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 Hedland.

4 September 2008

Economic Regulation Authority
WESTERN AUSTRALIA

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Economic Regulation Authority
Perth, Western Australia
Phone: (08) 9213 1900

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Overview

The purpose of this Issues Paper is to provide background information and outline the key issues on which the Authority is seeking comment from interested parties. The paper is intended to assist interested parties to understand the nature of the issues to be considered by the Authority in making its determination and to help interested parties in making submissions.

In this paper questions are raised, highlighted in boxes, seeking input from interested parties. These questions are set out on pages 7,17,18,27 and 28.

Respondents should feel free to comment on any of these issues, or other issues they consider relevant to this matter. Section 1.4 of this paper provides further information regarding the process for making a submission.

Interested parties and stakeholders will have further opportunity to make submissions following the release of the Authority's Draft Determination, which is expected to occur in early 2009. The Final Determination is due to be released by 30 June 2009.

1 Introduction

1.1 Background to the Rail Regulatory Regime

The Authority administers the Western Australian railways access regime. The regime consists of the *Railways (Access) Act 1998* (**Act**) and the *Railways (Access) Code 2000* (**Code**). The rail network and types of infrastructure subject to the regime are defined in this legislation. The Authority's role is to administer the Act and the Code

The *Railway and Port (The Pilbara Infrastructure Pty Ltd) Agreement Act 2004* (**TPI Agreement Act)** between the State Government and The Pilbara Infrastructure (**TPI**) (a subsidiary of Fortescue Metals Group Ltd (**FMG**)) relates to the development of a multi-user railway and multi-user port facility in the Pilbara. Part 3 of the TPI Agreement Act, which amends the Act and the Code to include TPI's railway (from the Cloud Break iron ore mine to Port Hedland) in the Western Australian rail access regime, came into force on 1 July 2008.

Schedule 4, section 3(1)(a) of the Code requires the Economic Regulation Authority (Authority) to make an annual determination, as at 30 June, of the Weighted Average Cost of Capital (**WACC**) to be applied in calculating the floor and ceiling costs for each of the rail networks covered under Schedule 1 of the Code.

The Authority is required to determine the WACC for the TPI railway by 30 June 2009.

1.2 Issues Paper Structure

The structure of the Issues Paper is as follows:

- Chapter 2 provides background on the iron ore industry.
- Chapter 3 provides comment on the methodology issues relevant to the WACC determination for the TPI railway. This chapter also contains advice from CRA International who are assisting the Authority in the WACC determination for the TPI railway.
- Chapter 4 contains extracts from the TPI submission provided to the Authority and provides details on a key issue raised in the TPI submission, namely the regulatory treatment of stranded assets. This chapter also contains advice from CRA International.

1.3 Review Process

The Code does not require public consultation except for the WACC determination as at 30 June in 2003 and every fifth year thereafter. However, as the TPI railway is the first greenfields ('new') railway to be included in the WA Rail Access Regime and this new railway has significant differences to the rail freight network (Pilbara location, single (minesite to port) line, high axle load design, iron ore transport specific) the Authority has decided to undertake a public consultation process in determining the WACC for the TPI railway.

The Authority intends to follow the following timetable in undertaking this review.

- Submissions on the Issues Paper are due by 15 October 2008.

- A Draft Determination is expected to be published in early 2009 and submissions will be invited.
- The Authority will issue the Final Determination on or before 30 June 2009.

1.4 Public Submissions

Submissions on any matters raised in this Issues Paper should be in written form and electronic form (where possible) and must be received by **4:00pm (Western Standard Time) 15 October 2008.**

Written submissions should be mailed to:

Mr Russell Dumas
Director – Gas and Rail Access
Economic Regulation Authority
PO Box 8469
Perth BC WA 6849

Electronic submissions should be made to: TPI WACC@era.wa.gov.au.

In general, submissions made to the Authority will be treated as in the public domain and placed on the Authority's web site.

Where an interested party wishes to make a submission in confidence, it should clearly indicate the parts of the submission for which confidentiality is claimed and specify in reasonable detail the basis for the claim. Any claim of confidentiality will be considered in accordance with the provisions of Section 50 of the Code.

The publication of a submission on the Authority's web site shall not be taken as indicating that the Authority has knowledge either actual or constructive of the contents of a particular submission and, in particular, whether the submission in whole or part contains information of a confidential nature and no duty of confidence will arise for the Authority.

Further information regarding this inquiry can be obtained from:

Mr Russell Dumas
Director – Gas and Rail Access
Economic Regulation Authority
Ph (08) 9213 1900

Media enquiries should be directed to:

Mr Paul Byrne
Byrne & Byrne Corporate Communications
Ph (08) 9385 9941
Mb 0417 922 452

2 BACKGROUND

2.1 Australian Iron Ore Industry

Western Australian iron ore production in 2007 was 290 million tonnes (**mt**) or 97 per cent of Australian production.[1] Pilbara iron ore production from Rio Tinto Iron Ore (**RIO**) (which controls Hamersley Iron and the Robe River Joint Venture) and BHP Billiton (**BHPB**) accounts for around 95 per cent of Australian production. Western Australia has around 99 per cent of Australia's Economic Demonstrated Reserves (**EDR's**), with the Pilbara region accounting for around 89 per cent of Australia's EDR's.[2]

Australian iron ore exports have maintained an overall share of around 39 per cent of world seaborne trade over the past decade.[3] Around 70 per cent of seaborne trade takes place under long term contractual arrangements (typically 3-7 years).[4] RIO and BHBP are the world's second and third largest iron ore producers, respectively. Together with the world's largest iron ore producer, Brazilian company Companhia Vale do Rio Doce, BHBP and RIO account for almost 80% of the global seaborne trade in iron ore.[5]

Pilbara producers have a competitive advantage in the supply of iron ore to Asian Pacific countries due to lower transport costs. Over 95 per cent of Australian iron ore is exported to Asia.[6]

Reflecting growth in global iron ore demand, Australia's iron ore production is forecast to increase from 299mt in 2007 to 440mt by 2012.[7] Pilbara iron ore production will continue to provide the vast majority of Australian production.

China is the world's largest iron ore importer (384mt in 2007), or 46 per cent of world iron ore imports. Japan is the second largest importer, with a share of 17 per cent (139mt in 2007).[8] Australia's share of the Chinese and Japanese import market is 40 per cent and 55 per cent, respectively.[9]

Iron ore is a commodity with a relatively low value in relation to its weight. In 2004, iron ore had an average value of approximately A$25 per tonne (sold at a Pilbara export terminal).[10] However, primarily due to higher Chinese demand, contract prices have increased significantly since 2004.

[1] ABARE 2008, Australian Minerals Statistics, March quarter 2008.

[2] Australian Government 2008, Australian Atlas of Minerals Resources, Mines and Process Centres.

[3] Minerals Council of Australia Submission on the Draft Recommendations of the National Competition Council for the declaration of the Robe, Goldsworthy and Hamersley Railways.

[4] FMG 2004, Supplementary Submissions dated 8 July 2004 in respect to the Application For Declaration Of The Service provided by BHP Billiton Iron Ore Pty Ltd, dated 11 June 2004.

[5] FMG 2004, ibid.

[6] Department of Industry and Resources, Western Australia.

[7] ABARE 2007, Australian Commodities Vol. 14 No. 1, March quarter 2007.

[8] ABARE 2007a, Australian Commodities Vol. 15 No. 2, June quarter 2007.

[9] ABARE 2007b, Australian Commodities Vol. 14 No. 4, December quarter 2007.

[10] FMG 2004, op. cit.

Benchmark contract prices for Pilbara exports to China in 2008 reached US$202 per tonne, 96 per cent higher than the 2007 contract price.[11] Reflecting price increases, the value of Australian iron ore exports has risen from A$6.2 billion in 2004 to A$16.3 billion in 2007.[12]

2.2 Pilbara Iron Ore Sector

2.2.1 Iron Ore Producers

The major iron ore producers (and exporters) are BHPB and RIO. BHBP production in 2007 was 108 mt, with production planned to increase to 300mt per annum (**mtpa**) by 2015.[13] RIO's production in 2007 was 145 mt,[14] with intentions to increase the 200mtpa capacity of its Pilbara operation in 2008 to 420mtpa.[15] BHBP and RIO have an estimated 7 and 11 billion tonnes of reserves and resources, respectively.[16]

FMG is currently shipping 2mt of ore per month, with intentions to:

- reach 55mtpa by January 2009;
- expand to 110mtpa after 2010; and
- have long-term expansion to 200mtpa.[17]

A joint venture between RIO and Hancock Prospecting recently completed the Hope Downs Project (Stage 1), which is expected to reach 30mtpa capacity in 2009.[18] Hancock Prospecting is also conducting a prefeasibility study on the Roy Hill deposit (potential production of 55mtpa),[19] which is located 20 kilometres south-east of the FMG Christmas Creek deposit.

There are a number of smaller companies in the Pilbara that intend to start producing iron ore over the next decade. These potential producers include Atlas, BC Iron and Brockman Resources (formerly Yilgarn).

2.2.2 Existing Infrastructure

Existing railway facilities (Robe River, Hamersley, Goldsworthy and Mt Newman) in the Pilbara are owned and operated by BHPB and RIO. These railways are regarded as some of the most efficient heavy haulage systems in the world.[20]

The BHBP and RIO railways are covered by various State Government Agreement Acts (**State Agreements**) proclaimed in the 1960's and 1970's. These State Agreements included provisions that were:

[11] Per dry metric tonne unit of Pilbara blend lump. Source: Rio Tinto Media Releases.June/July 2008.

[12] ABARE 2008a, Australian Commodities: June quarter 2005 and June quarter 2008.

[13] BHPB 2008, 'An excellent business with an exciting future', Media Presentation 19 January 2008.

[14] Rio Tinto 2008, Fourth quarter 2007 operations review,, January 16 2008.

[15] Rio Tinto 2008a, 'Rio Tinto announces 2008 iron ore price settlement', Media Release.June 23 2008.

[16] BHPB 2008, Op. cit.

[17] FMG media releases and presentations 2007/08.

[18] Rio Tinto 2008, op. cit.

[19] Pilbara Development Commission 2008, Resource Projects, updated July 2008.

[20] Department of Treasury and Finance 2008, Pilbara Railways (Third Party Haulage) Regime, Public Consultation Paper June 2008.

> intended to require the Pilbara iron ore producers to carry freight for third parties, provided that this did not unduly prejudice or interfere with the iron ore producers' operations. However, to date no independent (i.e. non-joint venture) third party freight has been carried on the Pilbara Railways.[21]

The Pilbara Rail Access Interdepartmental Committee (**PRIAC**) noted that in regard to third party access, the State Agreements contain haulage provisions rather than below rail track access provisions (where the third party can operate their own rolling stock).

> The early State Agreements incorporated haulage of iron ore, non-iron ore product and passengers, however more recent State Agreements, such as The Pilbara Infrastructure Pty Ltd (TPI) State Agreement, have included track access provisions as detailed in the Railways (Access) Code 2000.[22]

FMG is currently seeking access to the BHPB and RIO railways through its applications to the National Competition Council (**NCC**) seeking declaration of the services under *Trade Practices Act 1974*. Declaration would provide FMG and other access seekers with:

> an enforceable right to negotiate access to a declared service on reasonable terms and, if necessary, provides that access prices and other terms and conditions may be arbitrated by the Australian Competition and Consumer Commission (ACCC).[23]

PRAIC is currently developing a rail haulage regime (for iron ore) that could be applied to the Pilbara railways. This approach is 'designed to run in parallel with the Part IIIA declaration process' and to 'create a haulage regime that is capable of certification as an effective State access regime under Part IIIA. [24] PRAIC noted that the regime will only be implemented if the State Government and the relevant company mutually agree to amend the State Agreement(s) to adopt the Regime.

2.2.3 TPI Railway

The TPI railway was commissioned in May 2008. This railway (260km) runs from Fortescue's Cloud Break resource in the Chichester Ranges (East Pilbara) to TPI's port facilities at Anderson Point (Port Hedland). (see Figure 1)

TPI is a wholly owned subsidiary of FMG. The TPI Agreement Act requires that the TPI railway have a capacity of not less than 70mtpa and be subject to the Act and Code.[25] The Authority's understanding, based on a recent discussion with the Department of Planning and Infrastructure (**DPI**), is that this railway is not yet up to the standard required under TPI's State Agreement as the required thickness of ballast has not yet been placed along the full length of the railway. Consequently, the current capacity of the railway is likely to be less than the 70 mtpa minimum specified under this State Agreement. The Authority understands from DPI that the Government's position is that the full ballast thickness is required to be placed along the entire length of the railway in accordance with TPI's State Agreement requirements.

[21] Department of Treasury and Finance 2008, op. cit.

[22] Department of Treasury and Finance 2008, op. cit.

[23] NCC 2006, Fortescue Metals Group Ltd Application for declaration of a service provided by the Mt Newman railway line under section 44F(1) of the *Trade Practices Act 1974*: Key findings from the final recommendation 23 March 2006.

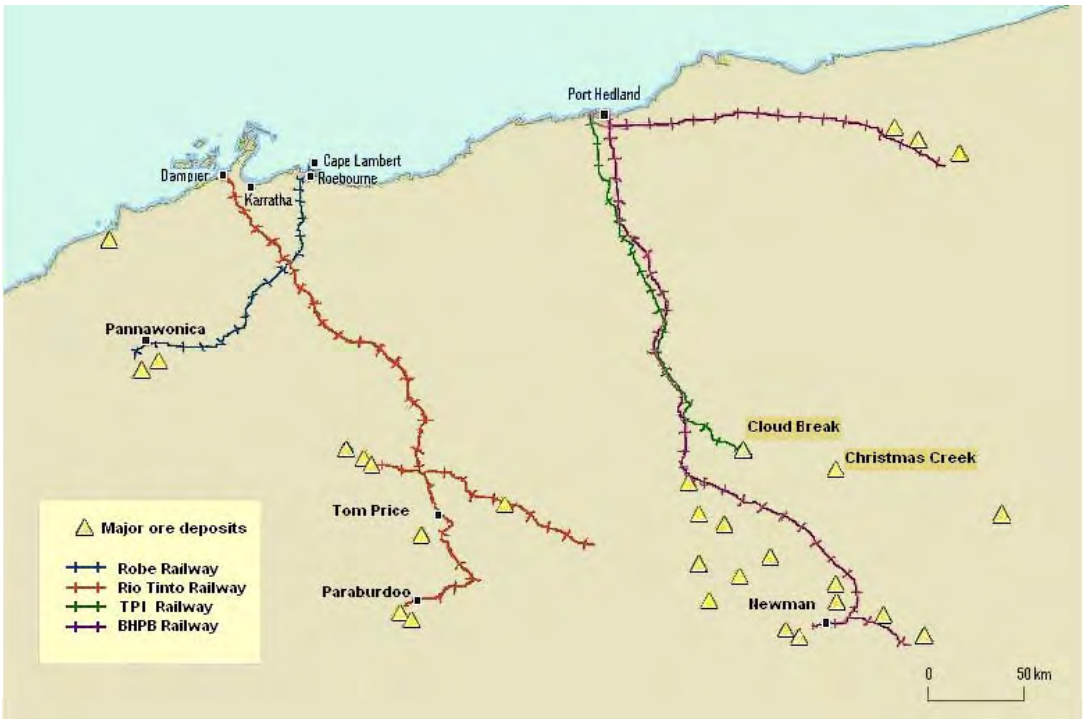
[24] Department of Treasury and Finance 2008, op. cit.

[25] TPI State Agreement, clauses 10(2)(a) and 16.

Due to the isolated nature of the region, iron ore is the only resource of significance that is likely to be transported on the TPI railway for the foreseeable future. FMG has previously noted that the remote location of ore resources, together with the volume of product required to be transported, mean that, other than where resources are located close to a port, road transport is not a viable option to rail.

Atlas Iron has a binding agreement to access TPI's port facilities for the export of ore from the Pardoo project. Atlas will truck the ore 75 kilometres to Port Hedland and the first Atlas shipment is expected to be exported in October 2008.[26] BC Iron has memoranda of understandings with FMG for the commercial negotiation of rail haulage, port and shipping services.[27]

Figure 1 Pilbara Railways



2.2.4 FMG Iron Ore Resources

FMG has iron ore resources in the East Pilbara (includes Cloud Break, Christmas Creek, Mt Nicholas and Mt Lewin) and in the West Pilbara (includes the Solomon project). In addition to the existing TPI railway to Cloud Break, FMG has announced a spur line to Christmas Creek, with a possible line to the Solomon project.

FMG has estimated a reserve of 1.04 billion tonnes at the Cloudbreak and Christmas creek projects. This includes 121 million tonnes of proved and 932 million tonnes of probable reserves. The Cloud Break/Christmas Creek developments have an estimated mine life of 20 years.[28] The Solomon Project has an Inferred Resource estimate of 1.7 billion tonnes.[29]

[26] Atlas Iron Limited 2008, 'Fortescue signs JV with Atlas Iron', Media Release 15 August 2008.

[27] BC Iron 2007, "MoU with Fortescue Metals Group Ltd" ASX Announcement dated 6 July 2007; Atlas ASX announcement, "MoU signed with Fortescue Metals Group Limited", dated 11 June 2007.

[28] NCC 2005, FMG Proposals For Iron Ore And Infrastructure Development In The Pilbara - Annexure 1.

[29] FMG website.

According to FMG, the initial 45-55mtpa production target has been fully contracted, with signed agreements pertaining to exports of a further 50mtpa.[30]

2.2.5 Other Iron Ore Resources

Companies other than BHBP, RIO or FMG have identified potentially viable deposits. However these resources have not been proven up to JORC[31] standard due to a number of factors, including concerns that access to rail services may not be available. The NCC noted that:

- Although there were at least 16 junior explorers with potential iron ore projects in the Pilbara, it was unlikely that more than a small minority of these junior explorers will become producers.
- Access to rail services may affect whether potential deposits are proven to the point of saleability.
- The majority of iron ore tenements, which are currently the subject of exploration in the Pilbara (other than those owned by major iron ore producers), contain deposits which fall at the smaller end of the spectrum. If the inferred resources are confirmed, most of these deposits will apparently be large enough to support their own mining infrastructure, but none will be able to support the construction of rail or port facilities.[32]

Issues

1) The Authority invites interested parties to provide information on relevant current and proposed mineral resources in the vicinity of TPI's railway line to assist the Authority in its analysis of the potential future users of this railway.

[30] FMG Annual Report 2006-07.

[31] The Joint Ore Reserves Committee (JORC) oversees the mandatory system for classification of tonnage/grade estimates for mineral resources and ore reserves.

[32] NCC 2006, Final Recommendation: Application by Fortescue Metals Group Limited for declaration of a service provided by the Mount Newman Railway Line Application for declaration under section 44F(1) of the *Trade Practices Act 1974*.

3 WACC Determination for the TPI Railway

3.1 Legislative Requirements of the Code

The requirement on the Authority to determine WACC values for railways under the Western Australian rail regime is established under Schedule 4, section 3 of the Code:

> Regulator to determine weighted average cost of capital
>
> (1) For the purposes of clause 2(4)(b), the Regulator is to —
>
> (a) determine, as at 30 June in each year, the weighted average cost of capital for each of —
>
> (i) the railway infrastructure associated with the urban network described in items 49, 50 and 51 in Schedule 1; and
>
> (ii) the railway infrastructure associated with the railways network described in the other items in that Schedule;
>
> (ia) the railway infrastructure associated with that part of the railways network described in item 52 in that Schedule; and
>
> (b) publish notice of each such determination in the Gazette as soon as is practicable after it is made.

Schedule 1 lists the routes covered by the Code. TPI's railway is covered under item 52 of Schedule 1 which states:

> All tracks that are part of the railway constructed pursuant to the TPI Railway and Port Agreement.

TPI's railway, as defined under Schedule 1 above, currently consists of the line from FMG's Cloud Break iron ore mine to Port Hedland. Under this definition, any new lines constructed by TPI in the future, as part of extensions or enlargements to this railway pursuant to the approved proposal arrangements under clauses 12 and 13 of TPI's State Agreement, would also come under the Code.

3.2 General Methodology

The WACC refers to the average cost of debt and equity capital, weighted by a proportion of debt and equity to reflect the financing arrangements for the asset, i.e.,

$$WACC = R_e \frac{E}{V} + R_d \frac{D}{V}$$

where:

R_e	=	cost of equity capital,
R_d	=	cost of debt capital,
E	=	market value of equity,
D	=	market value of debt, and
V	=	market value of the asset (E+D).

There are three key matters in estimating a WACC:

- the choice of method and financial model applied in estimation of costs of equity and debt;
- the treatment of inflation; and
- the treatment of taxation.

The Code does not specify a methodology to be applied in estimating values of the WACC for rail systems. The methodology to be applied is a matter for determination by the Authority.

Since the establishment of the rail regulatory regime in Western Australia, the regulator has used the Capital Asset Pricing Model (**CAPM**) as the financial model. The most common formulation of the CAPM estimates the required return on the equity share of an asset as a function of the risk free rate and a market risk premium (reflects the premium that investors require over the risk free rate):

$$R_e = R_f + \beta_e\left(R_m - R_f\right)$$

where:

R_e	=	cost of equity capital;
R_f	=	risk free rate of return;
R_m	=	market rate of return;
$[R_m - R_f]$	=	market risk premium; and
β_e	=	equity beta (systematic risk).

Given the CAPM is uniformly applied by Australian economic regulators and broadly accepted by regulated businesses, unless evidence is presented to show that an alternative model to CAPM can provide a more robust estimate of the cost of equity capital, the Authority will apply the CAPM method in the TPI determination,

On the treatment of inflation, the Authority has in previous WACC determinations under the Code specified WACC values as real values, consistent with determining floor and ceiling prices in real terms and subsequently indexing these prices for actual inflation.

On the treatment of taxation, the Authority has in previous WACC determinations under the Code determined and applied pre-tax rates of return (with an assumption that the taxation rate of the rail businesses is equal to the statutory corporate income tax rate). This treatment of taxation is now largely unique to the Authority, with other regulators generally applying post-tax rates of return.

The Allen Consulting Group (**ACG**) has stated that a post-tax rate of return is generally to be preferred to a pre-tax approach, given the estimated cost of taxation under a post-tax approach is closer to the cost of taxation that would actually be incurred by an efficient provider of an infrastructure service.

However, (**ACG**) also stated that there are reasons why a pre-tax rate of return may be preferred, including:

- consistency with past practice of the Authority;
- relative simplicity of financial modelling; and

- avoiding complications in regulatory accounting that would arise under a post-tax approach as a result of the Western Australian rail access regime taking a particular approach to the valuation of assets (with periodic revaluation on a replacement cost basis) and accounting for capital expenditures and depreciation. [33]

The Authority requested CRA International to provide advice on the TPI railway WACC determination. This advice is detailed in section 3.4.

Regarding rates of return, CRA noted that while a post-tax nominal rate of return is to be preferred, 'consistency with the 2008 Freight and Urban Railway Networks determination is one reason why it may be appropriate to employ a pre-tax real WACC in the current determination'.

The Authority notes that a stated reason for the adoption of a post-tax nominal methodology is that the corporate tax rate is not considered to be a reliable estimate of the effective tax rate. There is a risk that using the statutory tax rate will overestimate the returns required by companies to meet tax obligations. However, a post-tax approach requires complex modelling of taxation cash flows with substantial information requirements (including verifying an individual company's effective tax rate). A pre-tax approach assumes an average taxation liability over the lifetime of the assets.

Options for the Authority in the treatment of taxation for the TPI determination are to:

- maintain the pre-tax approach with an assumed cost of taxation at the statutory rate of corporate income tax (consistent with past practice);
- maintain a pre-tax approach, but with determination of benchmark assumptions of the costs of taxation rather than assuming a cost of taxation at the statutory rate of corporate income tax; or
- adopt a post-tax approach.

3.3 Parameters

This section outlines previous approaches taken by the Authority in the determination of the WACC for rail infrastructure.

3.3.1 Risk Free Rate (of return)

In its 2008 Final Determination on the Weighted Average Cost of Capital for the Freight (WestNet Rail) and Urban (Public Transport Authority) Railway Networks (**2008 Rail WACC Determination**), the Authority set the real risk free rate by:

- determining a nominal risk free rate as the average of implied returns on nominal government bonds;[34]
- determining a forecast value of inflation; and
- calculating the real risk free rate by use of the Fisher equation.[35]

[33] Allen Consulting Group, Railways (Access) Code 2000: Weighted Average Cost of Capital 2008 WACC Determinations October 2007, Report to the Economic Regulation Authority.

[34] Government bonds are taken to be free of default risk.

In the 2008 Rail WACC Determination, the indicative nominal risk free rate was determined as the average of implied yields on 10 year Commonwealth Government Securities over the 20 trading days to 30 May 2008. The rate was then estimated at 6.37 per cent, while the Authority considered the long-term average rate of inflation to be 2.75 per cent. Together, these two rates implied a real risk free rate of 3.52 per cent.[36]

The Authority notes that, in recent regulatory determinations where the rate of inflation is determined by means other than the difference between yields on nominal and real government bonds, both the Australian Energy Regulator (AER) and Essential Services Commission (ESC) have applied values of forecast inflation set at 2.6 or 2.7 per cent.[37]

3.3.2 Financial Structure

In the 2008 Rail WACC Determination, the Allen Consulting Group considered capital market evidence for gearing assumptions, with this evidence comprising observed capital structures of a set of "comparable" listed businesses. With only a couple of exceptions, the financial structures of the comparable firms indicated gearing levels of 20 to 40 per cent.

The Authority took the view that an appropriate assumption for the financial structure of both the urban and freight networks was a financial gearing of 35 per cent debt to assets.

3.3.3 Cost of Debt

The cost of debt capital is the current cost to the business of raising and servicing (secured and unsecured) debt.

The Authority has in previous WACC determinations under the Code determined the cost of debt by adding a debt-risk premium (or "debt margin") to a risk free cost of capital to estimate a cost of debt.

In the 2008 Rail WACC Determination, the Authority obtained updated estimates of debt margins based on CBASpectrum fair value yields for 10 year BBB+ rated corporate bonds, averaged over the 20 trading days to 30 May 2008. The debt margin for the freight network (assumed credit rating of BBB+) as at May 2008 was then estimated as 302 basis points.

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[35] The Fisher equation calculates the real interest rate (R) as:

$R = (1 + r) / (1 + i) - 1$

for a given nominal interest rate (r) and inflation rate (i).

[36] ERA, Final Determination 2008 Weighted Average Cost of Capital for the Freight (WestNet Rail) and Urban (Public Transport Authority) Railway Networks.

[37] Australian Energy Regulator, January 2008, Final Decision: SP AusNet Transmission Determination 2008-09 to 2013-14, pp 105, 106. The AER applied a ten-year inflation forecast of 2.59 per cent, calculated as an average over ten years of short term (two year) inflation forecasts of three per cent and a long term forecast of 2.5 per cent. Essential Services Commission, 7 March 2008, Gas Access Arrangement Review 2008–2012 Final Decision – Public Version. The ESC applied a ten year inflation forecast of 2.7 percent, based on a range of considerations including market practice in making assumptions on long-term inflation, levels of historical inflation, and the Reserve Bank's target range for the rate of inflation. The ESC has subsequently issued its further final decision approving access arrangements that incorporate rates of return determined with an assumed inflation rate of 2.6 per cent; Essential Services Commission, 19 May 2008, Review of Gas

3.3.4 Market Risk Premium

A value of the market risk premium cannot be determined directly, but rather a considered assumption must be made of the value. Since the late 1990s, historically realised equity premia suggest values of between 5 and 8 per cent and the practices of market practitioners point to values equal to or less than 6 per cent.

On this basis, the Authority has, in past determinations, considered that a market risk premium of six per cent is appropriate.

3.3.5 Systematic Risk (Beta)

The systematic risk (beta) of a firm is the measure of how the changes in the returns to the firm's stock are related to the changes in returns to the market as a whole. It reflects the business's exposure to non-diversifiable risk, which is that portion of the variance in the return on an asset that arises from market-wide economic factors that affect returns on all assets, and which cannot be avoided by holding the assets as part of a diversified portfolio.

The subject of systematic versus unsystematic risks (known as non-specific and specific risks, respectively) is one of the more difficult in the estimation of WACC.

The Independent Pricing and Regulatory Tribunal (NSW) estimated an asset beta in the range of 0.32 to 0.46 for the Rail Access Corporation's coal business in 2005,[38] while the Queensland Competition Authority estimated that Queensland Rail's asset beta for bulk coal traffic was in the order of 0.50 in 2005.[39]

In the 2008 Rail WACC Determination, the Authority took the view that the cost of equity for the freight network should be determined on the basis of an asset beta value of 0.65, corresponding (on the basis of a financial gearing ratio of 35 per cent debt to assets) to an equity beta value of 1.0.

3.3.6 Taxation Imputation

A franking credit is received by Australian resident shareholders for corporate taxation paid at the company level when determining their personal income taxation liabilities under the system of dividend imputation.

In the 2008 Rail WACC Determination, the Authority considered that until debate on the value of imputation credits are resolved, it is appropriate to apply a value of gamma of 0.5.

3.3.7 Debt and Equity Raising Costs

In its 2008 Rail WACC determination, the Authority considered that an allowance of 12.5 basis points in the cost of debt was an appropriate allowance for debt issuance costs. Furthermore, the Authority considered that, where appropriate, equity raising costs should be recognised in the valuation of the regulatory asset base and in new capital expenditures, rather than in the WACC. As such, the Authority did not give consideration to the costs of raising equity finance in the 2008 Rail Determination.

[38] IPART 2005, Report on the Determination of Remaining Mine Life and Rate of Return: NSW Rail Access Undertaking from 1 July 2004.

[39] QCA 2005, Decision QR's 2005 Draft Access Undertaking, December 2005.

3.4 CRA Comment on the WACC Issues

The Authority requested CRA International (**CRA**) to provide regulatory advice in respect of the Authority's WACC determination for TPI's Railway. CRA was not asked to comment on the CAPM or the market risk premium.

CRA's comments are as follows:

Systematic risk

Notwithstanding the contract with FMG, CRA notes that the systematic risk of the TPI railway is likely to reflect the systematic risk of iron ore mining because its revenues are more closely linked to that industry rather than the general rail industry.

The existence of strong projected demand for the railway does not alter the underlying systematic risk. Systematic risk is more properly assessed by considering how returns from the activity (the provision of the railway) may covary with returns from the market as a whole. Strong demand projections may rely on the assumption of continuing strong international demand for steel. If international demand falls then there would be a reduction in demand for Australian iron, steel, and coal. This in turn could have a dampening effect on the entire Australian economy, and hence on returns on the market as a whole. This suggests that there is positive systematic risk, but does not quantify the magnitude of that risk.

Systematic risk may be enhanced because FMG is mining low-grade ore, and therefore may be more sensitive to commodity price cycles. It is possible that when commodity prices are low the mining of low grade ore becomes uneconomic, and hence FMG could reduce the volume of ore mined or even suspend mining.

On the other hand, a large foundation contract may have a take-or-pay element, and this would act to reduce the systematic risk of the TPI railway.

On balance it is not clear whether the TPI railway would have a higher or lower systematic risk than appropriately selected comparator firms.

There are a number of options for comparator firms.

- Other single-use railways. However, there are unlikely to be many of these internationally that are traded as a separate entity rather than being part of a conglomerate;
- Firms involved in iron ore mining. However, these are again likely to be part of a firm involved in multiple mining operations;
- Firms in other infrastructure industries that may be exposed to cycles and which are likely to have large foundation contracts (e.g. gas pipelines, of which there are several potential Australian comparators);
- Firms in other transport industries, such as ports. However, most of these will be handling multiple commodities and therefore have a more diversified risk profile than TPI;
- Direct analysis of the systematic component in iron ore prices relative to Australian stock market returns. This could be done

by constructing a hypothetical model of an iron ore railway and estimating how the returns from that firm varied across the commodity price cycle. It would then be necessary to estimate the historical relationship between Australian stock market returns and the commodity price cycle, and then calculate the covariance between returns from the hypothetical firm and the stock market.

While we can conceive of this as an intellectual exercise, it is essentially not practical. The iron ore prices are for immediate or near-term delivery. In contrast, the stock market is, in essence, discounting an infinite stream. As such, commodity prices and stock prices are not directly comparable. It is also a very complex option and suggests a greater degree of precision than the methodology would actually deliver.

Use of the Debt Beta When Calculating Asset and Equity Betas

The asset beta is a measurement of the extent to which returns on the asset (i.e. the activity as a whole) are systematic. The existence of systematic risk for the asset potentially gives rise to an element of systematic risk both for holders of equity and for holders of debt.

It seems reasonable that there is some component of the debt premium that is systematic, and hence that there is a positive debt beta. However, the entire debt premium is not due to systematic risk, e.g. factors such as liquidity premium.[40]

The existence of positive debt betas raises two questions:

- Should a debt beta be used in the calculation of debt and equity betas (as per the Monkhouse formula)?
- Should a debt beta be used in the calculation of the cost of debt?

We address the first question below, and the second question in the following section.

In Australian implementations of the CAPM the equity beta is calculated according to the Monkhouse formula:

$$\beta e = \beta a + \left[(\beta a - \beta d)(1 - t(1-\gamma)) \frac{D}{E} \right]$$

where βe is the equity beta;
βa is the asset beta;
βd is the debt beta;
t is the tax rate;
D is debt;
E is equity; and
γ captures the ability of investors to use imputation credits.

Given the Monkhouse formula, the use of debt beta may impact on the calculation of asset and/or equity betas.

[40] Jing-zhi Huang and Ming Huang 2003, "How Much of the Corporate-Treasury Yield Spread is Due to Credit Risk?", Stanford University, May, Table 2, page 47. Huang and Huang estimate the unexplained element (which could be liquidity and other factors excluding systematic and pure-default risk) whch is not explained by market and pure-default risk. Even for B grade bonds, this estimated value is just 82.2bps.

CRA notes the following points:

- When calculating an equity beta it is not appropriate to utilise a debt beta together with asset betas which were calculated without a debt beta, as this will have the effect of understating the required equity beta. Given that asset betas may be drawn from published sources that have not employed a debt beta, it would not be appropriate to use a debt beta when re-levering those estimates.
- The consistent application of an assumption about the debt beta (i.e. employed in both the calculation of asset betas and then the calculation of an equity beta from the selected asset beta) has no material impact on the calculated equity beta, even when the debt beta is assumed to be large.[41]

CRA concludes that, for the purposes of calculating the asset and equity betas, when implemented properly the debt beta has little material impact, so can be safely ignored.

Cost of Debt

Regulators commonly use yields-to-maturity for the cost of debt. However, yields-to-maturity do not equate to discount rates. One assumption that, by definition, is explicitly made when calculating yields-to-maturity is that interest and principal is paid in full. That is, they are calculated on the basis of "Promised Cash Flows" and reflect the rate of return an investor would earn on the note or bond if it were paid in full.[42] This assumption even applies to bonds, such as distressed debt, where there is a real possibility that they will not be paid in full.

The yield-to-maturity is therefore the return an investor will receive if all goes well and the issuer is able to honour his promises.

[41] CRA constructed a number of hypothetical examples to test the impact of the debt beta. For each example tested there were two calculations: one with a debt beta of zero, and the other with a debt beta of 0.5, which is larger than any reasonable estimate of the debt beta. The difference between the two calculations of the industry equity beta is in the order of only 0.001 to 0.005.

[42] For a technical explanation see for example Richard A. Brealey, Stewart C. Myers and Franklin Allen 2006, "Corporate Finance", 8th edition, pages 649-650.

[43] Richard A. Brealey, Stewart C. Myers and Franklin Allen 2006, "Corporate Finance", 8th edition, pages 514-515.

[44] Ian A. Cooper and Sergei A. Davydenko 2007, "Estimating the Cost of Risky Debt", Journal of Applied Corporate Finance, Vol. 19, No. 3, Summer, pp. 94-95.

[45] Ian A. Cooper and Sergei A. Davydenko 2007, ibid.

[46] Francis A. Longstaff, Sanjay Mithal, and Eric Neis 2004, "Corporate Yield Spreads: Default Risk or Liquidity? New evidence from the Credit-Default Swap Market". For estimates of the credit default spread and the non-default spread see Table 4.

[47] Jing-zhi Huang and Ming Huang 2003, Op cit. See, for example, Table 2, page 47. Column 7 provides the calculated credit spread, which ranges from 10 basis points for Aaa rated debt to 389 basis points for B rated debt. This spread includes pure default risk (i.e. the risk-neutral default probability element) and an element of systematic risk. The pure default element, which should be deducted, is the predominant factor,

[48] Francis A. Longstaff, Sanjay Mithal, and Eric Neis 2004, Op cit. For estimates of the credit default spread and the non-default spread see Table 4. Against the Treasury Curve, estimates of the credit spread range from 53 basis points for AAA and AA rated bonds to 356 basis points for BB rated debt. The non-default portion of the spread ranges from 104 basis points for AAA and AA rated bonds to 428 basis points for B rated debt.

However, the discount rate for valuation purposes should be based on the return an investor can realistically "expect". That is, they should be based on "expected cash flows" adjusted for the likelihood that interest and principal payments may be limited or not occur at all. For distressed debt the difference between yields-to-maturity and expected returns or discount rates is typically substantial.

In summary, the yield-to-maturity can be expressed as:

yield-to-maturity (promised yield) = expected return + credit spread

The expected return is the theoretically correct estimate of the cost of debt to include in the WACC.

Alternative approaches to calculating the cost of debt are:

1. Continue with the approach of using the observed yield-to-maturity. This is likely to be a close approximation of the return on low-risk debt, but may significantly overstate the cost of debt for firms with lower rated debt.[43,44]
2. Utilise the "Merton Model" advanced by Cooper and Davydenko.[45] This approach does have some implementation difficulties, as it requires estimates of the volatility of equity returns and the maturity of debt.
3. Start with the risk-free rate and attempt to build up the cost of debt by adding a debt beta and possibly a liquidity premium. One estimate of the liquidity premium can be obtained from Longstaff, Mithal, and Neis, who use credit default swaps to obtain an estimate of the default and non-default components of the observed yield spread.[46]

   The non-default portion is shown to be significantly related to various measures of liquidity, and therefore is likely to have increased given recent events in credit markets. (We note that it would be possible to include a debt beta at this step while ignoring the debt beta in the cost of equity – as we noted earlier, the consistent application of a debt beta in calculating the cost of equity has no material effect.)
4. Use the results of empirical studies to provide an estimate of the credit spread that should be deducted from the yield-to-maturity to obtain an estimate of the expected return. Using Huang and Huang's results, the deduction from observed yields would be of the order of 40 basis points for Baa (BBB) rated debt.[47] A different estimate is provided by Longstaff, Mithal, and Neis, who estimate a credit spread of 163 basis points for BBB rated debt.[48]

When selecting between these alternatives, CRA notes that:

- Alternative 2 is likely to be difficult to implement; and
- Alternative 3 requires a calculation of the portion of the cost of debt that is due to factors such as liquidity, and adjusting that for current conditions. This bottom-up calculation is likely to be more difficult than the top-down equivalent calculation in Alternative 4.

The key issue then becomes whether to use the observed yield-to-maturity, noting that it will be higher than the expected return, or whether to deduct an estimate of the credit spread obtained from a range of empirical studies.

Leverage / gearing

As a practical matter, it is easiest to employ the mid-point of the range observed for the selected comparator firms. This may differ significantly from TPI's actual capital structure, but the purpose of the WACC calculation is to obtain a benchmark return.

The theoretical optimum is to use the market value of debt and the market value of equity. However, it is generally not possible to observe the market value of debt for comparator firms. As a result it is necessary to use the book value of debt and the market value of equity. The book value of debt will normally be a close approximation of the market value, particularly if a substantial portion of debt is floating rate, or is structured in tranches that mature (and hence are refinanced) over time.

Debt and equity raising costs

The logic for the inclusion of both of these costs is that they are costs that the firm must pay before it can pay the estimated cost of debt and required return on equity. These costs must therefore either be included in the cash flows used to calculate the floor and ceiling prices, or added to the cost of debt and cost of equity.

The addition of these costs is reasonably well accepted in Australia, although the magnitude may be debated.

CRA seeks estimates from market participants of the magnitude of these costs, supported by evidence (confidential if necessary) of costs that have actually been incurred.

Other Matters

In the 2008 determination of the WACC for the Freight and Urban Railway Networks the Authority adopted an inflation projection of 2.75% rather than calculating inflation implied from the returns on inflation-indexed bonds. The Authority's approach is described in detail in the 2008 determination. CRA notes that there is evidence that returns on inflation-indexed bonds are affected by factors other than inflation expectations, and thus do not necessarily provide a good estimate of expected inflation. CRA support the Authority's approach and consider that it is a practical approach to developing an inflation projection that is likely to provide a reasonable indication of inflation expectations.

In CRA's view it is appropriate that the benchmark risk-free rate is the yield on 10-year Commonwealth Bonds. The period over which the rate is averaged is a pragmatic issue.

Pre-Tax Real WACC

CRA observes that the Authority expresses a preference for a pre-tax real WACC although the Authority also notes previous advice from the Allen Consulting Group that "a post-tax rate of return is generally to be preferred in economic regulation".

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. Nevertheless, we also note that the desire for consistency with the 2008 Freight and Urban Railway Networks determination is one reason why it may be appropriate to employ a pre-tax real WACC in the current determination.

An important issue for consideration is the appropriate method for converting between post-tax nominal and pre-tax real discount rates. The correct pre-tax real discount rate is the rate that satisfies the following "NPV equivalence" condition:

NPV(pre-tax real) = NPV(post-tax nominal)

One of the standard methods applied for converting from post-tax nominal to pre-tax real is to first gross up for tax to convert from post-tax nominal to pre-tax nominal, and then apply the Fisher equation to convert to pre-tax real. The steps could also be performed in the other order.

Development of a simple cash flow model assists in determining which approach yields the appropriate discount rate. Such a model will show that the NPV equivalence condition is generally not met. The formula for conversion between post-tax nominal and pre-tax real is considerably more complex than the standard formula applied, and the resulting pre-tax real discount rate may be considerably higher than the rate resulting from traditional calculations.

A post-tax nominal discount rate does not transform to a single unique pre-tax real discount rate. The transformation is dependent on the pattern of cash flows, including:

- the real growth rate of revenues less operating costs; and
- the rate and magnitude of tax depreciation.

Issues

2) The Authority invites interested parties to provide views on the appropriate WACC methodology and parameter values for the determination of the WACC for TPI Railway.

3) The Authority invites interested parties to comment on the CRA advice in relation to the WACC issues and to respond to the question raised by CRA.

4 TPI submission

TPI requested approval to make a submission to the Authority at the time this Issues Paper was being prepared. The Authority agreed to this request. TPI provided a submission to the Authority on 29 July 2008. TPI's submission is available on the Authority's web site www.era.gov.au.

The TPI submission outlined views on the key risks associated with the railway and an overview of possible methodologies for quantifying these risks. An extract from TPI's submission is provided in the section below.

A key point raised in the TPI submission is the treatment of stranding risk. To assist interested parties in their assessment of this issue, a summary of several Australian regulatory decisions pertaining to stranded assets is provided in section 4.2. The Authority sought comment on the TPI submission from CRA International, with CRA's comments provided in section 4.3.

4.1 Extract of TPI's Submission

Asymmetric Risk and the TPI Railway

Stranding Risk

TPI's network can be compared to other freight networks in Australia. Whilst each heavy haul rail network in Australia serves mines that present stranding risks to varying degrees, TPI's stranding risk is likely to be higher. First, this is because the network is new (that is, it is a greenfields investment). Second, its revenue risk is highly concentrated, based on a single commodity. Its prospective customers are likely to be few in number, and, being junior miners, will be relatively vulnerable to downturns. TPI's entire network could be stranded if there was a significant downturn in the iron ore market.

Should Stranding Risk be Compensated

In a competitive market, a business has a number of alternatives in relation to risk. First, it can seek to mitigate the risk. Risk can generally be reduced by either reducing the probability of occurrence or by reducing the impact of the risk on the business (rarely both). A deterioration in commodity markets is beyond the control of both TPI and the users of its network so the focus is more likely to be on strategies that could reduce the impact on the business. An infrastructure provider exposed to stranding risk (through exposure to a single mine or portfolio of mines), could for example:

- require upfront capital contributions, a deed of arrangement and/or other commitments from mines (taxation and legal costs can reduce the effectiveness of these mitigation techniques), noting that this option was never available to TPI; and/or
- employ accelerated depreciation with a view to say, recovering its full return on and return of capital over the life of the contracts with users.

In Australia, a consensus is yet to emerge on the regulatory treatment of

asymmetric risk, with various regulators taking alternative views. However, the issue has been recognised at a policy level (and to a limited extent by regulators). The Commonwealth has legislated to establish a regime for third party access to services provided by infrastructure owners, as is the case with TPI railway. When an infrastructure owner is subject to such a regime, the Competition Principles Agreement stipulates that:

6(5)(b) Regulated access prices should be set so as to:

(i) generate expected revenue for a regulated service or services that is at least sufficient to meet the efficient costs of providing access to the regulated service or services and include a return on investment commensurate with the regulatory and commercial risks involved.[49]

This clearly states that a third party access provider is entitled to compensation for commercial risks such as asset stranding. In addition, the National Gas Law introduced a range of measures for natural gas pipelines to ameliorate regulatory risk for greenfields investments, including access holidays and light-handed regulation.

Applying the Capital Asset Pricing Model (CAPM)

In a regulatory setting, the 'true' cost of equity may not be equal to the cost from applying a conventionally determined WACC in an environment where the distribution of possible cash flow outcomes is either skewed or truncated.

In a conventional framework, nonsystematic risk is normally compensated through cash flows rather than the WACC.

The key challenge is to ensure that the regulatory environment ensures that an infrastructure provider is adequately compensated for any risk that it cannot cost effectively avoid.

Regulatory treatment

The regulatory treatment of stranding risk is mixed. While some regulators have expressed sympathy for the principle, compensation has not always been provided. One of the reasons for this is because a robust and defensible means of quantifying the risk has not necessarily been provided.

One example where the prospect of regulatory truncation was expressly recognised by a regulator in respect of a greenfields investment was by ESCOSA for the Alice Springs to Darwin Rail Line. Other than the TPI rail infrastructure, the only significant greenfield rail infrastructure that has become subject to regulatory price setting in Australia is the Alice Springs to Darwin rail line.

Another example of where compensation has been provided was by the QCA in its review of the Dalrymple Bay Coal Terminal (DBCT) in 2005, where it provided an uplift to the WACC in recognition of the significant investment risk that was seen to underpin the terminal's expansion. This uplift was not based on an explicit compensation however; instead, the QCA accepted the higher equity beta that was being proposed by DBCT Management.

There is a compelling case for the compensation of stranding risk where it can be shown to be material, with this compensation commensurate with the residual risk that is efficiently borne after any risk mitigation strategies have

[49] Competition Principles Agreement – 11 April 1995 (As amended to 13 April 2007). Section 6,5, (b) (i).

been taken into account. As noted above, a key issue is being able to quantify the risk and determine how it should be compensated.

Valuing asymmetric risks

Asymmetric risk needs to be valued and priced. Compensation may be reflected in the cash flows as an insurance premium or in the WACC applied to the cash flows. Whilst a cash flow adjustment represents the theoretically most appropriate approach, an alternative involves an adjustment to the maximum allowable rate of return so that the expected rate of return is equivalent to the WACC derived in a conventional manner. Finally, it is possible to consider the actual cost of debt as a proxy to inform the market's assessment of asymmetric risk. These approaches are discussed in turn.

Options

A methodology for valuing/pricing the risk is to use real option principles where the asymmetric risk is effectively a call option. The value of the call option needs to be determined.

Most investments are like a call option on shares, in that it gives the holder the right, but not the obligation, to make an investment in a project. The introduction of asymmetric risk forces firms to give away some (or all) of the upside from the investment. In a regulated setting, users of the regulated service are effectively being granted a free call option as they are always able to purchase the service for the regulated price (the strike price), even if the market price of that service (were it cost reflective) would be in excess of this. The value of the option to users is equivalent to the value that would otherwise accrue to the regulated business if it was able to freely determine its prices in a competitive market.

Applying real option techniques to valuing asymmetric risk requires the estimation of a number of variables, including:

- the term to maturity. If the calculation is undertaken on a yearly basis, the term to maturity will be one year;
- the risk free rate of return. The yield on a Commonwealth bond with one year to maturity would be used as the discount rate;
- a measure of volatility. From a comparator analysis, firms would be identified that would have similar characteristics. The volatility of the cash flows of the comparator firms would be used as the proxy.

The other parameters we need to estimate are the equivalent of the 'strike price' (that is, the price of the regulated service) and the market price (or, the price that might be charged by the business if it could freely determine its prices in a competitive market). Determining these two variables requires some form of stochastic simulation. A stochastic simulation will model two sets of cash flows for the business, one reflecting asymmetric risk and one without it. These variables are difficult to quantify in practice.

Probabilistic cash flow approach

The second approach that can be adopted is to make an adjustment to the conventionally assessed cost of capital so as provide the infrastructure owner with an expected return that is equivalent to the conventionally assessed cost of capital once the impact of asymmetric risk is taken into account.

Again, this approach requires considerable information concerning the probability weighting of future returns.

Practical approach

TPI (through its parent, Fortescue) has raised several tranches of debt to finance its Pilbara developments, including construction of rail and port facilities. These facilities range in value and size from over US$1bn to approximately $US250M.

Debt finance is usually structured in a manner that allows the lender to assign risk to the party that is best able to manage it. However, in the case of debt financing in this instance, lenders had no option but to bear the risk of stranding and for this risk to be priced into the interest rate.

Consequently, the debt margin required by lenders above the contemporary BBB debt margin provides an important insight into how debt markets priced the stranding (as well as the asymmetric) risk associated with the project.

It is recognised that the attraction of this approach is its objectivity and transparency as opposed to its theoretical integrity. Nevertheless, given the considerable informational requirements of alternative approaches, actual debt financing costs provide reliable and transparent information as to how capital markets might value stranding risk.

Conclusion

As outlined above, TPI is exposed to significant stranding risk on its rail network investments. This risk is not currently compensated via WACC. We are of the view that there is a compelling case for this risk to be compensated, with any such compensation commensurate with the residual risk borne by TPI after any risk mitigation strategies are employed. The key issue revolves around quantifying this risk.

Three independent approaches have been suggested that provide a basis for estimating the compensation that is appropriate for asymmetric risk:

- option valuation approach - which provides the equivalent of an insurance premium to take into account the impact of asymmetric risk. This approach is theoretically sound, but difficult to quantify;
- an adjusted cost of capital - which involves increasing the maximum allowed cost of capital such that the expected return is equivalent to the conventionally determined cost of capital; and
- estimating the premium to the cost of capital by reference to the debt premium for the debt raised to finance the project, based on the margin above a normal SSS credit rating that was actually paid for the debt sourced by TPI. This approach is less defensible from a theoretical perspective but nevertheless provides an objective benchmark to inform the assessment of stranding risk.

Given that the three approaches are independent, it is possible to quantify the premium according to each of these techniques (when applicable) which in turn allows for a process of validation of the preferred approach.

4.2 Regulatory Treatment of Stranded Assets

Regulators address two key issues with regard to stranded assets.

- Does the infrastructure owner face asymmetric risks?
- Given these risks exist, how should this risk be most appropriately accounted for in the regulatory process?

Stranded asset risk could be accounted for in a number of ways, including by:

- adding a premium to the WACC;
- reducing the assumed economic life (accelerated depreciation) to reflect a probability weighted life; or
- adopting longer regulatory review periods to enable investors to retain higher profits arising from factors such as higher than expected demand growth.

4.2.1 Decisions on Rail Infrastructure

4.2.1.1 The Independent Rail Access Regulator

In a submission to the 2003 WACC Determination, Westnet Rail (**WNR**) proposed an increment to its WACC of 0.84% to reflect asymmetric risk pertaining to stranded asset risk. WNR noted:

> The stranded asset risk arises as a consequence of the long-term nature of the investment in rail infrastructure versus the generally shorter-term nature of the projects the infrastructure serves. While the code allows for the accounting of "economic" rather than "physical" life and can potentially account for higher amortization for specific infrastructure, the economic lives listed in the Costing Principles submission of the 19th of December 2002 reflect "physical life". Stranded asset risk could be accounted for by reducing the assumed economic life to reflect a probability weighted life, but Westnet argues that it is more appropriate to adjust the WACC for several reasons.[50]

In making its determination, the Independent Rail Access Regulator (**IRAR**) noted that:

> The Regulator is aware that some regulators in Australia, such as the ACCC and ESCOSA, have recognised that asymmetric risks are a valid issue that should be incorporated into the regulatory process and that the procedure used to reflect the economic impact of asymmetric risk is still evolving.
>
> The Regulator concurs with the approach that asymmetric risk, where it exists, should be addressed through the cash flow as the risk is likely to be specific to a route or part of the network where there is likely to be only one or a small number of users, rather than include the risk in the WACC which would effect all users of the network and involve an element of cross subsidisation.
>
> However, the Regulator is of the view that the stranded asset risks identified by WNR are already 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

[50] Westnet Rail 2003, Response to Office of the Rail Regulator On NECG's W.A.C.C. Paper.

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.[51]

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

4.2.1.2 Essential Services Commission of South Australia

The Essential Services Commission of South Australia (**ESCOSA**) determined the regulated rates of return for the Alice Springs-Darwin (**ASD**) railway.

To assist in its determination, ESCOSA commissioned a report from Tasman Economics. This report noted:[52]

> the ASD Railway is bearing very substantial demand risk, as it needs to win demand from alternative and incumbent modes of transport, such as sea, road and air.
>
> The equity returns presented for the ASD Railway have been calculated on a most-likely basis, and hence are not directly comparable with a CAPM based WACC. The options for reconciling the two are to either:
>
> - Adjust the CAPM risk measure, beta, upwards; or
> - Incorporate expected cash flows into the financial projections and hence estimate a return based on expected values.
>
> Both options have been used by utility regulators on different occasions. Thus, in the 1998 ACCC decision on access for Victorian Gas Transmission1, the ACCC adjusted beta upwards to account for specific asymmetric risks faced by the network owner. In its 1999 Draft Statement of Principles for the Regulation of Transmission Revenues (for electricity), the ACCC concluded that consistency with the WACC/CAPM framework requires that the net impact on earnings of specific risks be factored into projected cash-flows and not the cost of capital.
>
> However, the important point to note with regard to the ASD Railway is the difference in nature and scale of the asymmetric risks being faced by the infrastructure provider. In the cases addressed above by ACCC, the network provider had established demand, captive customers, and in the view of the ACCC, relatively little asymmetric risk.
>
> Moreover, the 1998 ACCC gas access decision referred pointedly to the different risk position facing greenfield investments. It is to take account of this risk that the National and Victorian Gas Codes provide for a tender process for new pipelines, whereby the rate of return is determined competitively. Clearly the ACCC was concerned about the applicability of CAPM to the risk associated with greenfield site

[51] IRAR 2003, Weighted Average Cost Of Capital To Apply To Westnet Rail And The Western Australian Government Railways Commission Determination Of The Western Australian Independent Rail Access Regulator In Accordance With The Requirements Of Clause 3, Schedule 4 Of The Railways (Access) Code 2000, 1 July 2003.

[52] Tasman Economics 2001, Assessing A Cost Of Capital For The Alice Springs To Darwin Railway, December 2001.

> projects, and appears to have come to the conclusion that for greenfield investments the market is best able to determine the appropriate rates of return.
>
> A second respect in which the ASD Railway differs from a typical regulated utility lies in the timing of returns to the infrastructure provider. Most regulated utilities have a pattern of cash flows and profits that is stable over time. If significant investment is required of the utility, profits may trend upwards with the regulatory asset base as it increases with net capital expenditure. ASD, by contrast, starts with no revenue and profits in the early years, and makes profits only after many years of operation.

ESCOSA recognised two general approaches in deriving (maximum or minimum) regulated rates of return from estimates of the WACC. These were to:

- derive a margin – or 'uplift' factor – above the conventional WACC. This margin is designed to offset the scope for regulatory truncation or to compensate for project-specific risks.
- use an actuarially-fair premium for insuring against any truncation or any project-specific risk, with that amount being imputed to APT's operating costs.

ESCOSA noted that:

> to ensure use of such a WACC does not 'truncate' returns (given the greenfields nature of the railway project), consideration must also be given to setting the ceiling rate of return above the industry-wide WACC in order that the post-regulation mean expected rate of return would equal that WACC.
>
> Regulatory truncation may only be an issue were ESCOSA to impose a ceiling on returns *below* the project's maximum expected return.
>
> Because the industry-wide WACC (of 7.0%) *exceeds* the maximum expected rate of return on total assets (of 3.9%), use of the industry-wide WACC estimate does *not* truncate the returns expected on the Project at financial closure. In these circumstances, ESCOSA is therefore justified in *not* providing for any uplift factor or imputed self-insurance premium beyond the industry-wide WACC when setting the ceiling rate of return.
>
> While there is no case for adjusting the ceiling rate of return beyond the industrywide WACC, a separate issue relates to whether the gap apparent between the maximum expected rate of return and the industry-wide WACC might warrant a reduction in the ceiling rate of return below the industry-wide WACC.
>
> ESCOSA therefore concludes that the ceiling rate of return on total assets is the rate associated with achievement of the industry-wide WACC of 7.0%. ESCOSA estimates that this ceiling rate of return on total assets is equivalent to a post-tax nominal rate of return on project funds of 17.7%.

4.2.2 Decisions on Other Infrastructure

4.2.2.1 ACCC

In calculating annualised CAPEX, the standard approach is to establish the efficient capital costs of replacing the existing network and then estimate the annual capital charges which reflect an appropriate rate of return on capital (and depreciation charges).

In the regulation of telecommunication services, the ACCC uses a tilted annuity approach to determine the level of capital costs to be recovered in each year and to calculate indicative prices for telecommunication services. This approach accounts for depreciation through technological obsolescence by tilting the annuity replacement stream (based on the replacement costs of a modern equivalent asset).

In determining the level of capital costs to be recovered in each year, a tilted annuity is preferred over a simple annuity, namely because a simple annuity does not take account of a number of factors, including that:

- a capital item may be underutilised for a large part of its economic lifetime and only be fully used as service volumes grow; and
- equipment prices change over time and this will change the future costs faced by new entrants.[53]

The objective of a tilted annuity approach is to reflect the price path that would be charged in a competitive market. This approach may be used by the regulator to:

> provide relief on capital recovery grounds .. by increasing the allowed rate of capital recovery by accelerated depreciation allowance.
>
> The tilted annuity method results in more depreciation at the beginning of the asset life if a sufficiently high negative equipment price trend is anticipated, which is usually the case if technological progress is rapid.[54]

4.3 CRA Comment on TPI's Submission

The Authority requested CRA International (**CRA**) to provide general comments on the TPI submission. This advice is as follows:

TPI proposes three alternatives for stranded asset compensation:

- Employing an options-based analysis to value the insurance premium that would need to be added to the GRV annuity. TPI notes that some of the variables in this analysis are difficult to quantify in practice;
- Using a probabilistic cash flow approach whereby the allowed rate of return is adjusted so that the expected return across the modelled scenarios is equal to the WACC. TPI notes that like the options approach this approach requires considerable information concerning the probability weighting of future returns; and
- A "practical approach" using the difference between TPI's actual debt margin and the contemporaneous margin on benchmark BBB debt as an indication of the stranding risk. This amount would be added to the WACC.

Setting aside the complexity of the first two approaches, CRA notes that the "practical approach" is likely to understate the premium required for compensation for stranding risk. We assume that stranding is not an "all or nothing" outcome, but that there may be partial stranding where additional demand for the railway does not eventuate (or collapses at some point in the future) and hence there is unused capacity on the network and revenues are

[53] WIK-Consult 2007, Mobile Termination Cost Model for Australia, Report for the Australian Competition and Consumer Commission, prepared by Brinkmann M., Prof. Hackbarth K.D, Ilic D., Dr. Neu W., Dr. Neumann K-H. and Prof. A.P. Figueras.

[54] Hardin A., Ergas H. and J. Small 1999, Economic Depreciation in Telecommunications Cost Models, A paper prepared for 1999 Industry Economics Conference Regulation, Competition and Industry Structure 12-13 July, Hotel Ibis, Melbourne.

insufficient to fully recompense providers of capital. Different mines will have different "trigger" prices at which they will shut down. It is reasonable to assume that there is a distribution of such trigger prices (i.e. all mines do not shut down at the same price). In many of these events of partial stranding it is the equity investors who will bear the stranding risk. Debt holders will only bear stranding risk after equity investors have borne their share of the risk. The risk borne by debt holders is therefore less than the risk borne by equity investors, and therefore the premium on debt may under-compensate for stranding risk.

Conversely, we consider it an open question as to whether the incentive problems that TPI dismisses really can be dismissed with such ease. However, it is also noted that many utilities in the United States are compensated for their actual cost of debt, and that does not appear to raise incentive concerns.

We also note that an alternative options-based approach exists for estimating stranding risk: a model of a representative junior mine could be developed, incorporating key variables such as iron ore prices, freight costs, and access charges. For each combination of freight costs and access charges there would be an iron ore price at which the junior mine would shut down. Future iron ore prices could be obtained from industry analysts, with a combination of historical data and OTC swaps providing information on volatility of ore prices.

Given this information it would be possible to estimate the probability of the shut down price occurring, and from there develop a probability distribution for partial stranding. This approach could be treated as a variation of TPI's probabilistic cash flow approach, being used to develop coherent scenarios of both the magnitude and timing of partial stranding and the probability of that stranding occurring. This approach might also be treated as a variation of TPI's options-based approach, as the distribution of partial stranding could potentially be used to value the option represented by stranding.

It appears that if there is to be compensation for stranding risks then it would be necessary to utilise one of the more complex approaches. However, an important question is the materiality of the stranding risk.

In this respect there are several questions on which CRA seeks comments.

The majority of the capacity of the railway is to be used by FMG. Does FMG foresee any circumstances in which it might close its mine and thereby partially strand the rail assets?

The additional capacity of the rail line is available to be used by third parties.

Should the stranding risk associated with the third parties be related to the average cost of the total capacity, or should the stranding risk be limited to the incremental cost of that additional capacity? If FMG would have built the rail line for its own purposes without any third party access, then it is arguable that the stranding risk could be limited to the incremental cost of the capacity required for third party access. However, it is also important to recognise that TPI could in the future have shareholders other than FMG (and on that basis not be the same as FMG), with the entire capacity becoming potentially strandable in the future.

If the stranding risk is viewed as being material, then which approach is most suited to valuing the risk / providing compensation?

Issues

4) The Authority invites interested parties to comment on any of the issues raised in the TPI submission.

5) Specifically the Authority invites advice on:

   - the expected future loads and spare capacity on the TPI railway and the likelihood (if any) of the TPI railway asset becoming stranded; and
   - in the event of stranding risk:
     - the magnitude of this risk; and
     - the best approach to value and incorporate this risk into the regulatory framework.

6) The Authority invites interested parties to comment on the CRA advice in relation to TPI's submission and to respond to the questions raised by CRA.