cash dividends and franking credits*, 82 The Economic Record 258, 2006, p 258.

credit, in particular after the introduction of the 45-day holding period rule.[31] Compared with the dividend drop-off methodology it uses a larger number of observations for a given company and this tends to enhance the reliability of the results. Also, as derivatives trade well in advance of ex-dividend dates, prices are not contaminated by the activities of short term arbitrage traders. However, some finance experts argue that those trading in derivative instruments may not value imputation credit in the same way as the average investor under CAPM.[32]

Analysis of tax statistics

The utilisation of franking credit can also be estimated by examining ATO data on the redemption of franking credits by taxpayers. Studies that use tax statistics *directly* calculate the utilisation rate for all investors across the Australian market based on the proportion of credits redeemed by taxpayers. A recent study by Handley and Maheswaran estimated a utilisation rate of 81 per cent and 71 per cent over the periods 2001 – 2004 and 1990 – 2004 respectively.[33]

4.2.1 Gamma value adopted by Australian regulators

A majority of recent regulatory decisions in Australia have adopted a gamma of 0.50 as shown in Table 4.3.

Table 4.3 Gamma value adopted by jurisdictional regulators

Regulator	Sector	Gamma (final)
AER (2008)	Electricity transmission and distribution WACC review, explanatory statement	0.65
AER (2008)	Draft NSW Electricity Distribution	0.50[a]
IPART (2008)	CityRail	0.30 – 0.50
IPART (2008)	Sydney Water	0.30 – 0.50
ESC (2008)	Gas	0.50
ERA(2008)	WestNet (freight)	0.50
ESCOSA (2006)	Gas	0.48
QCA (2006)	Gas	0.50
ACCC (2008)	ARTC interstate rail network	0.50

a: the National Electricity Rules clause 6.5.3 deems the assumed gamma to be 0.5.

Source: relevant decisions of IPART, AER, ACCC, ESC, QCA, ESCOSA and ERA.

31 The Australian Taxation Office introduced the 45-day rule in 1997 to prevent short term trading in imputation credits. The rule requires an investor to hold a stock for at least 45 days prior to announcement of dividend by the company to qualify for the imputation credit.

32 Cannavan et al, op cit, 2004, pp 167-197.

33 Handley & Maheswaran, *A measure of the efficacy of the Australian imputation tax system,* 84 The Economic Record 264, 2008, p 90.

4.2.2 ARTC's proposal

Guided by recent empirical studies and analysis undertaken by its consultant, ARTC submits that it is appropriate to assume a value of zero for gamma on the basis of evidence including:

- Statistical problems in estimating a reliable gamma using the dividend drop-off methodology.
- The introduction of the 45-day rule introduced from July 1999 resulted in a major structural change that has impacted on the value of franking credits as found by recent studies (Bellamy & Gray, 2004, Cannavan, Finn and Gray, 2004, Feuerherdt, Gray & Hall, 2007).
- The influence of foreign investors is already recognised in all market determined parameters including the risk free rate, debt margin and the market risk premium. It is therefore inconsistent to assume a fully segmented market and ignore the presence of foreign investors in the Australian market (SEC disagrees with IPART[34] in that the Australian market is fully segregated and the marginal investor is therefore a domestic investor).[35]

The ACCC has previously reviewed the evidence presented by ARTC in support of its proposed value of gamma for its interstate rail network undertaking and decided on a gamma of 0.5.[36]

4.2.3 IPART preliminary thinking

The estimate of gamma proposed by ARTC would increase the WACC by between 1.3 per cent and 1.5 per cent, relative to the gamma used in recent IPART decisions. The value of gamma will therefore be an important determinant of the WACC.

IPART considers that there is strong merit in maintaining a consistent approach to the estimate of gamma across regulatory decisions. There is a presumption that unless an alternative approach to the calculation of gamma is demonstrated to be clearly superior, the existing approach by IPART should be preferred.

Recent evidence on gamma is mixed, with estimates from the two most recent studies being zero and 0.58, using very different methods.[37] The higher figure has received more weight by other regulators and IPART would tend to agree with this. As such, IPART's preliminary view is that there is not sufficient evidence to move away from an estimate of gamma of 0.3 to 0.5.

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34 IPART, op. cit., 2008, p 173.

35 ARTC, op. cit., 2008, pp 91-92.

36 ACCC, *Final Decision Australian Rail Track Corporation Access Undertaking – Interstate Rail Network*, July 2008, pp 164.

37 Feuerherdt, Gray & Hall, *The Value of Imputation Credits on Australian Hybrid Securities*, International Review of Finance, 2007, p 3; Handley and Mahesawaran, *A measure of the Efficacy of the Australian imputation tax system*, The Economic Record, Vol. 84, No. 264, March, 2008, pp 82-94.

IPART seeks comments on the following

8 Is there any reason for IPART to depart from its recent regulatory decisions to adopt a gamma value of 0.3 to 0.5?

4.3 Gearing

Gearing refers to the capital structure of an entity measured as the proportion of total assets that are funded by debt. Gearing is used to weigh the costs of debt and equity in estimating the WACC. Gearing is also used to determine the credit rating and debt premium and to re-lever asset betas into equity betas.

It is a common regulatory practice to benchmark a regulated business's capital structure by reference to gearing levels of businesses operating in similar industries rather than using the regulated business's actual capital structure. In doing this the regulator is aiming to approximate the optimal capital structure of the business.

US listed rail infrastructure companies provide one benchmark for ARTC, although they differ in many ways to ARTC. These companies comprise rail infrastructure operations, typically for freight, and many also offer transportation services. They operate in the US, Canada and Mexico. The most recent observed gearing level of US rail infrastructure companies are shown in Table 4.4.

Table 4.4 Gearing levels of North American rail operators

Firm/company	Description of operation	Capital Structure (gearing)
Burlington Northern Santa Fe Corp	Operates a railroad system in the US and Canada, including provision of infrastructure and transportation	46%
Canadian National Railway Company[a]	Operates rail infrastructure and operations in the US and Canada	-
Canadian Pacific Railway Limited[a]	International freight transportation company	-
CSX Corporation	International freight transportation company	49%
Genesee & Wyoming Inc.	Owns and operates regional freight railroads and provides rail services	39%
Kansas City Southern[a]	Operates rail freight services in the US and Mexico	49%
Norfolk Southern Corporation	Owns and operates rail track, rail services and a land corporation	41%
Union Pacific Corporation	Rail transportation provider	37%

[a] Gearing levels for some operators were not available as of January 2009, but should be available for IPART's Draft Report.

Source: ARTC, 2008, pp 98-99, Bloomburg, IPART calculations

US rail infrastructure companies had gearing levels of between 37 per cent and 49 per cent, as of January 2009. These gearing levels are above the historical averages for these firms, reflecting recent declines in equity values.

Australia regulators have used an assumed gearing level of 35 per cent to 60 per cent in rail access or firms in related industries (Table 4.5).

Table 4.5 Gearing level adopted by Australian regulators for rail and coal infrastructure

Decision	Regulator	Gearing (Debt/Debt+Equity)	Credit rating
ACCC (2008)	ARTC (interstate network)	50%	BBB
ERA (2008)	WestNet Rail (freight)	35%	BBB+
QCA (2005)	Queensland Rail	55%	BBB+
QCA (2005)	Dalrymple Bay Coal Terminal	60%	BBB+
IPART (2004)	Hunter Valley coal network	50% to 60%	BBB to BBB+

Source: ACCC; QCA; IPART; ERA

Generally, the capital structure of a firm is driven by the business risk of the firm and the cost of debt versus equity. Where the business risk of a firm is high, it is expected that the firm will carry less debt and vice versa. Accordingly, a coal network is expected to have a more stable cash flow than a rail network that carries general freight that may face more competition from other forms of transport. Arguably, a below rail service provider could sustain a more highly geared capital structure.

4.3.1 ARTC's proposal

ARTC proposes a capital structure range of 50 to 55 per cent.

The lower bound is set by reference to recent regulatory decisions and the average gearing of rail operators (48 per cent over the last five years). The upper bound is set at 55% which is based on ACCC's standard gearing assumption for regulated distribution and transmission businesses (60 per cent) adjusted downward to reflect the higher business risk faced by an access provider to a coal rail network relative to regulated energy network companies.[38]

ARTC notes that its higher business risk relative to energy transmission or distribution reflects an uncertain demand outlook for ARTC's services on the Hunter Valley Coal Network.[39]

[38] ARTC, op. cit., 2008, p 31.
[39] ARTC, op. cit., 2008, p 30.

4.3.2 IPART's preliminary thinking

IPART is considering two issues associated with the appropriate capital structure of the Hunter Valley Coal Network.

- What is the optimal capital structure given the substantial increase in debt premiums since the global financial crisis?
- What is the debt premium associated with different levels of gearing?

The global economy is currently going through a process of deleveraging, although this partly reflects the rise in gearing from lower market values for equity.[40] The global financial crisis has also led to substantial increases in the price of debt and reduced access to financial markets. These two factors may mean that the levels of gearing used as benchmarks by regulators will change over coming years.

IPART seeks comments on the following

9 What is the appropriate capital structure that should be adopted in the WACC calculation for the Hunter Valley Coal Network?

10 At what level of gearing could ARTC obtain a BBB+ credit rating for debt?

4.4 Equity beta

Under the CAPM, the systematic risk of an asset is measured by its 'beta' factor. In statistical terms, the beta factors reflect the extent to which future returns are expected to co-vary with the overall market. An equity beta of 1 means the equity in the asset has the same risk as the market whereas higher risk equity will have a beta greater than one.

A business entity's equity beta is determined by its 'business risk' and 'financial risk'. Business risk arises from the variability of the business's cash flow to the overall economic activity while financial risk refers to the debt level (or gearing) of the business. A higher debt level implies a higher equity beta.

Equity beta is used to estimate the equity return of a business by the CAPM formula:

$Re = Rf + \beta e \times (Rm - Rf)$.

If a firm is listed on a stock exchange, its equity beta can be estimated by analysing the movement of the firm's share price relative to that of the market. For a firm not listed on a stock exchange, the common approach to determine the firm's equity beta is to undertake the de/re-levering process based on observed equity beta of comparable firms that are listed on sharemarkets. As comparator firms have different gearing levels the observed equity betas needs to be de-geared to produce an asset beta. In essence, the asset beta removes the effect of financial risk from the

[40] Devlin, W. and H. McKay, "The macroeconomic implications of global deleveraging", Australian Treasury Economic Roundup, Issue 4, 2008, p 54.

systematic risk. The equity beta for the regulated firm is then estimated by re-gearing the asset beta by the benchmark gearing level chosen for the regulated firm. The process is undertaken through the Monkhouse formula:

$\beta e = \beta a + (\beta a - \beta d)*\{1- [Rd/(1+Rd)]*[t*(1-\gamma)\}*D/E$

Where:

βa = asset beta

βd = debt beta

Rd = the cost of debt capital

t = corporate tax rate

γ = gamma

D/E = value of debt/value of equity

The most recent equity betas of US rail infrastructure companies and operators, and their asset betas estimated by applying the Monkhouse formula with a zero debt beta are set out in Table 4.6. Asset betas of US rail companies tend to be between 0.4 and 0.6, with the Genesee & Wyoming rail company an outlier with an asset beta of 0.87.

Table 4.6 Equity and asset beta estimates of North American rail operators

Company	Equity beta	Gearing	Asset beta[a]
Burlington Northern Santa Fe Corp	0.78	0.46	0.42
Canadian National Railway Company	0.90	-	-
Canadian Pacific Railway Limited	1.17	-	-
CSX Corporation	1.00	0.49	0.51
Genesee & Wyoming Inc.	1.42	0.39	0.87
Kansas City Southern	1.39	0.49	0.71
Norfolk Southern Corporation	1.06	0.41	0.63
Union Pacific Corporation	0.91	0.37	0.58

a Asset beta = equity beta *equity/equity+debt.

Source: Bloomberg, IPART calculations.

Regulators also arrive at the value for the equity beta by assessing a number of other relevant issues including:

- risk relative to that of comparable listed companies and other regulated industries, both in Australia and overseas
- a first principles analysis of asset risk, including:
  - variability in revenues and covariability with economic activity
  - structure of regulation
  - operating leverage (the extent to which costs are fixed)

- submissions from the regulated firms and relevant stakeholders and
- previous regulatory decisions.

4.4.1 Recent regulatory decisions on rail access and other relevant sectors

Table 4.7 summarises recent regulatory decisions on rail made by Australian regulators.

Table 4.7 Recent regulatory decisions on asset beta

Regulator/year	Sector	Asset beta
ACCC (2008)	ARTC Interstate rail network	0.65
ERA (2008)	WestNet Rail (freight)	0.65
QCA (2008)	Queensland Rail	0.50
QCA (2005)	Dalrymple Bay Coal Terminal	0.50
IPART (2004)	Hunter Valley Coal Network	0.32 to 0.46

Source: Relevant decisions of ACCC, ERA and QCA.

4.4.2 ARTC's proposal

ARTC proposes an asset beta range of 0.50 to 0.60, based on an assessment of its systematic risk factors that impact on the asset beta (first principles analysis) and having regard to asset betas of a set of comparable companies (listed on sharemarkets) with similar business and risk profile as the ARTC and relevant regulatory decisions.

Its consultants' (Synergies Economic Consulting) first principles analysis concludes that:

- ARTC has high operating leverage (due to high fixed cost base) and hence high systematic risk.
- Demand for ARTC's service is closely intertwined with demand for coal, in particular thermal coal for export.
- ARTC is regulated by revenue cap which provides some revenue certainty for the term of regulatory period.
- ARTC possesses market power but regulation prevents it exercising this power.[41]

The lower bound of the asset beta range proposed by ARTC mirrors the recent QCA decision in relation to Queensland Rail's Central Queensland Coal Network while the upper bound is based on other rail regulatory decisions as well as estimates from listed coal and rail companies used in the analysis of comparable companies.[42]

41 ARTC, op. cit., 2008, pp 56-57.
42 ARTC, op. cit., 2008, p 4.

Based on the asset beta range of 0.50 to 0.60, and applying the Monkhouse formula, the corresponding equity beta proposed by ARTC is 0.99 to 1.32.[43]

4.4.3 IPART's preliminary thinking

IPART considers that the following issues could be important in determining the equity beta for the Hunter Valley Coal Network:

- the nature of regulation
- the extent of monopoly power
- asset betas of comparable companies and the spectrum of risk against which the asset should be considered
- the relationship between coal exports and Australian economic activity
- growth in the Hunter Valley Coal Network, and
- the debt beta.

The nature of regulation

IPART has considered the regulatory structures surrounding the Hunter Valley Coal Network. Currently, regulatory structures reflect a revenue cap for the rail infrastructure operators, combined with an unders and overs account that maintains returns below the revenue ceiling. The unders and overs account works to return revenue to users if more revenue is collected than allowed under the revenue ceiling and allows increased future revenue for the rail infrastructure operators if less revenue is collected than allowed by the revenue ceiling. The revenue ceiling incorporates actual operating costs, depreciation and a return on assets (the WACC).

The revenue ceiling does not operate across the entire Hunter Valley Coal Network asset base. Rather, it operates on a combinatorial basis, where:

> …for any Access Seeker, or group of Access Seekers, Access revenue must not exceed the Full Economic Costs of the Sectors which are required on a stand alone basis for the Access Seeker or group of Access Seekers.[44]

In theory, the revenue ceiling could be applied to individual sectors and individual access seekers. Currently, ARTC and RailCorp divide their sectors into 'constrained sectors', in which revenue is approaching the full economic costs and other sectors, in which revenue is well below the full economic cost. By the end of the 2007/08 financial year, about 80 per cent of ARTC's capital base was constrained. None of the sectors operated by RailCorp are constrained. The extent of ARTC's capital base that is constrained has risen over time (Figure 4.1).

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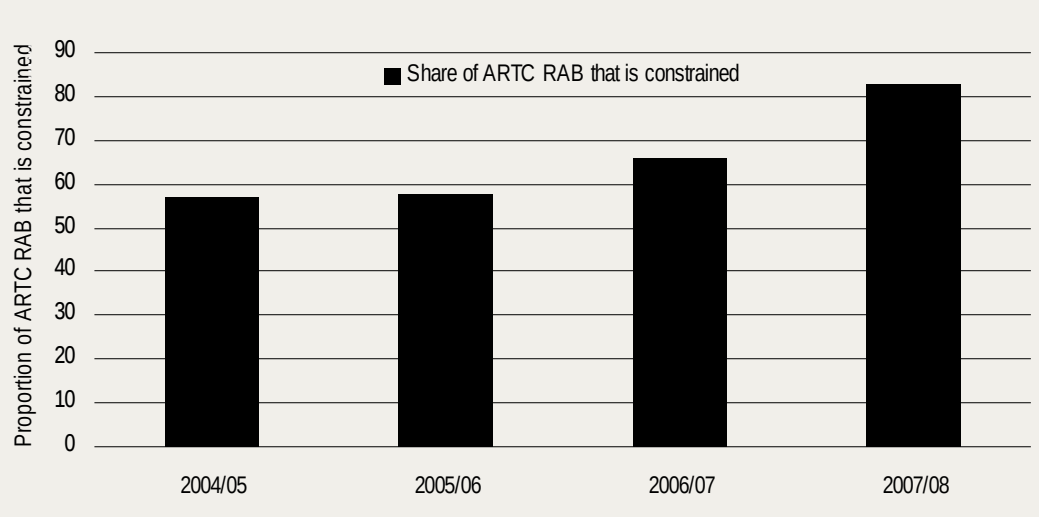
43 ARTC, op cit., 2008, p 8.

44 IPART, *NSW Rail Access Undertaking: Annual Review of Compliance, IPART Guidelines*, November 2006, p 2.

Figure 4.1 Share of ARTC regulated asset base that is constrained



Sources: ARTC submissions to IPART reviews.

The revenue cap operates to reduce the risk to the rail infrastructure operators. If demand is lower than expected, then this generates revenue below the ceiling, which can be added onto the amount of revenue collected next year. This removes risk as long as the rail infrastructure operators have sufficient monopoly power.

Extent of monopoly power

ARTC's submission notes that ARTC does hold monopoly power.[45] There are no substitutes for coal delivery for the Hunter Valley Coal Network.

ARTC does not have market power in all parts of its network. In some parts, the full economic costs are not being recovered (about 20 per cent of ARTC's capital base). In these sectors it would appear that ARTC does not have sufficient market power to recover its costs. Future investment is likely to be in areas where ARTC can recover its full economic costs and will therefore also be constrained.

RailCorp does not appear to have market power as it does not recover the full economic cost in any of the sectors that it operates.

Market power could be mitigated by competition from other coal mines outside of the Hunter Valley Coal Network, particularly for mines that are higher cost. The average price charged by ARTC is about $1 per tonne[46], compared to an average price of coal exported (fob) of over $70 per tonne.[47] This suggests that substantial changes in ARTC charges are small relative to the price of coal, limiting the extent to which competition from other coal mines could mitigate market power.

45 ARTC, op cit., 2008, p 41.

46 ARTC, Hunter Valley Regulatory Network: Roll forward of asset base, ceiling test and unders and overs account, Submission to IPART, January 2009.

47 ABARE, Australian Commodity Statistics, 2007, Tables 244 and 247.

The combination of market power across much of the network and a revenue cap is likely to mean that ARTC can recover its WACC with little systematic risk.

The ACCC allowed an asset beta for the ARTC of 0.65 for its interstate rail network.[48] In making its decision, the ACCC noted that ARTC operated with substantial inter-modal competition and priced well below its revenue ceiling on major segments. The ACCC noted that such an asset beta may not be appropriate for other regulated rail networks or even for ARTC's interstate network in the future.

The risk that does exist for ARTC and RailCorp is asymmetric. ARTC and RailCorp have little scope to recover more revenue than allowed under the revenue ceiling. They could recover less due to sectors that are not constrained and the possibility of asset stranding. These issues are discussed in greater detail in section 5.

Asset betas of comparable companies and the spectrum of risk

The asset betas of comparable companies can provide useful evidence of the risks facing ARTC. In using comparator analysis, it is important to note that there will always be differences between the comparators and the company being regulated. These can include differences in the businesses that they operate in and differences in regulatory structures.

In its submission, ARTC put forward asset betas from rail and coal companies as comparators for the Hunter Valley Coal Network. The asset betas of coal companies averaged 1.33, while the asset beta of rail companies averaged 0.83.

IPART is disinclined to place substantial weight on the analysis of comparable companies asset betas presented in ARTC's report. Coal companies may not be good comparators for ARTC. In addition, ARTC seems to have selected comparable companies using methods that result in an upward bias of the asset beta through:

- Excluding companies with equity beta estimates that had t-statistics of less than 2. The t-statistic measures how likely it is that the equity beta is different than zero. The higher the t-statistic, the more likely that the equity beta is greater than zero. By using this filter, SEC removed companies that tended to have low equity betas and hence asset betas. This biases upwards the estimate of the asset beta. A more appropriate filter would be to remove companies with a high standard error.
- Excluding companies that had equity beta estimates with low R-squared (below 0.1). R-squared, in this case, measures the amount of the variation in the company that is systematic. By using this filter, companies whose share prices are not well explained by systematic variation, which also tend to be those with low equity betas, are excluded. This biases upwards the estimate of the asset beta.

In discussing the comparator analysis presented by ARTC, IPART notes that ARTC did not rely heavily on the analysis of comparator companies.

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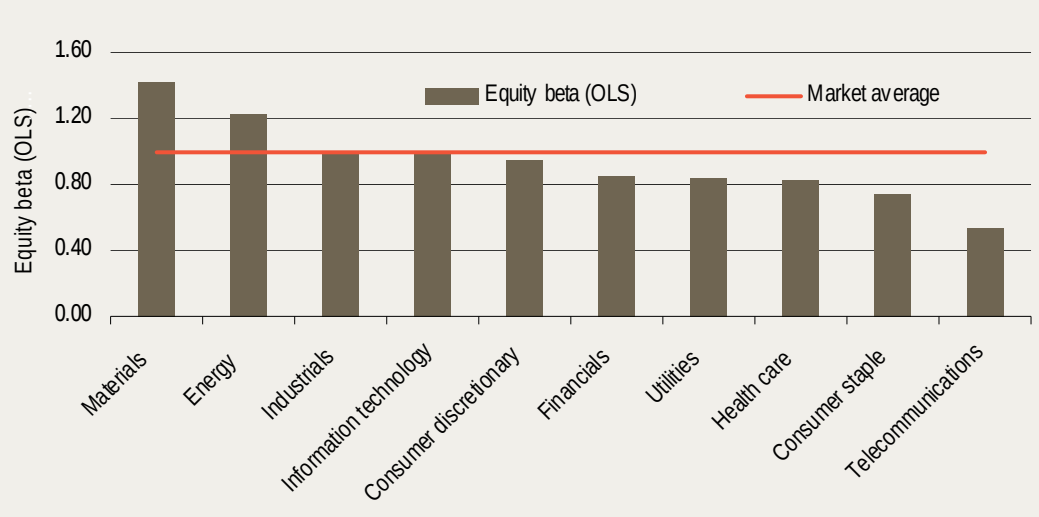
48 ACCC, *Final Decision, Access Undertaking – Interstate Rail Network, Australian Rail Track Corporation*, June 2008, p 155.

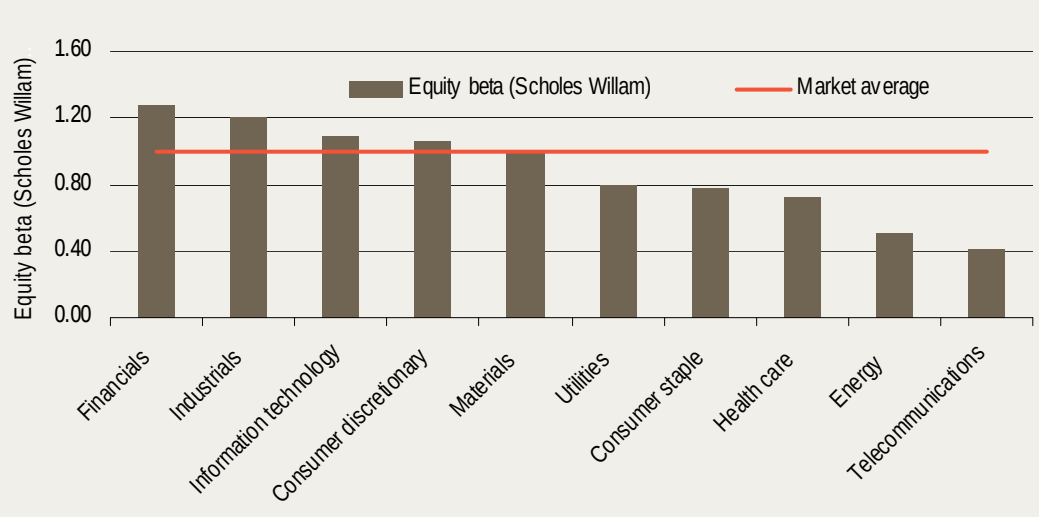
To put the asset beta and equity beta into perspective, IPART has assessed the spectrum of risk across the entire market based on equity beta estimates presented by the Centre for Research in Finance in Australia.[49] The sector with the lowest equity beta, telecommunications, has an estimated equity beta of about 0.4 to 0.5. This sector also has lower gearing than many other sectors in the Australian economy, resulting in an asset beta not much lower than this.

Figure 4.2 Sector equity betas (OLS estimation)



Source: Centre for Research in Finance, Risk Measurement Service, Australian Graduate School of Management, 2008.

Figure 4.3 Sector equity betas (Scholes Williams estimation)



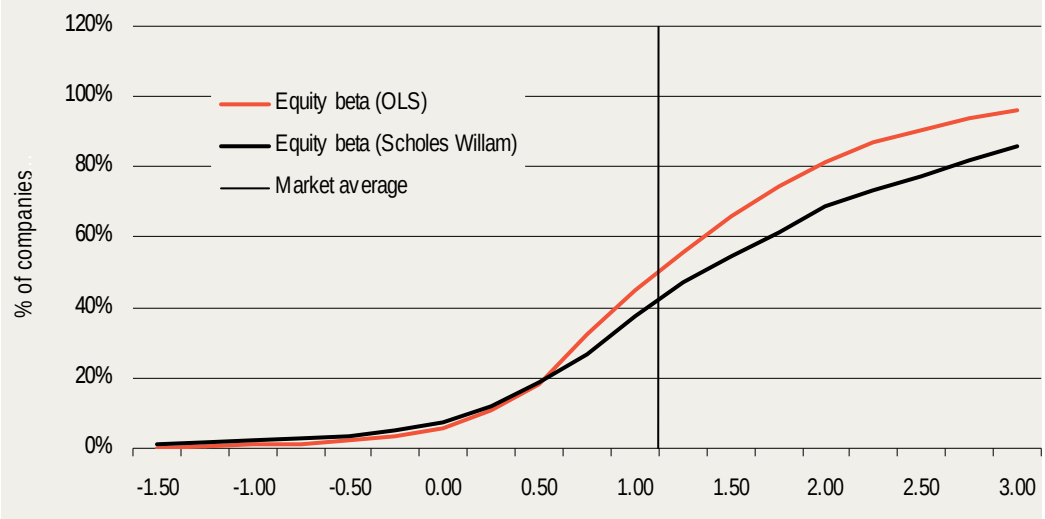
Source: Centre for Research in Finance, Risk Measurement Service, Australian Graduate School of Management, 2008.

[49] Centre for Research in Finance, Risk Measurement Service, Australian Graduate School of Management 2008.

The sectors are also broken up into smaller groups (not shown on chart), including transportation. The transportation sector has an estimated asset beta of 0.52.

The equity beta appropriate for the Hunter Valley Coal Network can also be benchmarked against the distribution of equity betas in Australia's share market. The cumulative distribution of equity betas based on the estimates from the Centre for Finance is shown in Figure 4.4. Estimates of equity beta are clustered around one (which is the market average). A quarter of companies have equity betas of less than 0.64 and a quarter of companies have equity betas greater than 1.78 (based on the ordinary least squares estimates of the equity beta).[50]

Figure 4.4 Cumulative distribution of equity betas of companies listed on the ASX



Source: Centre for Research in Finance (2008), Risk Measurement Service, Australian Graduate School of Management.

The average asset beta for Australian companies is currently about 0.7, as the market has lower gearing than typically used to benchmark regulated firms.

Coal exports and Australia's economic activity

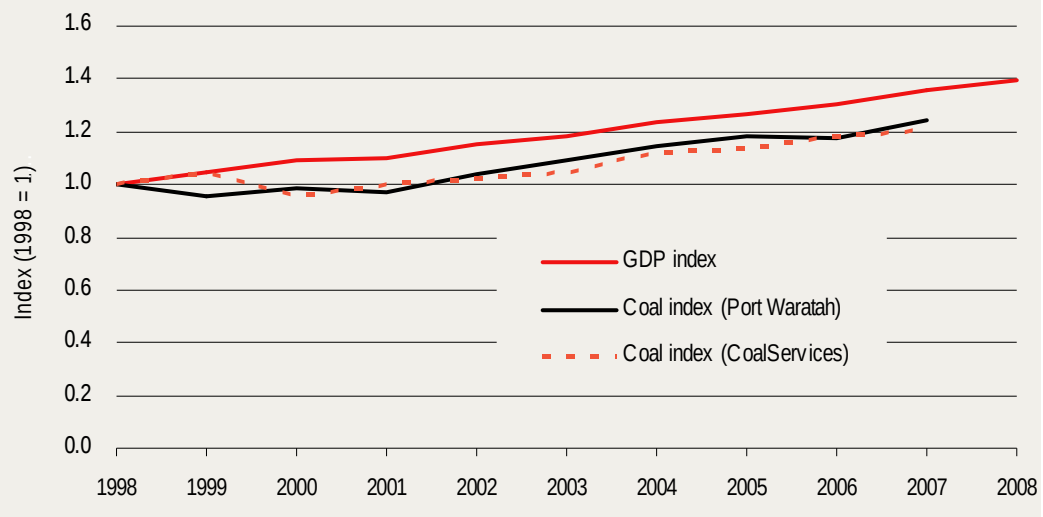
ARTC and RailCorp tend to operate through tonnage based prices. These prices are not necessarily constant. For instance, ARTC has, in the past, operated a cusp price system, whereby the first amounts of coal transported have a higher price. Once a threshold has been reached, such as a revenue threshold, then prices fall. This has the effect of reducing the volume risk to ARTC.

Nevertheless, a tonnage based price suggests that ARTC might be subject to risk through variability in coal export volumes. This is particularly the case if reductions in coal exports force some sectors of the rail network to become unconstrained or stranded.

50 The Scholes William method of estimating the equity beta is aimed at adjusting for thin trading.

Exports of coal from Port Waratah, which capture 80 per cent of the thermal coal throughput for the Hunter Valley Coal Network[51], have increased significantly since 1998, although by less than real GDP (Figure 4.5).[52]

Figure 4.5 Coal exports and GDP



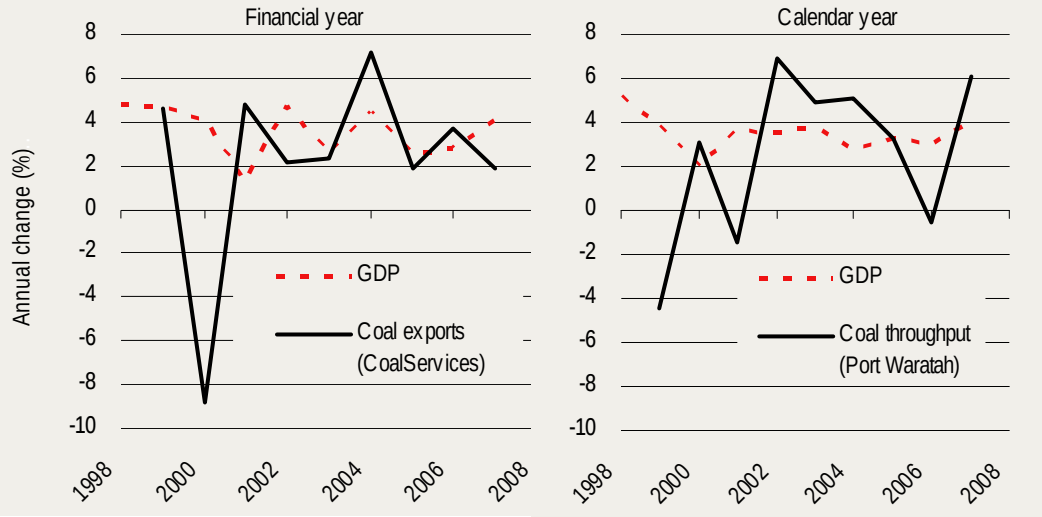
Source: ABS, Catalogue No. 5206.0, Australia's National Accounts: National Income, Expenditure and Product, Table 1; CoalServices Annual Report 2006/07 and earlier annual reports; Port Waratah Coal Services Annual Report 2007 and earlier annual reports.

It is very difficult to draw conclusions about the relationship between coal exports from Newcastle and economic growth, given the lack of variability in economic growth from 1999 to 2007 (Figure 4.6).

51 ARTC, op cit., p 39.

52 GDP is real GDP calculated as the trend for the ABS chain volume series.

Figure 4.6 Annual changes in coal exports and GDP



Source: ABS, Catalogue No. 5206.0, Australia's National Accounts: National Income, Expenditure and Product, Table 1; CoalServices Annual Report 2006/07 and earlier annual reports; Port Waratah Coal Services Annual Report 2007 and earlier annual reports.

Of more interest is the impact of recent economic events on coal throughput. The global financial crisis represents a substantial global economic shock, affecting Australia's main coal exports markets and Australia. Japan, which has absorbed 67 per cent of coal exports from Port Waratah[53], is forecast to face falling GDP in 2008 and 2009.[54] The spot price of thermal coal in US dollars (80 per cent of the throughput at Port Waratah is thermal coal[55]) has halved from its peak in 2008. [56] If the Hunter Valley Coal Network is likely to be subject to systematic risk, then the current set of circumstances would very likely reflect this.

So far in 2009, coal throughput at Port Waratah has not fallen. Annualised received volumes of coal at Port Waratah for January 2009 were 92.3 mtpa, compared to 91.3 mtpa in 2008.[57] Coal export volumes through Port Waratah did not fall through 2008. This suggests that volume risk for the Hunter Valley Coal Network may be low.

However, we are in the early stages of the real economy impacts from the global financial crisis. Coal throughput may be impacted with a lag. In addition, coal throughput may continue to grow, but at a different rate than that experienced in the past or factored into investment decisions.

53 Port Waratah Coal Services January 2009 end of month charts, accessed from web site: http://www.pwcs.com.au/pages/about/stats.php.

54 Australian Treasury, Updated Economic and Fiscal Outlook, January 2009, Part 3: Economic outlook.

55 Port Waratah Coal Services, Annual Report 2007, p 11.

56 Australian Treasury, Updated Economic and Fiscal Outlook, January 2009, Part 3: Economic outlook.

57 Port Waratah Coal Services, operating statistics, January 2009.

New investment and growth capex

ARTC argues that the extent of the investment program planned for the future increases its risk.[58] As it notes, the nature of regulation means that the investment program proposed by ARTC has little if any upside risk, but has unlimited downside risk if assets are stranded.

The size of ARTC's planned investment is substantial – approximately $1 billion for the 2008-2018 period.[59] ARTC notes that it would treble the size of the regulated asset base.[60] It also notes that the investment is to enable more marginal volumes in the Hunter Valley to be reached. ARTC's investment plans are largely driven by customer demand, with an expansion of coal mining in the Hunter Valley.[61]

IPART considers that the characteristics of ARTC's planned investment program are likely to increase its risk. It also agrees that these risks are largely asymmetric.

There are avenues that ARTC can use to minimise the extent of the risks from new investment. For example, longer term contracts may be used to guarantee revenue from new investments for a longer period.

IPART also notes that ARTC has managed to secure equity funding from the Australian Government in the context of its substantial forecast capital program.

Regulatory risk

In its proposal, ARTC notes that it is subject to regulatory risk as some costs may be incurred but not be considered efficient. ARTC has not had actual costs deemed inefficient in the past. There have been minor corrections to the allocation of ARTC's costs between constrained and unconstrained sectors.[62]

Nevertheless, there is the potential for actual costs or capital expenditure to be deemed inefficient. This is an asymmetric risk for ARTC. As such, IPART is of the preliminary view that it should be considered along with other asymmetric risks that ARTC faces.

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58 ARTC, op cit., pp 42-43.

59 ARTC proposal, Synergies consultancy report, December 2008, p 3.

60 ARTC, op cit., p 2.

61 Under the Rail Access Undertaking, ARTC is required to establish a consultation process with access seekers for capital expenditure. This process is reported to IPART. (For example, ARTC 2006-07 Capital Consultation: Hunter Valley Network, October 2002.)

62 CRAI, R*eview of compliance of compliance of ARTC with NSW Rail Access Undertaking ceiling tests 2004-05*, prepared for IPART, February 2007.

The debt beta

The debt beta measures the extent to which the market value of debt based on the Hunter Valley Coal Network is correlated with the market. The debt beta is used to deleverage the asset beta into an equity beta. The higher the debt beta for a given asset beta, the lower will be the corresponding equity beta.

Most regulators around the world assume a zero debt beta. This typically reflects the trivial impact that the debt beta has on the analysis rather than the view that the debt beta is actually zero. When the debt beta is used to construct asset betas from equity betas (such as through comparator analysis) and then used to translate the asset beta back into an equity beta, the debt beta assumption is trivial, as long as the gearing levels of the firms are similar.

Summary

IPART is of the initial view that the systematic risks facing ARTC may be smaller than represented in an asset beta of 0.5 to 0.6 as proposed by ARTC. But it does note that while ARTC's systematic risks may be lower, there may be asymmetric risks that need to be considered (see Section 5.1).

IPART seeks comments on the following

11 What is the appropriate asset beta that should be used to derive the equity beta for estimating the cost of equity for the Hunter Valley Coal Network?

12 Where does a rail operator with a revenue cap and mechanism for unders and overs sit within the spectrum of asset risks?

13 What has happened or is expected to happen to the amount of coal transported through the Hunter Valley Coal Network since the global financial crisis?

14 What is an appropriate equity beta to meet customer demands for new investment and enhanced service?

4.5 Tax rate

ARTC is regulated through a pre-tax real WACC. To calculate the pre-tax real WACC requires the use of a tax rate. Regulators can either choose:

- an effective (or actual) tax rate, or
- the statutory tax rate (30 per cent).

Differences between the effective and actual tax rates can reflect regulatory depreciation versus depreciation allowed for tax purposes and tax minimisation possibilities.

ARTC has proposed to use the statutory tax rate. IPART has typically used the statutory tax rate in its previous reviews. IPART's preliminary view is to maintain its current approach to the treatment of tax.

5 Additional issues for the WACC

There are a number of additional issues of relevance for this review.

- Asymmetric risk from stranded assets.
- Choosing the appropriate WACC within the range.
- Transition to the ACCC.

5.1 Asymmetric risk from stranded assets and regulatory risk

ARTC argued in its submission that the regulatory framework capped possible upside returns but does not limit downside returns. This reflects the risk of stranded assets, from which ARTC cannot recover any revenue. ARTC argues that these risks are particularly important because of the new investment in rail infrastructure in the Hunter Valley Coal Network.

Asset stranding could be an issue for ARTC, given the way that the regulatory regime operates. Extra revenues have to be returned to users, while revenue losses may not be able to be made-up if a sector is made redundant due to mine closure or becomes unconstrained. The rail access undertaking allows for the revenue ceiling to be calculated for each of the 32 sectors in the Hunter Valley Coal Network and for each individual access seeker or group of access seekers. An inability to recover costs in one sector or from one access seeker would therefore not be able to be made up through other sectors.

ARTC does have avenues available to it to reduce its risk of asset stranding or under-utilisation. Long-term contracts could be used to lock-in revenues, even within the regulated environment. Mines or rail operators can make capital contributions to the rail network. These could be used to alleviate the risk of underinvestment in specific assets that could result from issues of asset stranding.

ARTC may also face regulatory risk if costs are not deemed efficient. This is a downside risk for ARTC with no corresponding upside in the current regulatory framework.

In order to assess the magnitude of these asymmetric risks, information would be required on the likelihood of asset stranding or under-utilisation.

IPART also notes that asymmetric risks would not typically be considered in assessing the WACC. Instead, they may be accounted for in assessing expected

demand or expected revenues. The regulatory framework for the Hunter Valley Coal Network does not provide avenues for incorporating asymmetric risk through these mechanisms.

IPART seeks comments on the following

15 Should asymmetric risk be considered in choosing the WACC for the Hunter Valley Coal Network?

16 What is the likelihood of sectors being stranded or under-utilised?

17 Is there scope to use long-term contracts or other mechanisms to remove asymmetric risk?

5.2 Choosing within the range

Often regulators do not present a range for the WACC. When they do, they sometimes choose above the midpoint or below the midpoint of the range. IPART's recent decisions on the range and the point chosen within the range are shown in Table 5.1.

In 2004, IPART chose a WACC above the mid-point of the range for the Hunter Valley Coal Network. This reflected broad agreement between industry stakeholders that the appropriate rate of return was above the mid-point of the range in order to encourage new investment.

For its recent decisions, IPART has chosen a WACC (real pre-tax) below the midpoint of the range, reflecting its view that the debt premiums at the high end of the range do not represent the cost of debt for regulated companies.

Table 5.1 Recent regulatory decisions on the point within the range (real pre-tax)

Regulator/year	Sector	Range	Point
IPART (2008)	CityRail	6.5 – 9.7	7.2
IPART (2008)	Sydney Water Corporation	6.8 – 8.4	7.5
IPART (2004)	Hunter Valley Coal Network	5.5 – 8.0	7.3

Source: Relevant decisions of regulators.

5.2.1 ARTC proposal

ARTC has proposed that IPART considers the 75th percentile of the range. Its consultant's determined a real pre-tax range of between 8.84 and 10.53 per cent, and based on that analysis ARTC has proposed a rate of return of at least 10 per cent.[63] It argues for this based on:

- The costs of under-investment that result from setting a WACC that is too low are smaller than the costs of setting a WACC that is too high. This reflects the costs of discouraging efficient investment.
- The asymmetric risks faced by ARTC (which ARTC argues should be incorporated by choosing an equity beta from the upper bound of a reasonable range).
- This is consistent with previous regulatory decisions.

5.2.2 IPART's preliminary thinking

IPART has chosen WACC estimates at various points within the range in the past. These decisions have reflected:

- IPART's view on the likely values of the parameters within each range
- the costs of choosing a WACC that is too high versus choosing a WACC that is too low, and
- stakeholders' views in the appropriateness of various estimates of the WACC for new investment.

The same point within a range will not necessarily be chosen for each review. The point chosen will depend on the balance of evidence for the particular regulatory decision.

For this review, IPART will also consider whether the WACC should be chosen above the mid-point of the range to reflect the asymmetric risks facing ARTC, the inability to compensate for these risks through alternative regulatory adjustments and the future investment needs of the Hunter Valley Coal Network.

To assist it in deciding where in the range, IPART it is seeking the views of stakeholders in particular the users of the rail infrastructure provided by ARTC in the Hunter Valley. For the 2004 review, in making its decision on the appropriate rate of return of 7.3 per cent IPART placed considerable weight on the outcome of the public hearing where stakeholders indicated that the appropriate rate of return fell within the range of 7.1 to 7.5 per cent.

IPART seeks comments on the following

18 What is the WACC that is acceptable to stakeholders?

63 ARTC proposal, December 2008 p 3.

19 Are the costs of setting a WACC too low greater than setting a WACC too high taking into account ARTC's proposed capital program over the coming years?

5.3 Transition to the ACCC

As stakeholders will be aware, ARTC is currently drafting an undertaking for the ACCC's consideration which would replace the NSW Rail Access Undertaking. The exact timing of this transition to the ACCC is uncertain, but ARTC's intention is that the ACCC undertaking will be approved and become effective from 1 July 2009, replacing the application of the NSW Rail Access Undertaking to those parts of the Hunter Valley coal network for which ARTC is the Rail Infrastructure Owner.[64] Therefore, it is likely that IPART's rate of return and mine life decision from 1 July 2009 may be in effect for less than the full five years with respect to the ARTC sectors of the network. In this context it should be noted that ACCC has recently released its decision on ARTC's Interstate rail network.

6 Estimates of the WACC

In order to give stakeholders a guide to the possible WACC and the implications of possible methodological changes, IPART presents below the impact on the WACC proposed by ARTC of possible parameter changes. These are not decisions by IPART, but aim to allow stakeholders to consider their position on different issues of relevance for this review.

The impacts of particular parameter changes include:

- Updating the market parameters for the debt premium, nominal risk-free rate and the adjustment for expected inflation (using a scarcity premium approach[65]), the pre-tax real WACC range widens from the 8.8 per cent to 10.5 per cent range proposed by ARTC to 8.1 per cent to 11.1 per cent. This reflects a higher estimate of the real-risk free rate than proposed by ARTC, but a potentially lower debt premium.
- A higher gamma than that proposed by ARTC, of 0.5 to 0.3, reduces the WACC range to 6.9 per cent to 10.2 per cent.
- A lower market risk premium than that proposed by ARTC, of 5.5 per cent to 6.5 per cent, reduces the WACC range to 6.6 per cent to 9.8 per cent.
- A lower asset beta than that proposed by ARTC, of 0.4 to 0.5, reduces the WACC range to 5.9 per cent to 9.0 per cent.

In terms of impact on the WACC then, the key questions for stakeholder will include:

64 See ARTC's proposal, 2008, p 2.

65 For its draft and final decisions IPART may move to an approach based on indexed swaps, as discussed in section 3.

- the appropriate debt margin for the Hunter Valley Coal Network
- the appropriate method to calculate the adjustment for expected inflation
- the value of gamma
- the asset beta (and hence equity beta) for the Hunter Valley Coal Network, and
- the optimal level of gearing in the current economic environment.

Table 6.1 WACC under different parameters

Decision	ARTC proposal		…with updated market parameters and inflation		…with gamma of 0.5 to 0.3		…with MRP of 5.5% to 6.5%		…with lower asset beta	
	Low	High	Low	High	Low	High	Low	High	Low	High
Risk-free rate (%)	4.95	4.95	4.07	4.07	4.07	4.07	4.07	4.07	4.07	4.07
Implied real risk-free rate (%)	2.16	2.16	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52
Debt to total value (%)	50	55	50	55	50	55	50	55	50	55
Debt margin (%)	3.0	3.0	0.9	3.5	0.9	3.5	0.9	3.5	0.9	3.5
Debt raising costs (%)	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Market risk premium (%)	6.0	7.0	6.0	7.0	6.0	7.0	5.5	6.5	5.5	6.5
Gamma	0.00	0.00	0.00	0.00	0.50	0.30	0.50	0.30	0.50	0.30
Tax rate (%)	30	30	30	30	30	30	30	30	30	30
Asset beta	0.50	0.60	0.50	0.60	0.50	0.60	0.50	0.60	0.40	0.50
Debt beta	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equity beta	0.99	1.32	0.99	1.32	1.00	1.32	1.00	1.32	0.80	1.10
Cost of equity (nominal post-tax) (%)	10.88	14.17	10.02	13.29	10.05	13.32	9.55	12.66	8.45	11.23
Cost of equity (nominal pre-tax) (%)	15.55	20.24	14.32	18.99	11.82	16.87	11.23	16.03	9.94	14.22
Cost of debt (nominal pre-tax) (%)	8.08	8.08	5.11	7.69	5.11	7.69	5.11	7.69	5.11	7.69
Inflation (%)	2.73	2.73	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51
Pre-tax real WACC (%)	**8.84**	**10.53**	**8.08**	**11.09**	**6.85**	**10.15**	**6.56**	**9.78**	**5.92**	**8.98**
Difference from ARTC proposal (% pts)			-0.76	0.56	-1.99	-0.38	-2.28	-0.75	-2.92	-1.55

Note: Market parameters updated to 4th of February.

Source: IPART calculations; ARTC (2008).

7 The full list of questions for stakeholder comment