



Assessment of ARTC/Synergies proposals on the cost of capital

and Response to the IPART
Discussion Paper

Prepared for the NSW Minerals Council

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1 Introduction

The purpose of this paper is to comment on the proposals put by ARTC and Synergies regarding the appropriate cost of capital for ARTC's Hunter Valley Coal Network. It responds also to the Discussion Paper Issued by IPART in February 2009.

The following sections discuss in detail the proposals put forward by Synergies on behalf of ARTC and the issues raised by IPART. Section 2 discusses methodological considerations, Section 3 examines Synergies's proposed parameters and IPART's comments and Section 4 summarises our proposed recommendations regarding appropriate WACC parameters.

2 Methodological Considerations

2.1 WACC methodology and taxation

Synergies propose the use of a pre-tax real methodology, consistent with IPART's previous approach. This involves deriving an "Officer" post tax nominal cost of capital and applying the market transformation.

In the Discussion Paper, IPART has indicated that it proposes to continue using its previous approach and apply a pre-tax WACC and the statutory tax rate of 30%.

However, pre-tax transformations provide only an approximation of the taxation costs facing the business. Under a post tax nominal framework formulation the tax cashflows are modelled explicitly. The post tax nominal approach is used by the ACCC (including in its determination of ARTC's Interstate Rail Network Undertaking) and increasingly by other jurisdictional regulators. Commentators such as Charles River Associates (CRA) and the Allen Consulting Group (ACG) also advocate a post tax approach¹:

It is also the view of CRA that a post tax nominal rate of return is to be preferred, primarily because this develops a WACC that is consistent with the rates of return actually required by providers of capital.

In particular, under a pre-tax approach it is often assumed that the taxation rate of the regulated business is equal to the statutory corporate income tax rate. However as recognised by IPART, the issue of a statutory or effective tax rate is not integral to the decision of a post-tax or pre-tax WACC².

Given accelerated tax depreciation schedules, use of the statutory tax rate will over-estimate the tax burden in the presence of a significant capital expenditure program. Given the size of the capital expenditure program foreshadowed by ARTC, its effective tax rate is likely to be significantly lower than 30%.

We recommend that IPART adopt a post-tax approach to the WACC. This would be consistent with current regulatory practice in many jurisdictions, and in particular with the approach used for ARTC's Interstate Access Undertaking. However should IPART wish to maintain consistency with previous HVCN decisions by retaining a real pre-tax approach, it would be

¹ ERA, Sept 2008, Issues Paper: Determination of the Weighted Average Cost of Capital for The Pilbara Infrastructure's Railway from the Cloud Break Iron Ore Mine in the Pilbara to Port Headland.

² IPART, 2002, Weighted Average Cost of Capital Discussion Paper, p4.

important to use an appropriate effective tax rate. Otherwise the rate of return allowed to ARTC will be inconsistent with the returns allowed by the ACCC, and substantially above the level required by an efficient infrastructure provider.

2.2 Use of CAPM

In its discussion Paper, IPART asks

Should the global financial crisis change the way regulators estimate the WACC? If so, how should this be done? Should any adjustments be temporary?(Q1).

We support the use of CAPM as the most appropriate approach to assessing required equity returns, and do not believe that the financial crisis should change the methodology underlying the approach. However, the turbulence in financial markets may make key parameters, such as the level of the risk free rate and debt margins, more volatile.

This greater volatility means that more frequent assessment of the market parameters would be appropriate. For example, the market based parameters could be up-dated annually, as is done by ERA for the WA Rail Access Regime.

2.3 Asymmetric consequences of regulatory error

The statement by the Productivity Commission regarding the consequences of setting a cost of capital which is too low has been widely quoted by incumbent infrastructure providers. However, it is the case that over-investment is costly also. In a report to the ESC, NERA suggested that³:

...both under-investment and over-investment are costly, and it is not at all clear which is preferable. If over-investment gives rise to capacity that will not be utilised by reasonably anticipated future demand, the resources dedicated to overbuilding that asset could presumably have been better utilised elsewhere, eg, in the provision of alternative infrastructure services for which the consumer welfare associated with their provision may be equal or greater.

Synergies quote the example of QCA's review of the Dalrymple Bay Coal Terminal (DBCT) Access Undertaking in 2004/5 as supporting the choice of a point estimate from the upper bound of a reasonable range.

³ NERA, March 2004, Alternative Approaches to "light-handed regulation".

QCA was faced with considerable uncertainty regarding key WACC parameters, most notably the beta factor. DBCT is the only regulated 100% coal export port in Australia⁴, and there was considerable debate over the comparators suitable for generating a proxy beta⁵. Therefore QCA erred on the high side when choosing an estimate for beta. QCA did not bias the selection of other WACC parameters towards their upper bounds, which is altogether a more generous approach.

In this context we note also that many regulators, including the ACCC, ERA and the ESC determine an estimate of the cost of capital by reference to the most appropriate estimate of each parameter in preference to a range. For most, if not all, parameters we believe that a single point estimate is appropriate.

2.4 Stranding risk

2.4.1 Synergies's proposal

Synergies suggest that ARTC is subject to asset stranding risk which is not remunerated by CAPM. The stranding risk is said to arise because ARTC is about to commit to a major investment program and does not have certainty of revenue beyond the duration of the regulatory period.

The need for the additional capacity is being created by the development of new mines, which are some distance from the port. Synergies suggest that these new mines are more vulnerable to adverse changes in exchange rates because they face higher transport costs. This is said to give rise to a higher level of systematic risk and a greater risk that assets become stranded. Synergies propose that ARTC be compensated for the stranding risk by selecting a beta factor from the upper end of the range.

2.4.2 Response

The first point to make is that the ARTC's assumption about more remote mines closing first is not necessarily true as rail transport costs are a relatively small proportion of FOB costs and could be outweighed by other positive cost factors that might favour some mines over others (such as coal quality, stripping ratio, productivity and other operational factors).

⁴ QCA, April 2005, Final Decision: Dalrymple Bay Coal Terminal Draft Access Undertaking, p145

⁵ QCA, April 2005, Final Decision: Dalrymple Bay Coal Terminal Draft Access Undertaking, p149

However, if for the sake of argument we accept that there is some additional level of risk for new mines, then we need to consider whether this risk needs compensation additional to the standard WACC. In doing so a number of issues need to be addressed. This includes the nature of the risks: whether they are systematic, whether they are asymmetric and whether they are avoidable. Also relevant is their likelihood and potential significance.

CAPM assumes that an investor requires the risk free return available in the market, plus a premium for holding risky assets such as shares. The CAPM framework assumes that investors seek to avoid risks by holding a diversified portfolio of assets. In this way the specific risks associated with holding a particular share are diversified away. However investors cannot diversify away the component of risk that is correlated with overall market returns. This is termed systematic risk and is the only risk requiring remuneration under CAPM.

Nature of asymmetric risk

CAPM assumes that returns are normally distributed. However, if risks are asymmetric (and in particular suffer long “downwards tails”) then the requirements of the CAPM are breached and the estimate of beta will be biased. In addition, CAPM assumes that the cost of capital is applied to the expected value of costs and revenues, which means that the implication of asymmetric risk for the distribution of returns needs to be incorporated into the cashflows. A key question therefore is whether the risks are genuinely asymmetric.

It is not clear that the risks associated with the enhancement of the existing network faces a significant downward “tail” of possible outcomes. Cost under-runs as well as cost over-runs are possible in undertaking the investment, and stranding of the existing network is not especially likely given the density of traffic and inter-changeability of routes⁶.

Stranding risk and new mines

Synergies’s argument that the new mines will face a higher cost structure (due to transport costs) than existing mines is also mis-placed. Although thermal coal has lower margins than coking and PCI coal, at recent coal prices many of Hunter Valley mines have been quite profitable. Even with the significant escalation in mining costs during the past two years, there is scope for the mines to take a considerable price decrease before mine closures would be contemplated. Moreover Australian and Hunter Valley coal is good quality, is mined efficiently and uses efficient rail infrastructure. It is located close to many major Asian markets and is strongly competitive in world terms. In the event of a major downturn in demand for coal, Australia and the Hunter Valley are likely to be among the least affected.

⁶ IPART, April 1999, Aspects of the NSW Rail Access Regime: Final Report, p71

Moreover the production of coal in Australia, while occupying a large share of the world seaborne coal trade, is only a very small proportion, less than 5%, of world production. This means that provided Australia remains at the low end of the world cost curve then continued expansion can be expected.

The reserves to the west of the Hunter Valley are very substantial, and require very substantial investment by the mining companies to develop. By comparison, the amount of rail infrastructure required to support the mines is relatively small, and does not make a significant difference to the total cost of extracting the coal.

In addition, decisions to develop, or to continue to develop new mines are being made by the mining companies in full knowledge of the current global economic position. The downturn may mean that plans for more marginal mines will be shelved. This in itself makes it less likely that new mines will be closed down after they have been developed. The mining companies will be examining the economics of new mines very carefully, and ARTC will be able to probe its customers about mine prospects before committing to extension of the rail infrastructure. We understand that a reassessment of the capacity expansions of coal rail and port capacity in Queensland is already happening. Even if the downturn hits proposed projects and expansions, projects under development have so far survived with the fall in the A\$ partially offsetting the US\$ fall in prices.

In addition development decisions for large new mines are usually justified on an economic life of at least 20-25 years, which is less than the life assumed for HVCN infrastructure in IPART's 2005 determination (35 years) and similar to the 23 years as proposed by ARTC. This reinforces the fact that new mines will face strict investment criteria before they proceed, and decreases the likelihood of stranding once they are up and running (with the possibility of the assumed mine life subsequently being lengthened).

Furthermore ARTC has foreshadowed that all of the new infrastructure capacity will carry firm access contracts with terms of at least 15 years, which would serve to lower the risk of the infrastructure provider and help to offset the market risk of such investments.

It is also the case that the infrastructure provider could adopt a "real options" approach to the provision of new infrastructure to minimise risk. Real options analysis has developed as a robust methodology for planning in the face of uncertainty, and assists a service provider in minimising downside risks while maximising the potential for upside gain. Identifying risks and options, and identifying scope for investment in "readiness" options, can assist in keeping options for capacity enhancements open until there is greater certainty, with a rapid response to increased infrastructure requirements as the appropriate

conditions are met. Under a real options approach, the dichotomy shown in Figure 4 in Synergies's report would be managed adaptively, greatly reducing the risk of inappropriate investment.

Table 1 **Committed coal projects in NSW**

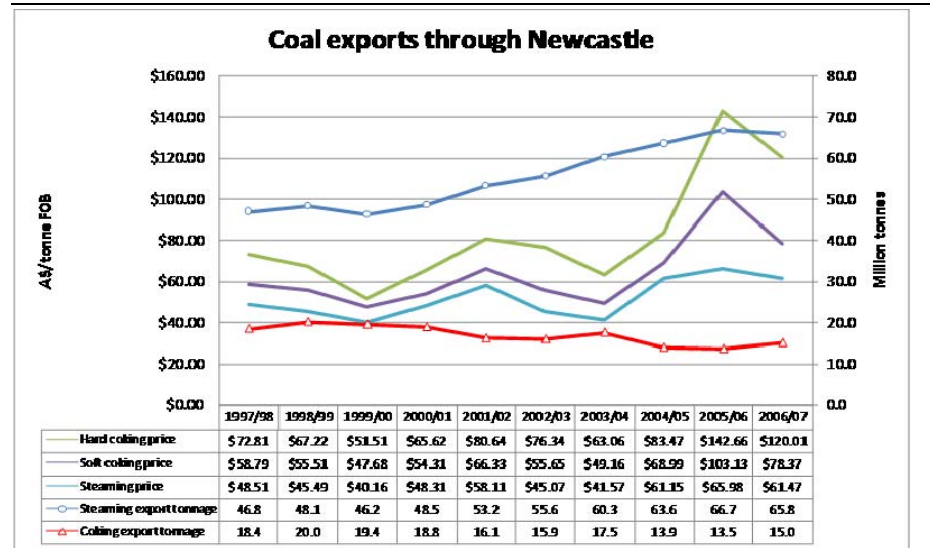
	Year of commencement	Expected production
2009	2009	3
2010	2010	14.7
2011	2011	29.5
2012	2012	5
2013	2013	8.5
2020	Beyond 2013	17.3
	Total	78

Data source: ABARE, October 2008, Major Australian minerals & energy development projects at http://www.abareconomics.com/publications_html/data/data/data.html

In October 2008, ABARE identified 15 projects with around 78mtpa of projects that are under construction or committed in NSW. The ABARE data is summarised in the above table and suggest a reasonably gradual ramp up of coal production. Moreover not all major potential new projects and expansions are on the ABARE list.

Exports of thermal and coking through the port of Newcastle over the past decade and the associated FOB export prices are shown in the following graph. The strong price increase since 2004/05 is clearly evident. However coking coal exports have gradually declined even with the high prices which suggest the presence of resource or infrastructure limitations or lack of market growth. Thermal coal export tonnage has been growing since 1999/00, well before the coal prices began to move upwards. Again the higher coal prices have not been matched by acceleration in the growth of exports, most likely due to rail and port infrastructure constraints.

Figure 1 Coal exports through Newcastle



Data source: DPI, 2008 New South Wales Coal Industry Profile.

This data does not support the claim made by Synergies that tonnage in NSW responds to price. It shows the opposite in fact, with tonnage growth in NSW being associated with market growth and infrastructure capacity additions.

Take or pay contracts and capital contributions

Importantly, stranding risk can be mitigated or avoided altogether by requiring capital contributions from new mines requesting extensions to the network and/or the agreement of long term take or pay contracts.

ARTC’s Draft HVAU proposes a 15 year minimum access contract term with a large Take or Pay (“TOP”) component of access prices covering ARTC’s new investment and other fixed costs. Under this contract ARTC is not obliged to commit to new capital investment projects unless it has contractual access commitments covering the extra capacity resulting from the capital investment. This lowers risk to ARTC because the contract term is longer than the five or less years of most access contracts under the current Undertaking, and there is a TOP component unlike the current contracts. Conversely, there is almost no enforceable obligation on ARTC to perform (i.e. to supply the capacity contracted or at the times contracted) under the proposed access contracts.

It is likely that capital contributions will be made by major new coal users of the Muswellbrook-Gunnedah line to support the major upgrading (Liverpool Ranges tunnel etc) needed for traffic to increase above the current 12-15Mtpa capacity.

Conclusion

In conclusion, we do not believe that the new investment faces significant risk of asset stranding. Transport costs make little difference to the viability of a mine, decisions to invest in new mines are being made on a rigorous basis and

in full knowledge of the current world outlook, the operation of the regulatory regime serves to protect ARTC's revenues and there are a number of actions that can, and are, being taken by ARTC to reduce its revenue risk.

2.4.3 Appropriate treatment within the regulatory regime

Arguments regarding the treatment of asymmetric risk, including stranding risks, have been considered by a number of regulators in different jurisdictions.

For example, in its 2004 Final Decision on NSW Electricity Distribution Pricing, IPART stated⁷:

The Tribunal has previously acknowledged that the CAPM is based on a number of assumptions that are unlikely to hold perfectly in the real world. It uses the model because it is generally recognised to be the best model currently available. However, it does not consider it theoretically correct to increase the equity beta within the CAPM based on the argument that the assumption of normally distributed returns is violated. It believes that if asymmetric risk represents a truncation of returns and consequently violates the CAPM assumption of normally distributed returns, a different model should be used. In the absence of a better model and sufficient evidence that asymmetric risk is the only risk that violates the assumption of normally distributed returns, the Tribunal considers it correct to account for these risks elsewhere in the building block model where necessary.

Self-insurance allowance

Consistent with that approach, a number of regulators have agreed that asymmetric or truncated returns can be adjusted for via the cash flows. The addition of a "self-insurance premium" to operating costs ensures that the WACC is applied to cashflows which reflect the true expected value of outcomes, as required by the CAPM.

Thus the ACCC, ESCOSA and QCA have all considered the incorporation of a self insurance premium to allow for asymmetric risks. However there are strict requirements for costs to be recognised as asymmetric. In particular, the regulated business needs to demonstrate that it has resolved to self-insure for the identified events, and will not make any future claims to recover the costs in the event of the adverse event occurring.

For example, in the SPI Powernet decision, the ACCC set out the following requirements⁸:

⁷ IPART, June 2004, 2004 Final Decision on NSW Electricity Distribution Pricing, p231

As a general matter, the Commission is required to apply an incentive based form of regulation under the code. After careful examination of the merits of self-insurance on efficiency grounds, the Commission has determined that the following matters must be established prior to considering a self-insurance application:

- *confirmation of the board resolution to self-insure;*
- *a report from an appropriately qualified insurance consultant that verifies the calculation of risks and corresponding insurance premiums;*
- *relevant self-insurance details that unequivocally set out the categories of risk the company has resolved to assume self-insurance for. This would need to clearly establish what the insured events and exclusions are so as to avoid any future debate as to whether or not an event was a self insured one and form the basis for actuarial assessment noted above;*
- *a regulated entity's resolution to self-insure would also be expected to explicitly acknowledge the assumed risks of self-insuring (i.e. in the event of future expenditure required as a result of an insurance event such costs would not be recoverable under the regulatory framework as the relevant premiums would have already been compensated for within the operating and maintenance element of the allowed MAR and funded by users, eg if a 1 in a 100 year event occurs in year 1 then the business will need to have the financial ability to restore assets out of own resources).*

Board resolution and corporate governance requirements are fundamental issues. Risk management strategy of an entity and approaches to events that could affect the overall risk profile of the entity are matters for Board consideration. This is important because it may require parent entity/ shareholder support to self-insure and/ or affect debt covenant requirements of lenders.

In both the SPI Powernet decision and its GasNet decision, the ACCC concluded that a number of claims for asymmetric risks were not justified when assessed on these criteria.

Other methods of compensation

More generally, it is important to ensure that the regulatory regime does not provide compensation for the asymmetric risk elsewhere.

ARTC recognises that the operation of the regulatory regime serves to protect its revenues for the duration of the regulatory period. However ARTC claims that it has revenue certainty only for the duration of the regulatory period and not beyond. In our view this is not the case. The rules for determining ceiling revenues are well defined and will continue to be so when regulatory

Roll forward of RAB and revenue ceiling

⁸ ACCC, Dec 2002, Decision: Victorian Transmission Network Revenue Caps 2003-2008, p78-9.

jurisdiction passes to the ACCC. Moreover, the ACCC has made it clear that it does not favour re-valuing existing assets⁹:

The ACCC strongly believes that revaluation should not normally be allowed under a DORC framework because periodic revaluation:

- *may not be necessary for the regulated firm to be fairly compensated over the life of its assets;*
- *may create unnecessary uncertainty for regulated firms and the users of regulated services;*
- *may encourage gaming of the regulator on revaluation estimates; and*
- *increases ongoing regulatory costs.*

The ACCC also made it clear that it considered the roll forward of the RAB by inflation and the additional of capital expenditure at actual cost created adequate incentives for investment¹⁰.

The presumption, therefore, is that ARTC's assets will not be written down should there be a future diminution in coal freight. In that event, ARTC would be able to raise prices to remaining customers in order to protect its revenues, in line with the rules on ceiling costs.

The operation of the under and over payments regime also serves to provide some revenue protection, as they enable revenue on a route to be averaged over time. Thus underpayments can be offset against overpayments which would otherwise be "truncated" by the revenue ceiling. In addition reductions in revenue from the scaling down or closure of a mine can in effect be recovered from other operators using that line segment.

The protection offered by the regime is evidenced by ARTC's ability to set access charges annually at a level to recover full economic costs, irrespective of changes in traffic levels, for the constrained network (i.e. for Zones 1 & 2 which carry 90-95% of current coal traffic) and its intention to do the same for the unconstrained network (i.e. Zone 3) when traffic levels from the coal fields to the west of the Hunter Valley increase, as coal producers and ARTC project they will to meet market growth. ARTC is further protected by the capacity of coal users to pay higher access charges in the event that traffic levels fall, even substantially.

Shorter depreciation lives

The then WA rail regulator IRAR considered the issue of stranding risk in its 2003 WACC determination for WNR. WNR suggested that stranded asset risk

⁹ ACCC, Apr 2008, Draft Decision Access Undertaking – Interstate Rail Network Australian Rail Track Corporation, p143

¹⁰ ACCC, Ibid, p140

arose given the long term nature of the investment in rail infrastructure. However, the Authority considered that the stranded asset risks identified by WNR were adequately protected through:

- *the Costing Principles where the Regulator has allowed WNR to calculate the annuity based on a shorter life where WNR can demonstrate that the economic life of an asset is dependent on the life of a specific business, such as a mine;*
- *the re-determination of the ceiling costs with the review of the GRV of the asset base every three years, which could also take account of changed asset lives in cases of potential asset stranding;*
- *the ability of WNR, if affected by asset stranding, to surrender the rail line (if it is not one of the main lines) under the terms of the Lease Agreement or receive compensation from the State Government to maintain the rail line in question; and*
- *the ability to minimise asset stranding through contractual agreements in access agreements.*

Taking all these factors into account, IRAR did not support WNR's request for an incremental increase to its WACC to reflect asymmetric risk (including stranding risk).

IPART and the Draft HVAU provide for 5 yearly determinations of remaining mine life. In previous decisions IPART has determined relatively short depreciation lives for the existing HVCN, allowing accelerated depreciation to be recovered in line with the expected life of mines rather than the economic lives of the rail assets involved. Any further stranding risk faced by ARTC would be substantially reduced by the shorter average remaining mine life which is proposed by Booz & Co (down from 30 years to 23 years) and the concomitantly higher depreciation rates that would result.

2.4.4 Recommendation

The above discussion suggests that the likely extent of stranding risk faced by ARTC is significantly less than that claimed by Synergies, particularly if ARTC applies an adaptive approach to the management of capacity.

The operation of the regulatory regime, and the capacity of coal miners to pay, serve to protect ARTC from the risk of reduced revenues. Moreover this protection does not cease at the end of the forthcoming regulatory period as claimed by Synergies.

Further, ARTC is able to mitigate any potential risk, through the requirement for capital contributions, the use of a depreciation profile that reflects the economic life of the mines on each segment and the proposed introduction of take to pay contracts. In the current economic climate any commitment to new mines is likely to be tempered, which will in itself serve to minimise the stranding risk.

The discussion also indicates that there is not any strong regulatory precedence for choosing an equity beta on the high side of the range to compensate for asymmetric risk. The preferred regulatory solution is to allow for asymmetric risk through the calculation of a self-insurance premium. However, as instituted by the ACCC in other determinations, this places strong requirements on the regulated business to show that the business has resolved to self-insure the identified events, and is prepared to cover the consequences of an event occurring. In this instance, it is far from clear whether and how ARTC would in fact bear the consequences of “self-insured” asset stranding since the operation of the regulatory regime would enable the ARTC to recover lost revenues from other operators on any given line segment.

3 Discussion of Synergies's proposed WACC parameters and issues raised by IPART

3.1 Risk free rate

Synergies proposal

Synergies propose that the nominal risk free rate be assessed as the average of implied returns on 10 year nominal Commonwealth government bonds over a 20 day averaging period. Using on a 20 day averaging period ending on 28th November 2008, the nominal risk free rate was assessed to be 4.95%.

Synergies argue that bias in indexed bond yields mean that they cannot be used to derive as estimate of the real free rate. Therefore Synergies adopts the approach used by the AER, which is to forecast inflation and then use the Fisher Equation to derive an estimate of the real risk free rate. The inflation forecast is based on an average of the RBA's forecasts for the next two years and the mid-point of the target range for inflation after that. The resulting forecast for inflation was 2.73%.

IPART discussion paper

In the Discussion Paper, IPART indicates that it is minded to continue to use its previous approach of using an average of 10 year nominal CGS yields to estimate the risk free rate, unless there is sufficient evidence of a better alternative.

Response

Synergies's proposal for assessing the nominal risk free rate is consistent with the approach used by the ACCC in its determination on ARTC's Interstate Access Undertaking, and that of other jurisdictional regulators. Updating to a 20 day averaging period ending on the 6th April 2009 would be 4.36%.

However in December 2008 the AER published its proposals for revised WACC parameters to be used in determining transmission and distribution prices/revenues¹¹. These proposals, and extensive explanatory statement, were developed jointly with the ACCC¹². The proposals were developed after extensive consultation and expert advisory input. They are particularly relevant for the ARTC given that the ACCC will ultimately become the regulator responsible for approving the ARTC's Hunter Valley Access Undertaking.

¹¹ AER, Dec 2008, Electricity transmission and distribution network service providers: statement of the revised WACC parameters (transmission): statement of regulatory intent on the revised WACC parameters.

¹² ACCC, April 2008, Draft Decision: Access Undertaking – Interstate Rail Network Australian Rail Track Corporation, p145

The AER concluded that Commonwealth Government Securities remain the appropriate proxy for the risk free rate. In particular, the AER rejected arguments regarding bias and found that arguments regarding the existence of a ‘convenience yield’ were questionable and not adequately supported by the evidence¹³.

Further, the AER proposes that the term to maturity assumptions used to assess the risk free rate and the cost of debt should match the length of the regulatory period. Thus AER proposes that Commonwealth Government Securities (CGS) with a 5 year term to maturity should be used to determine the risk free rate for electricity utilities, rather than 10 year securities. The AER considered that:

- The current 10 year term to maturity assumption will on average violate the ‘present value principle’ as it compensates regulated businesses for risks they do not face over the regulatory period. The empirical evidence indicates that the extent of over-compensation on the cost of debt has been around 40 basis points on average.
- A term of the risk free proxy which matches the length of the regulatory period (i.e. 5 years) better reflects the financing strategies of regulated energy network businesses.
- Rather than seeking long term debt as a matter of preference, a prudent financing strategy involves maintaining diversified debt portfolio with a range of maturities, so as to minimise refinancing risk.
- A forward-looking MRP of 6 per cent is consistent with a 5 year term assumption for the risk free rate.

IPART is required by the NSW Rail Access Undertaking to review the rate of return every five years¹⁴. This implies that the appropriate term to maturity assumption is 5 years. We note that the ARTC will apply to the ACCC for approval of its Hunter Valley Access Undertaking, in which case the HVAU may supersede the rate of return determined by IPART. It could be argued therefore that a shorter term period is appropriate.

ARTC’s draft HVAU proposes a ten year term for the access undertaking. However, ARTC will undertake a review of the undertaking after five years, and can apply to the ACCC for a variation at any stage. In addition, we note that although the ARTC Interstate Access Agreement has a ten year term, this

¹³ AER, Dec 2008, Electricity transmission and distribution network service providers: statement of the revised WACC parameters (transmission): statement of regulatory intent on the revised WACC parameters, p97

¹⁴ Section 2.1 of Schedule 3, NSW Rail Access Undertaking.

does not necessarily mean that the same term will meet with the ACCC's approval. The circumstances of the two railways are very different in terms of recovery of ceiling costs. For the Interstate Undertaking, ceiling costs are largely academic and hence the need for five yearly review of key parameters is less important. In addition, a longer period was favoured by customers of the interstate network, in order to facilitate investment planning.

IPART is determining the cost of capital appropriate for a five year period, and the HVAU, if approved by the ACCC, will include a five year review point. Accordingly the term of the regulatory period should be regarded as five years at most. The AER's concerns that using a longer period to estimate the risk free rate would over-compensate the ARTC indicate that basing the risk free rate on 5 year term yields is a better alternative to IPART's current approach of using 10 year yields. Using 5 year CGS averaged over a 20 day trading period to the 6th April 2009, the nominal risk free rate would be 3.80%.

Annual updating of time varying parameters

The risk free rate, and other time-varying parameters such as expected inflation and the debt margin, should be up-dated as close as possible to the time of IPART's decision. However, since these parameters vary continuously over time, they risk becoming increasingly out of date over the review period.

In the WA Access Regime, ERA updates its cost of capital estimate each year for these time varying parameters, with a full cost of capital review being undertaken every five years. We recommend that this approach of updating the market-based parameters be adopted by IPART, as it reduces the risk that the assessed cost of capital gets out of line with the market.

3.2 Inflation

Synergies proposal

Synergies propose estimating inflation using the approach developed by AER based on RBA forecasts for two years plus the mid-point of the RBA's target range thereafter.

IPART discussion paper

IPART proposes using a market based approach to estimate expected inflation, using Australian index-linked swaps to calculate an implied inflation curve.

Response

Synergies's proposals for estimating inflation and the risk free rate appear reasonable and are consistent with the approach currently adopted by the ACCC. The approach proposed by IPART also has merit, and would appear to provide estimates that are broadly consistent with Synergies proposals. We would not support the approaches which rely on comparison of nominal and index linked yields, given the bias that has been observed on index linked yields causing the Fisher equation to give biased results.

Estimated inflation (and the nominal risk free rate) will need to be updated using market data closer to the date of IPART's determination.

3.3 Capital structure (gearing)

Synergies proposal

Synergies has reviewed previous regulatory decisions on the appropriate benchmark capital structure and collected data on the capital structure for businesses in similar industries to ARTC. Synergies conclude that a range of between 50% and 60% is reasonable as a starting point, but recommends an upper bound of 55% because the business risks faced by a coal rail network is regarded as greater than that of an energy transmission company.

Response

As identified by IPART in its discussion paper, there are a number of relevant regulatory decisions on the appropriate benchmark level of gearing. There is the ACCC's final determination of ARTC's Interstate Access Undertaking (50%) and the ESC's 2006 determination of 50% for Pacific National. Also relevant is the recent draft decision for TPI's Pilbara railway, in which ERA suggested that 35% was an appropriate benchmark gearing level for a railway owner, consistent with ERA's previous decision for WestNet Rail¹⁵.

In its 2006 Determination of Queensland Rail's coal reference tariffs, the QCA accepted QR's proposal to maintain its existing capital structure of 55% debt and 45% equity. In its proposed access undertaking for 2009 (submitted in September 2008), QR considered that the assumption of 55% gearing remains an appropriate long term target¹⁶. This was despite QR forecasting a significant capital investment program.

It should be acknowledged that the scale of QR's investment program relative to the opening RAB is lower than that expected by ARTC. Thus QR is proposing capital expenditure over the next access undertaking period of some \$1 billion, compared to a proposed opening RAB of just under \$3 billion. However, the absolute scale of the investment program is similar to that proposed by the ARTC (\$1.15 billion).

Moreover, we note that the ESC previously rejected arguments that high levels of investment relative to the value of the RAB created additional risk for the Victorian regional water authorities. In particular, the rural water authorities were given an initial RAB of zero. Nonetheless, the same 60% gearing ratio was assumed for the rural business as was previously determined for the urban businesses, which had a combined opening RAB of some \$9 billion¹⁷.

¹⁵ ERA, Jan 2009, Draft Determination, Weighted Average Cost of Capital for The Pilbara Infrastructure's Railway from the Cloud Break Iron Ore Mine in the Pilbara to Port Hedland, p13

¹⁶ QR, Sep 2008, QR's Access Undertaking (2009) Vol 2, p72

¹⁷ See ESC, 20 June 2006 Media release, No 10/2006

The sample of rail firms over which an average capital structures was calculated by Synergies included a range of traffic types, including inter-modal freight, grain, bulk minerals and passengers. Railways serving intermodal freight are generally acknowledged to have a higher degree of systematic risk than bulk freight¹⁸, and hence might be expected to have a lower level of gearing.

The above discussion suggests that 50 to 60% provides a reasonable range for the benchmark level of gearing, (with ERA's use of 35% being something of an outlier). We consider that the most relevant comparator to ARTC's Hunter Valley coal network is QR's coal network, which suggests a point estimate of 55% as the most appropriate gearing level. This is consistent with IPART's previously recommended range of 50% to 60%. However given current capital market conditions, we would endorse moving to the bottom of Synergies's proposed range (ie 50%) to provide an appropriately conservative gearing benchmark. At that level of gearing NSWMC would expect ARTC to obtain a BBB+ credit rating for debt.”

3.4 Cost of equity

3.4.1 Systematic risk and beta

Synergies propose using the Monkhouse approach to de-lever and re-lever equity betas. As noted by Synergies, this approach has been consistently applied by the ACCC and was used recently by IPART. We agree that the Monkhouse approach is appropriate.

Synergies discuss the difficulty of estimating an appropriate debt beta. Synergies note that regulators, including the ACCC and IPART, adopt a debt beta of zero.

We agree that a debt beta of zero is a reasonable central assumption. However, commentators including Synergies have noted the importance of consistency in the debt assumptions used to de-lever and re-lever equity betas. Thus Synergies stated¹⁹:

..the debt beta is not considered an issue provided the same estimate is used in the de-levering and re-levering process.

¹⁸ ACG, Oct 2007, Railways (Access) Code 2000: Weighted Average Cost of Capital: 2008 WACC Determinations, p28

¹⁹ Synergies, Oct 2008, The Pilbara Infrastructure Pty Ltd: Review of the Weighted Average Cost of Capital, p20.

This means that evidence on equity betas from QR's coal network needs to be interpreted in the light of the debt beta of 0.12 assumed for QR's coal network business.

3.5 Equity beta

3.5.1 Synergies proposals

Synergies discuss a number of influences on a firm's degree of systematic risk in its First Principles analysis. Synergies then use a set of comparator companies to derive a range for the asset beta appropriate for ARTC's coal network. Synergies also highlight the statistical imprecision involved in estimating beta and repeats its view that the consequences of under-estimating the cost of capital are more severe than the consequences of over-estimation.

Synergies propose a range for asset beta of 0.5 to 0.6. The lower bound is superficially consistent with the QCA's 2005 decision for QR's coal network. However as discussed below, the QCA decision incorporated a positive debt beta and so in fact was equivalent to an asset beta of 0.44. Moreover the QCA decision was an upper bound rather than a lower bound.

Synergies proposed upper bound is within the range of asset beta estimates they found for other listed (US) rail firms. However these other rail businesses are likely to have higher systematic risk than ARTC as they serve intermodal markets.

In support of a beta above the lower bound, Synergies suggest that the size of ARTC's investment program relative to its existing RAB increases risk that is not remunerated elsewhere, and that ARTC should be afforded some compensation for stranding risk. Synergies also suggest that an upper bound beta takes regard of the asymmetric consequences of error in choosing the appropriate WACC, in that under-investment are said to carry greater consequences than over-investment.

The Discussion Paper (page 33) states that IPART also considers that the characteristics of ARTC's planned investment program are likely to increase risk and that these risks are asymmetric. IPART also has a preliminary view that there is asymmetric risk for ARTC from the potential for actual costs or capital expenditure to be deemed inefficient (regulatory risk).

3.5.2 Response

Regulatory precedent

We agree with Synergies that past regulatory decisions provide useful guidance on the appropriate range for the asset beta. Table 2 summarises the beta factors determined for rail in recent determinations.

Table 2 Recent rail regulatory decisions on beta factors

Regulator	Decision	Date	Asset beta
IPART	Hunter Valley Coal Network	May 2005	0.32 to 0.46
QCA	Queensland Rail Coal reference tariffs	Dec 2005	0.5, debt beta of 0.12
ESC	Victorian Rail Access Regime	May 2006 (Draft April 2006)	0.50 for PN
ERA	Freight and urban networks	June 2008	0.65 for freight
ACCC	ARTC Interstate Access Undertaking	July 2008	0.65

IPART

IPART previously adopted an equity beta in the range 0.70 to 1.0 for its 2005 determination, equivalent to an asset beta of 0.32 to 0.46²⁰. This was based on the range for equity beta determined by IPART in its 1999 determination of a WACC for the RAC network²¹. We understand from the ARTC's Explanatory Guide to the draft ARTC Hunter Valley Access Undertaking that the final WACC was based on an asset beta of 0.44²².

QCA

As identified by Synergies, QCA's December 2005 determination on the cost of capital for QR's coal network provides a particularly relevant precedent for ARTC's Hunter Valley network. QR originally proposed an asset beta of 0.60 using a portfolio of Australian coal firms to proxy QRs below rail operations. However, QCA argued that Australian coal companies are not appropriate comparators for benchmarking beta, as their explanatory factors for systematic risk are fundamentally different. QCA argued that operating leverage, form of regulation and contractual arrangements were the most relevant factors in assessing QR's beta factor²³.

On behalf of QCA, consultants ACG were asked to derive an estimated equity beta and examined 32 listed companies from the rail, coal, energy and transport sectors to assess their comparability to QR. ACG suggested that QR's equity beta was likely to lie between the Port of Taurunga's "pre-bubble" average equity beta of about 0.60, and the equity beta of the average Australian electricity network (0.90). Within this range, QCA determined a beta factor of 0.80, based on an asset beta of 0.45 and gearing of 55%.

Following extensive debates over appropriate comparators, and the degree of systematic risk facing QR, QCA accepted that it was arguable that QR should have the same asset beta (0.5) as had been adopted for the Dalrymple Bay Coal

²⁰ IPART, May 2005, Op cit, p20.

²¹ IPART, April 1999, Op cit, p60

²² ARTC, July 2008, 2008 ARTC Hunter Valley Access Undertaking Explanatory Guide, p51.

²³ QCA, Dec 2005, Decision: QR's 2005 Draft Access Undertaking, p16

Terminal as they were part of the same coal supply chain. QCA considered that the DBCT faced a higher asset stranding risk than QR, but that this was offset by the regulatory arrangements and lower operational gearing.

As indicated above, an asset beta of 0.5 derived for QR must be levered for ARTC using consistent assumptions for the debt beta. Using a debt beta of 0.12 and our preferred assumptions would give an equity beta of 0.91. Combining an asset beta of 0.44 with a debt beta of 0 would likewise give an equity beta of 0.91, indicating an element of consistency between IPART and QCA assumptions on equity beta.

It should also be noted that the QCA regarded an asset beta of 0.50 (equivalent to an asset beta of 0.44 for ARTC) as an upper bound. In selecting an asset beta at the upper bound, QCA was responding to stakeholder concerns about the need to provide incentives for the significant investment program envisaged, concern about the uncertainty involved in estimating beta factors and the risk of asset stranding. Given this, it is not clear why a further margin is required to allow for such issues for ARTC.

ERA and ACCC for ARTC's
Interstate Undertaking

The asset betas determined for WestNet Rail and ARTC's Interstate Undertaking are higher at 0.65. However these are much less relevant as comparators for ARTC's Hunter Valley network because freight networks serving intermodal traffic are subject to higher levels of systematic risk than railways carrying bulk commodities such as coal.

For example, in the Draft Determination for the WA rail freight network, ERA proposed adjusting the asset beta range downwards to reflect the lower systematic risk of the freight network's bulk minerals and grain business compared to intermodal traffic²⁴. Similarly, QCA commented that the ARTC's interstate network is likely to have greater systematic risk than QR's coal network as it is largely involved with domestic freight operations²⁵.

Synergies's rail sample

The same problem applies to the average beta derived by Synergies for a sample of rail companies. Indeed, when advising ERA on an appropriate asset beta for WestNet Rail, ACG cautioned an asset beta derived from US rail comparators may overstate the asset beta appropriate for WestNet Rail²⁶:

The reason for this is that the comparator businesses would have a greater proportion of revenues derived from intermodal (container) traffic, which would generally be expected to have higher levels of non-diversifiable risk (and higher

²⁴ ERA, June 2008, 2008 Weighted Average Cost of Capital for the Freight (WestNet Rail) and Urban (Public Transport Authority Railway) Networks, Final Determination, p25

²⁵ QCA, Dec 2005, Op cit, p30

²⁶ ACG, Oct 2007, Op cit, p28

beta values) than the freight rail system, which as a greater proportion of revenues from bulk transport of grain and mineral products. However, no relevant comparator businesses have been identified that have a greater proportion of revenues from bulk commodity traffic.

Such caution is even more apposite for ARTC's Hunter Valley network, given that most of the revenues are derived from the freighting of coal.

Contractual and regulatory arrangements

In assessing the extent of systematic risk, a crucial aspect is the extent to which variations in freight volumes translate into variations in network revenues. The presence of significant take-or-pay contracts will reduce the extent of systematic risk, as will a regulatory regime that provides security of revenue to the infrastructure provider.

For example, in setting an equity beta for WGAR, the passenger rail service provider, the then rail regulator ORAR determined a low asset beta on the grounds that the network had low systematic risk because government contracts largely mitigated WGAR's price, cost and volumes risk²⁷.

Similarly for QR, the QCA argued that the take-or-pay arrangements and volume triggers provided revenue protection for QR²⁸. The introduction of take-or-pay contracts by ARTC will similarly reduce the extent to which the HCVN is vulnerable to revenue fluctuations that correlate with the market. QCA also suggested that the regulatory arrangements for HVCN did not mitigate the higher systematic risk of the network. However, the regime does in fact provide significant revenue protection to ARTC – as ARTC acknowledge.²⁹ ARTC's revenue is protected against access pricing risk because it is able to set access charges for each mine each year to recover its estimated full economic costs on the constrained network and the operation of the overs and unders account ensures that occurs in practice.

Given Australian coal's low cost base, we do not believe the industry will suffer major mine closures in advance of exhaustion of reserves. Moreover, the operation of the access regime provides ARTC with assurances that the costs will be shared between the remaining operators in the event of mine closures. The introduction of take-or-pay contracts provides ARTC with additional revenue security. In this context, it is relevant that most of the take-or-pay contracts being negotiated by the ARTC will be evergreen, life-of-mine contracts with a minimum term of 15 years which will extend well beyond the

²⁷ ORAR, July 2003, Weighted average cost of capital to apply to Westnet rail and The Western Australian Government Railways Commission, p13

²⁸ QCA, Dec 2005, Op cit, p33

²⁹ ARTC, July 2008, Op cit, p45

10 year term of the Undertaking, further increasing the revenue protection afforded to the ARTC.

Selection of beta

Synergies argue that beta should be set towards the high end of the range to reflect the risk ARTC faces given its significant investment program. As indicated above, we do not find the arguments put forward by Synergies and IPART that investment in new mines creates significant asymmetric risk to be convincing. Similarly we consider that Synergies' and IPART's arguments regarding the scale of the investment program relative to the regulatory asset value are unconvincing also. In the case of the Victorian rural water companies, the initial RAV was set to zero – so that new investment was infinitely greater in scale – yet this was not seen as influencing the degree of asymmetric risk.

Moreover the ARTC has a range of options open to it to mitigate its demand risk, including take-or-pay contracts and customer capital contributions, and reduced depreciation lives where the economic life of a line segment is reduced due to planned closures. In addition, the ARTC's proposal does not provide any guarantee that the ARTC and not customers would bear the cost should self-insured events arise.

Finally, we note IPART's argument that ARTC faces the regulatory risk of having capital expenditures disallowed and that this risk is asymmetric. While regulatory risk has been raised by a number of regulated network industries, regulators have rarely recognised this as a source of asymmetric risk requiring compensation in the WACC.

Conclusion

The beta factor of 0.44 determined by IPART for the HVCN remains a relevant benchmark for the ARTC's existing network. The equity beta implied by IPART's determination is consistent with that determined by QCA for QR's rail network, which we regard as an appropriate comparator by virtue of the nature of the traffic and the size of anticipated investment program.

In a study for ERA, Allens Consulting Group concluded that precedent from other regulatory decisions, from the ACCC's 2002 ARTC determination, QCA's 2006 approval of QR's access undertaking and the ESC's 2006 determination for the Victorian Rail Access Regime (VRAR), suggested asset betas in the range 0.35 to 0.50 for rail businesses servicing bulk commodity freight³⁰. We consider that such a range remains appropriate for the HVCN.

³⁰ ACG, Oct 2007, Op cit, p31

3.6 Market risk premium

3.6.1 Synergies proposal

Synergies suggest that the key difficulty in estimating the market risk premium (MRP) arises from it being an expectation and therefore not directly observable. Synergies begin by examining whether the MRP has changed over time, and refute the argument made in some of the literature that the market risk premium for Australia is declining.

Synergies then examine both survey data and studies of historical averages of the market risk premium for evidence of the appropriate risk premium for Australia. While acknowledging that surveys have the advantage of being forward looking, Synergies found the available survey evidence of limited usefulness.

In examining the historical studies, Synergies address a number of estimation issues. These include the time horizon over which estimates are made and the importance of utilising a longer time period, the choice of arithmetic or geometric averaging and the extent to which deviations from the mean are persistent. Synergies cite a number of studies that have sought to estimate the historical MRP, and suggest that the results for Australia have tended to fall within a range 6 to 8%. Synergies also conclude that the long-run MRP has been at least 6.8%. Synergies could find no empirical evidence to support the suggestion that the MRP will fall in future, and concluded that 6% to 7% constituted a reasonable range for the MRP.

3.6.2 Response

Table 3 shows that other regulators have consistently supported the use of a market risk premium of 6% in previous rail decisions.

Table 3 Recent rail regulatory decisions on the market risk premium

Regulator	Decision	Date	Market risk premium
IPART	Hunter Valley Coal Network	May 2005	5.5 to 6.5%
QCA	Queensland Rail Coal reference tariffs	Dec 2005	6%
ESC	Victorian Rail Access Regime	May 2006 (Draft April 2006)	6%
ERA	Freight and urban networks	June 2008	6%
ACCC	ARTC Interstate Access Undertaking	July 2008	6%

Moreover, a number of recent regulatory decisions have confirmed the 6% assumption.

ACCC

ARTC's June 2008 proposed Interstate Access Undertaking proposed a market risk premium of 6.5%, based on historical studies and expert opinion from Synergies. In its determination, the ACCC cited a number of considerations in retaining its assumption of a 6% premium³¹:

- While historical return studies do suggest higher returns, a 2008 Australian study suggested previous studies were biased upwards due to errors in the dividend data used
- UK authors Dimson, Marsh and Staunton suggest that past market risk premia need to be adjusted downwards for unanticipated cash flow growth and unanticipated declines in business and investment risk
- Studies of Australian financial market practitioners involved in capital budgeting show they commonly use 6% per annum as a market risk premium for investment valuations.

The ACCC's rejection of Synergies argument for a higher risk premium in the context of ARTC's 2008 Access Undertaking is very relevant and supports the continued use of a 6% premium.

ERA

In its 2008 determination of a WACC for the rail freight and passenger networks, ERA noted that there is a long-standing difference of opinion between regulators and regulated businesses³²:

- Regulators have previously determined the market risk premium on the basis of both observed historical equity premia achieved in the market and a range of information on current and future expectations of equity premia. Typically regulators have adopted a premium of 6%.
- Regulated business have tended to argue that the premium should be assessed solely on the basis of observed historical equity premia, recommending values of between 5 and 8 per cent but favouring values greater than 6%.

ERA considered that there has been no marked change in the historical evidence since the late 1990s, validating the continued use of a 6% market risk premium.

QCA

In its initial access proposal, QR proposed a market risk premium of 7%. However, QCA argued that the 7% premium was based on a single estimate, and that the weight of empirical evidence suggested a 6% estimate at most³³.

³¹ ACCC, July 2008, Final Decision ARTC Access Undertaking – Interstate Rail Network, p157

³² ERA, June 2008, Op cit, p21.

³³ QCA, Dec 2005, Op cit, p13

ESC

The ESC likewise noted that additional evidence presented to a previous electricity distribution price review had been mixed, but the totality of information supported the continued use of 6% for the market risk premium³⁴.

IPART

In its 2005 report, IPART acknowledged the uncertainty associated with historical studies of the market risk premium. The Tribunal determined a range of 5.5 to 6.5 per cent having regard to evidence from long term historical market risk premium studies³⁵.

In its 2009 discussion paper IPART noted that the recent fall in equity markets is likely to have reduced the size of the market risk premium, and sought comment on whether it should depart from the range of 5.5 to 6.5 that it previously adopted for the market risk premium.

AER

In its December 2008 proposals on the cost of capital, the AER used three different measures to estimate the MRP³⁶. The AER recognised that each measure has its own strengths and weaknesses, so that rather than placing weight on any particular sole measure, the AER had regard to all, tempered by an understating of the strengths and weaknesses of each.

The first method considered historical estimates, grossed up for imputation credits. The AER recommended a term for the risk free rate that matches the term of the regulatory period (five years), so that consistency suggests that historical excess returns should be measured relative to 5 year CGS yields. However, the AER found that historical returns relative to 5 year CGS are not at present statistically significant. Therefore the AER proposed that historical estimates should continue to be estimated relative to 10 year CGS, but interpreted with the understanding that these estimates may underestimate historical estimates relative to 5 year CGS by approximately 20 basis points (based on the results of Officer and Bishop³⁷).

The AER found that historical excess returns fell within the range 6.1 to 6.7%, with some more recent estimates below this range. The historical averages were based on an arithmetic average, which may bias upwards the estimate of the expected market premium³⁸. The averages were also grossed up market for the value of imputation credits distributed at an assumed utilisation rate of 0.65. The AER considered a range of estimation periods to be relevant, 1883-

³⁴ ESC, April 2006, April 2006 Victorian Rail Access Regime: Proposed Rail Access Arrangements – Draft Decision, p154

³⁵ IPART, May 2005, Op cit, p16

³⁶ AER, Dec 2008, Op cit, p9

³⁷ B. Officer and S. Bishop, Aug 2008, Market risk premium – A review paper.

³⁸ AER, Dec 2008, Op cit, p157

2008, 1937-2008 and 1958-2008, all of which meet Synergies's criteria of being long term.

However the AER noted a number of reasons why historical estimates are more likely to overstate forward looking expectations of the MRP than to understate it³⁹. These included:

- Brailsford et al identify a number of data quality issues with the pre-1958 data that the authors consider likely to bias up estimates using data from this period. This means the above estimates over the 1883-onwards and 1937 onwards periods are more likely to overstate, than understate, a forward-looking MRP
- the use of historical equity returns will bias upwards the return on the CAPM market portfolio, which includes all assets in the economy and is not limited to equities. This means that the above estimates for any period are more likely to overstate, than understate, a forward looking MRP, and
- these estimates include several significant and positive one-off or unexpected events that are unlikely to be repeated. That means historical estimates over the periods considered are more likely to overstate, than understate, a forward looking MRP.

Surveys of market practitioners are also used to estimate the MRP. The AER considered that survey measures have the benefit of being forward looking and may better reflect prevailing conditions in the market for funds compared to long term historical averages. The AER found that a MRP of 6 per cent is by far the most common value adopted by market practitioners⁴⁰.

Cash flow based measures of the MRP generally use a dividend discount model. The AER found that cash flow measures that have been explicitly grossed up to include the value of imputation credits generally supported a MRP of around or below 6%. However the AER found such measures to be sensitive to the forecast assumptions used. While they provided a useful "cross-check", the AER considered they should be used with caution.

Taking into account all three measures, the AER did not consider that there was sufficient persuasive evidence to justify a departure from the previously adopted assumption of 6% for the MRP.

Recommendation

There is a heavy weight of regulatory precedent in favour of a 6% market risk premium. The ACCC has previously considered and rejected ARTC's arguments for a higher MRP, and the extensive analysis undertaken by the

³⁹ AER, Ibid, p179

⁴⁰ AER, Ibid, p178

AER supports continued use of a 6% MRP. The AER's assessment was made in the light of the financial crisis: accordingly we believe that a 6% MRP is appropriate for ARTC's HVCN, and that Synergies proposed range of 6% to 7% serves to overstate the MRP.

3.7 Gamma

3.7.1 Synergies proposal

Synergies contend that the value of gamma has fallen significantly, with zero being the best estimate available.

Synergies argue that the marginal investor is foreign. The introduction of the 45-day rule prevents foreign investors from benefiting from franking credits. Accordingly Synergies contend that franking credits will not be accorded a value in the pricing of shares. Synergies cite studies by Cannavan, Finn and Gray⁴¹, Feuerherdt, Gray and Hall⁴² and Gray and Hall⁴³ as providing empirical support for this proposition.

Synergies review a number of empirical "dividend drop-off" studies to derive an empirical estimate of the value of gamma. The results of these studies varied, with some studies finding that franking credits had some value, but others concluding the value was zero.

Synergies identify a number of methodological issues with the studies –most significant being multi-collinearity between the value of cash dividends and franking credits and the inclusion of data from the period prior to the introduction of the 45-day rule (which would produce an upward bias in results. Synergies cite Cannavan, Finn and Gray⁴⁴ as using an arguably more robust methodology than dividend drop-off studies. This study concluded that since the introduction of the 45-day rule, franking credits are of no value to the marginal investor.

To circumvent these methodological problems, Synergies undertook a simple non parametric paired test on a sample of stocks offering franked and unfranked dividends. Synergies conclude that there is insufficient evidence to

⁴¹ D. Cannavan, F. Finn and S. Gray (2004), "The Valuation of Dividend Imputation Tax Credits in Australia", *Journal of Financial Economics*.

⁴² Feuerherdt, Gray and Hall (2007), "The Value of Imputation Tax Credits on Australian Hybrid Securities", forthcoming publication in the *International Review of Finance*.

⁴³ S. Gray and J. Hall (2006), "The Relationship Between Franking Credits and the Market Risk Premium", Unpublished Working Paper, University of Queensland.

⁴⁴ D. Cannavan, F. Finn and S. Gray (2004), *Op cit*.

reject the hypothesis that franking credits are worthless, so that gamma should be set to zero.

3.7.2 IPART's discussion paper

In its discussion paper, IPART identifies the importance of the assumption on gamma, and notes that ARTC's proposal would have a significant effect on the assessed WACC. IPART's preliminary view is that there is not enough evidence to depart from IPART's previous assumption, given the importance of regulatory consistency.

3.7.3 Regulatory precedent

Regulatory precedent

Table 4 shows that previous rail regulatory decisions on gamma strongly support a gamma of 0.5.

Table 4 Recent rail regulatory decisions on gamma

Regulator	Decision	Date	Gamma
IPART	Hunter Valley Coal Network	May 2005	0.3 to 0.5
QCA	Queensland Rail Coal reference tariffs	Dec 2005	0.5
ESC	Victorian Rail Access Regime	May 2006 (Draft April 2006)	0.5
ERA	Freight and urban networks	June 2008	0.5
ACCC	ARTC Interstate Access Undertaking	July 2008	0.5

Gamma is often assessed using the Monkhouse approach, whereby gamma is defined as the product of the payout ratio and the utilisation ratio (termed theta) where:

- The credit payout ratio is defined as the face value of imputation credits distributed by the firm as a proportion of the face value of imputation credits generated.
- Theta is defined as the value of distributed imputation credits to investors as a proportion of their face value.

ACCC determination for ARTC

In the ARTC's Explanatory Guide to the 2007 Interstate Undertaking, the ARTC presented arguments on gamma similar to the above to the ACCC, based on advice from Synergies. Namely:

a value for gamma of zero, recognising that since the introduction of the 45-day rule, franking credits are now worthless to the marginal foreign investor (noting that under the vanilla WACC formulation, this will be reflected in the cash flows rather than the WACC);

In response the ACCC looked at evidence on the payout ratio and the utilisation rate⁴⁵. The payout ratio for the eight largest listed firms in Australia (including Rio Tinto and BHP Billiton) was 1, while a previous Australian study found an average payout ratio of 0.7. On the utilisation rate the ACCC argued that the CAPM used by Australian regulators is a domestic CAPM model, with all investors being resident domestic investors. Therefore the utilisation rate was assumed to be 1, with gamma in the range 0.7 to 1. The ACCC concluded that a value of 0.5 conservatively favours regulated firms and should ensure future investment is adequately remunerated.

IPART

IPART's previous decision for the HCVN likewise took the view that the marginal investor in Australian equities is domestic, and assigned a value to gamma in the range 0.3 to 0.5⁴⁶.

QCA

In its 2006 decision, QCA rejected QR's proposal for a gamma of 0.05. QCA argued that the low benefits attributed to foreign investors should not be attributed within the context of a domestic CAPM model, and that an international CAPM would in all probability result in a lower cost of capital than that proposed by QCA⁴⁷.

ERA

In its draft determination on the cost of capital appropriate to TPI's Pilbara railway, ERA commented that⁴⁸:

Australian regulators are faced with varying and conflicting theory and evidence on the value of franking credits. Evidence on the value of the imputation factor (including the impact of changes in taxation law on this value) supports gamma values anywhere in the range of zero to one.

ERA concluded that, given the current state of the debate on the value of dividend imputation, that it was appropriate to continue apply a gamma of 0.5.

3.7.4 2008 AER proposals

Dividend payout ratio

The AER began by considering the conceptual basis of gamma. The AER noted that under the Monkhouse approach of multiplying a payout ratio with the utilisation rate, it is implicit that retained imputation credits are not valued by investors. Expert evidence by Handley argued that this approach is inconsistent with the standard approach to valuation and the Officer WACC

⁴⁵ ACCC, July 2008, Op cit, p161

⁴⁶ IPART, May 2005, Op cit, p19

⁴⁷ QCA, Dec 2005, Op cit, p15

⁴⁸ ERA, Jan 2009, Op cit

framework⁴⁹. The AER concluded that gamma should be defined as the value of imputation credits created by the payment of corporate tax. This implies a payout ratio of 1.0 for the purposes of estimating gamma⁵⁰.

Utilisation rate (theta)

In assessing theta, the AER addressed the issue of the identity of the marginal investor. The AER proposed a conceptual framework of a domestic market of assets with foreign investors recognised to the extent they invest domestically. This conceptual framework recognises the realities implicit in domestic market data, and ensures consistency with the other WACC parameters. Consistent with this framework, the AER proposed that the value of imputation credits be based on a weighted average valuation of all investors in the market, where the weights are based on the wealth invested in the domestic market portfolio⁵¹.

When estimating theta, the AER considered that the data used should be representative of the current imputation tax regime - ie post-2000 data only given that the July 2000 tax changes allowed a full rebate of unused credits.

In reviewing the most cited empirical studies, the AER placed considerable weight on the Beggs and Skeels (2006) study⁵² which derived an estimate of theta of 0.57 from market prices. The results of the most recent SFG (2008) study⁵³ were given limited weight since the reliability of the results cannot be verified given the absence of statistical test results. The results of the 2004 Hathaway and Officer⁵⁴ study were likewise not granted any weight given the lack of statistical diagnostics and the fact that the key estimate of 0.5 was derived using data that referred to an earlier tax regime. The AER concluded that 2004 Cannavan, Finn and Gray study was not relevant as it covered a period prior to the current imputation tax regime. In addition the results of this study appeared to be inconsistent with other market based evidence, possibly due to clientele effects⁵⁵.

The AER also examined the evidence on theta from tax statistics. The AER considered that 2008 study by Handley and Maheswaran provided a reasonable estimate of theta from tax statistics in the post-2000 period of 0.74, with a reasonable range of 0.67 to 0.81. The study was seen to have a sound

⁴⁹ J. Handley, Nov 2008, A note on the valuation of imputation credits, Report prepared for the Australian Energy Regulator, Final, 12 November 2008(d), p.5.

⁵⁰ AER, Dec 2008, Op cit, p298

⁵¹ AER, Ibid, p310.

⁵² D. Beggs and C. L. Skeels, 'Market arbitrage of cash dividends and franking credits', The Economic Record, vol.82, no.258, September 2006

⁵³ SFG, The impact of franking credits on the cost of capital of Australian firms, A report prepared for ENA, APIA and Grid Australia, 16 September 2008(b).

⁵⁴ D. M. Cannavan, F. J. Finn and S. F. Gray, 'Op cit.

⁵⁵ AER, Dec 2008, Op cit, p324

conceptual basis and provide a direct (rather than inferred) estimate of the value of imputation credits across the Australian economy.

The issue of consistency between the gamma and the MRP was an important part of the review. Accordingly, the AER estimated an appropriately ‘grossed-up’ historical estimate of the MRP. The AER also considered the empirical result from dividend drop-off studies that cash dividends are less than fully valued and whether this suggests that the standard CAPM cannot fully explain the reality of differential taxation. The AER considered that there is no convincing evidence that the standard CAPM should be replaced to account for the realities of differential taxation. Therefore the AER did not impose a theoretical adjustment to the empirical results from dividend drop-off studies for CAPM consistency reasons, nor proposed that the standard CAPM be replaced.

AER conclusion

On this basis, and after considering the most recent available and reliable empirical evidence, the AER considered that there was persuasive evidence to depart from the previously adopted assumption of a gamma of 0.5. Based on the evidence considered most relevant, reliable, comprehensive and theoretically appropriate, the AER considered that a reasonable range for gamma lies between 0.57 (based on market prices) and 0.74 (based on tax statistics). The AER recommended a point estimate for gamma of 0.65.

Commentary on Synergies’s diagnostic test

Lastly we comment on the non parametric paired test undertaken by Synergies. The approach assumes that the characteristics of the two groups of shares are identical (and Synergies make only a limited attempt to homogenise the two groups, by removing trusts). However failing to adequately control for other factors that can influence the behaviour of share prices means it is possible to draw false conclusions, as these factors may have different impacts on different segments of the sample.

The failure to detect any significant differences in the behaviour of the fully franked shares compared to those paying unfranked dividends may be due to the inadequacy of the statistical testing procedure itself. The test applied by Synergies would have been much more powerful if it had been applied to franked and unfranked stocks before the introduction of the 45 day rule and discovered a significant difference. As it stands, the failure of the test could be due to a flawed test procedure.

3.7.5 Recommendation

The weight of past regulatory precedent is strongly in favour of a gamma of 0.5. However the AER’s extensive analysis concluded that there was sufficient evidence to move away from this estimate.

We believe that this evidence is sufficient to support a move away from IPART's previous assumption, especially given that the ACCC will be adopting assumptions consistent with the AER's recommendations in future regulatory reviews. Given that IPART faces a choice between maintaining consistency with the past or with the future, and given the weight of evidence examined by the AER, we believe that IPART should adopt the AER's estimate of gamma, namely an assumed gamma of 0.65. AER estimated that a reasonable range for gamma is 0.57 to 0.74.

3.8 Cost of debt

3.8.1 Synergies proposal on debt margin

Synergies have proposed a debt margin based on data from Bloomberg for a BBB rated firm. Since Bloomberg no longer provide information related to 10 year BBB corporate bonds, Synergies propose basing the estimate of the debt margin on the margin for 8 year BBB bonds plus the margin between A-rated 8 year and 10 year bonds. Using a 20 day averaging period to the 28th November 2008, Synergies estimate a debt margin of 300 basis points.

3.8.2 Response on debt margin

ACCC Interstate Undertaking

Synergies approach is based on the approach previously adopted by the AER. This approach was also accepted by the ACCC in its review of the ARTC's Interstate Access Undertaking.

Thus in its submission to the ACCC⁵⁶, the ARTC proposed basing the debt margin on a BBB credit rating, using ten year bond maturities averaged over a 20 day estimation period. ARTC proposed obtaining the data from Bloomberg, using the yield on eight year maturity BBB debt to proxy for the cost of ten-year BBB debt. The ACCC accepted the ARTC's approach as reasonable and determined a cost of debt of 3.42%, in line with prevailing market conditions.

2008 AER proposals

However, as noted above, in its 2008 proposals on WACC parameters for electricity sector, the AER has proposed that term used to assess the risk free rate and the cost of debt should match the length of the regulatory period. As discussed above, the period over which ARTC faces risk from the change in WACC parameters is less well defined than for electricity utilities since ARTC can request the re-opening of its Access Undertaking at any stage. Nonetheless, we support the approach by AER and propose that the term for assessing the risk free rate and the cost of debt margin be no more than 5 years.

⁵⁶ See ACCC, April 2008, Op cit, p149

Deloitte advised the AER that existing BBB+ rated corporate bonds are currently trading around 300 basis points⁵⁷. ERA determined that the debt premium based on ten year bonds was 2.95% based on a 20 trading day average to 20 December 2008⁵⁸. Deloitte also indicated that 10 year BBB bonds are trading at a premium over 5 year bonds of 58 basis points. Together this information suggests that an appropriate debt margin, based on five year BBB rated bonds, would be 2.37%.

3.8.3 Synergies proposal on debt raising costs

Synergies propose that a further allowance for debt raising costs of 12.5 basis points be added. This is consistent with the past practice of many regulators, including IPART, ACCC, QCA and ERA.

Synergies note that in its draft decision on the ARTC's Interstate Access Undertaking, the ACCC was of the view that a fair allowance for debt issuance costs would be lower, at 8.3 basis points⁵⁹. Synergies challenge the ARTC's assessment on the grounds that the allowance was based on the costs of a firm issuing its own debt, but excluded the costs involved with establishing and running a treasury operation.

3.8.4 Response on debt raising costs

The AER did not explicitly examine debt raising costs in its December 2008 WACC proposals. However, the AER referred to the views expressed in the AER's recent draft decisions on the NSW and ACT transmission and distribution determinations⁶⁰.

For example, in the TransGrid draft decision, the ACCC developed a benchmark for debt raising costs based on the costs applicable to Australian companies accessing private debt markets. These costs included gross underwriting fees, allowances for legal and roadshow expenses, credit rating fees and registry and paying charges for each bond issue. The AER assumed refinancing of debt with each (five year) regulatory period. Bond issues were assumed to be for \$200 million, with the cost benchmark found to decrease as the number of bond issues increased. TransGrid was assumed to require 13 bond issues to refinance \$2.54 billion of notional debt⁶¹ over the regulatory period.

⁵⁷ AER, Dec 2008, Op cit p105.

⁵⁸ ERA, Jan 2009, Op cit, p15

⁵⁹ ACCC, April 2008, Op cit, p152

⁶⁰ AER, Dec 2008, Op cit, p257

⁶¹ Equivalent to the opening RAB times the assumed benchmark gearing.

ARTC plans to spend around \$1 billion on infrastructure enhancements. Assuming this expenditure is spread evenly over the period and applying the AER's methodology to establish an opening notional debt would imply a benchmark debt raising cost of 8.3% (for 6 bond issues) for a five year period.

3.9 Equity raising costs

3.9.1 Synergies proposal

Synergies suggest that an allowance for equity raising costs is required given the size of ARTC's investment program over the next five years. Synergies update a previous study undertaken by ACG for the ACCC⁶² regarding reported equity raising costs for Australian IPOs. Synergies conclude that for equity raisings of more than \$100 million the average cost of raising equity was 5.01%.

3.9.2 Response on equity raising costs

As recognised by Synergies, there is a hierarchy for the funding of new investment. The AER state⁶³:

External equity funding for subsequent capex should be considered only when a case is made that retained earnings and additional borrowings are insufficient provided that the gearing ratio and other assumptions about financing are consistent with the regulatory benchmarks.

Currently the ARTC has virtually no long term debt. Consequently most if not all of the capital expenditure required over the five year review period can be debt financed while still adhering to ARTC's notional debt level.

Moreover, under the Australian Government's Nation Building package, the ARTC is due to receive a \$1.2 billion equity injection to help finance a \$1.6 billion program of track upgrades and investment. We understand this includes \$580 million for the HVCN⁶⁴. Given this equity investment, the ARTC should not require any external equity raising.

Finally we note that this investment by the Government is in addition to \$1.6 billion committed to rail infrastructure through the Building Australia Program. Much of this investment is in the nature of grant, aimed at supporting businesses in a difficult economic climate.

⁶² ACG, Dec 2004, Debt and Equity Raising Costs, Report prepared for the Australian Competition and Consumer Commission.

⁶³ AER, Dec 2008, Op cit, p140

⁶⁴ Commonwealth of Australia, Dec 2008, Nation Building: Rail, Road, Education & Research and Business, p6.

4 Summary of recommendations

Table 5 draws together our recommended WACC parameters, and resultant cost of capital, based on the information available to date. Many of the parameters will need to be up-dated closer to the point of IPART's decision. However, the table provides an indication of the cost of capital we consider to be appropriate for ARTC's Hunter Valley rail network.

Table 5 **ARTC proposals for WACC**

		ARTC/Synergies's 2009 proposal	HRATF ACIL Tasman 2009 Proposal
Parameter assumptions			
Nominal Risk Free Rate	Rf	4.95%	3.80%
Inflation rate	f	2.73%	2.45%
Real Risk Free Rate	Rrf	2.16%	1.05%32%
Cost of Debt Margin	Dm	3.0%	2.37%
Debt raising costs	DRC	0.125%	0.083%
Market Risk Premium	MRP	6.0-7.0%	6.00%
Proportion of Franking Credits Attributed Value by Shareholders	γ	0%	65.00%
Debt to capital	D/V	50-55%	50.00%
Equity to Capital	E/V	50-45%	50.00%
Debt Beta	β_d	0.00	0.00
Asset Beta	β_a	0.50-0.60	0.44
Equity Beta	β_e	0.99-1.32	0.879
Effective Tax Rate for Equity	Te	30.00%	10%
Calculated WACCs			
Nominal Vanilla WACC		9.48-10.82%	7.66%
Pre-Tax Real WACC		8.84-10.53% (>10%)	5.25%

Using the parameters recommended above, we derive an estimate for the nominal Vanilla cost of capital of 7.66%. This post-tax cost of capital should be combined with forecast tax cash flows to determine the appropriate ceiling costs for each line segment. In the absence of information on effective tax rates, we have made the assumption of an effective tax rate of 10% to illustrate the potential pre-tax WACC cost of capital of 5.25%.