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Cross checks to assess whether the Port's adopted return is a commensurate return

Expert report of Adrian Kemp and Brendan Quach for the Port of Melbourne

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Abbreviations

Abbreviated	Expanded
ACCC	Australian Competition and Consumer Commission
AER	Australian Energy Regulator
CAPM	Capital asset pricing model
DBCT	Dalrymple Bay Coal Terminal
DBCTM	Dalrymple Bay Coal Terminal Management
DRP	Debt risk premium
ERAWA / ERA	Economic Regulation Authority of Western Australia
ESC	Essential Services Commission
ESCOSA	Essential Services Commission of South Australia
ICRC	Independent Competition and Regulatory Commission
IPART	Independent Pricing and Regulatory Tribunal
MRP	Market risk premium
OTTER	Office of the Tasmanian Economic Regulator
Port	Port of Melbourne
QCA	Queensland Competition Authority
SL CAPM	Sharpe-Lintner capital asset pricing model
WACC	Weighted average cost of capital

Summary of opinions

The Essential Services Commission (ESC) in its Statement of Regulatory Approach (SoRA) has identified several cross checks that it intends to use to assess whether the return on capital adopted by the Port of Melbourne (the Port or PoM) is likely commensurate with that which would be required by a benchmark efficient entity providing services with a similar degree of risk as that which applies to the Port in respect of the provision of the prescribed services (commensurate return).

We have been asked by the Port to provide our opinion on numerous matters related to the Tariff Compliance Statement (TCS). The Port's request to us is framed as three questions, ie:

1. Whether the high-level cross-checks the ESC intends to undertake to assess compliance with clause 4.1.1(a) ... as expressed in the SoRA or its interim commentaries on PoM's annual TCSs are appropriate ways of assessing whether PoM's allowance to recover a return on its capital base is a Commensurate Return.
2. Whether there are any other cross-checks to appropriately assess whether PoM's allowance to recover a return on its capital base is a Commensurate Return.
3. Whether the rate of return on PoM's capital base which PoM proposes to adopt in its 2021-22 TCS satisfies the cross-checks identified in your answers to questions 1 and 2.

We present below a summary of our responses to the questions put to us by the Port, along with a reference to the relevant, subsequent section of the report in which they appear.

Question 1: whether the high-level cross checks identified by the ESC are appropriate ways of assessing whether the Port's allowance to recover a return on its capital base is a commensurate return

The cross checks that the ESC identifies are set out in Appendix A of the SoRA, and can be summarised as follows:

- other regulatory decisions for similar industries, such as transport infrastructure primarily used for freight, or other industries with similar risk characteristics;
- surveys of practitioners, with transparent methodologies, relating to particular market-wide components of a weighted average cost of capital;
- estimates of individual WACC parameters used by independent valuation experts ideally relating to firms with comparable characteristics to the port;
- qualitative assessments of whether the systematic risk of the benchmark efficient entity is higher or lower than the systematic risk of the average firm in the market; and
- assessment of whether the cost of debt adopted by the Port is less than the cost of equity.

The ESC's approach to each of the cross checks has some deficiencies which mean that as expressed in the SoRA they are not an appropriate way of assessing the Port's allowance to recover a return on its capital base.

Use of other regulatory decisions

In section 2.2, we highlight several shortcomings of the ESC's use of regulatory decisions, as indicated in its interim commentaries. We consider that for regulatory decisions to be appropriately used as a cross check:

- a range approached must be used without discretion;
- a like-for-like comparison must be undertaken;

- if regulatory parameters are considered in isolation, the parameter must be highly contextualised; and
- in deciding on which decisions to include in the analysis, a consistent approach is required.

The distinct and diverse approaches adopted by Australian regulators examined in this report highlight the extent of discretion that is inherent in rate of return estimation. Judgement and discretion are present at almost every step of the estimation process – ranging from the definition of the benchmark efficient entity to the methodology for determining an appropriate cost of debt and equity as well as the estimation of the constituent parameters.

It follows that applying regulatory decision cross checks appropriately requires the regulatory decisions chosen to be properly contextualised. To appropriately compare the Port's weighted average cost of capital (WACC) with that adopted by other regulators, in our opinion two cross checks are required.

Described in section 3, the first regulatory decision cross check involves comparing:

- a WACC range determined by applying various regulator approaches, but controlling for firm specific parameters (ie, adopting the Port's equity beta, gearing and credit rating) and updating market parameters to a comparable date of estimation; with
- the Port's WACC.

Described in section 4, the second regulatory decision cross check involves comparing the Port's firm specific parameters to those adopted by other Australian regulators. We consider that for the analysis to be robust, decisions can only be compared if they relate to entities with similar levels of risk, ie, to ensure like-for-like comparisons are made. Reflecting our opinion that regulated businesses with exposure to the freight transport supply chain face relatively comparable risk to the Port, we believe that:

- freight rail businesses are, absent a regulatory decision relating to a freight port, most comparable to the Port due to their exposure to changes in freight movements;
- coal related port and rail businesses are weakly comparable to the Port, reflecting their exposure to a single commodity for which volumes are driven by overseas demand; and
- natural monopoly businesses (eg, water and electricity) are not comparable to the Port.

Practitioner surveys and reports from valuation experts

In section 5.1, we summarise our opinion that there are numerous limitations which affect the use of survey evidence for cross check purposes, and so this cross check is not an appropriate way of assessing the Port's allowance to recover a return on its capital base.

In contrast, independent expert reports for, say, an Australian container port (that is used in the context of a recent actual commercial transaction) would be relevant for cross check purposes. However, we are not aware of any relevant independent expert reports for Australian container ports against which to cross check the Port's WACC.

Further, evidence that WACC estimates produced by independent experts frequently include arbitrary adjustments further supports our conclusion that they are not appropriate as evidence to support choices of individual WACC parameters, and more specifically for the choice of market risk premium.

Qualitative assessments of systematic risk

Although we consider that a qualitative assessment of systematic risk is appropriate, it should be appropriately robust and paired with quantitative analysis where possible. In section 5.2, we provide such a cross check.

Debt versus equity costs

In section 2, we highlight that one cross check specified in the SoRA is an assessment of whether the cost of debt adopted by the port is less than the cost of equity. We consider that such an assessment may be appropriate in certain circumstances.

However, in using this cross check it is important to ensure that a like-for-like comparison of prevailing (trailing) cost of equity with prevailing (trailing) cost of debt is made.

Question 2: whether there are any other cross checks to appropriately assess whether the Port's allowance to recover a return on its capital base is a commensurate return

In our report we set out several cross checks, reflecting both improvements on those expressed by the ESC, and others that we consider to be appropriate for assessing whether the Port's adopted rate of return is a commensurate return.

Quantitative assessment of average market risk

We consider a quantitative cross check which provides an indication of the relative riskiness of the Port's prescribed services and assess whether it supports the contention that the Port has below average market risk.

In our opinion, the estimation of the extent to which the Port's systematic risk correlates with the market's using a 'volume beta' provides an appropriate cross check of the relative riskiness of the Port's prescribed services. The volume beta (or accounting beta) is often used in the context of airport regulation,¹ and captures the relationship between the extent to which the volume of sales or revenue of a business' activity is associated with movements in the market overall.² Specifically, the volume beta is estimated by comparing the Port's year-on-year growth in trading volumes with Australia's economic growth.

Use of other financial models

A potential problem with relying on the Sharpe-Lintner CAPM (SL CAPM) is that over the past 50 years it has become well known that empirical versions of the SL CAPM tend to underestimate returns to low-beta assets and overestimate returns to high-beta assets. This empirical regularity suggests that the SL CAPM will tend to underestimate the cost of equity for a low-beta asset such as, for example, regulated water utilities.

As the SL CAPM is a single measure of the return on equity, and models are subject to error, there may be benefits from deploying other financial models as cross checks when assessing whether the Port's adopted rate of return is a commensurate return.

Peer review and sensitivity analysis

External peer reviews from banks, corporate treasuries or consultants provide a possible cross check on the Port's adopted cost of capital.

We consider that the consultation and tariff submission process will provide the opportunity for the cost of capital and WACC parameters to be subject to scrutiny and criticism. The use of peer reviews and consultant reports provides different opinions as to appropriate parameters and estimation processes adopted. Peer review and consultation provide both a sense check of the overall appropriateness of the WACC and parameters, and an opportunity to assess the sensitivity of different parameter estimates to changing assumptions.

¹ See: Commerce Commission of New Zealand, *Review of Christchurch International Airport's pricing decisions and expected performance (July 2017 – June 2022)*, Final report, November 2018, pp 93-95.

² The measurement of the extent to which the volume of sales/revenue is associated with movements in the market was suggested by Dr Martin Lally. See: Lally, M T, *The cost of equity capital and its estimation*, 2000, McGraw Hill, Sydney.

For example, in assessing beta, a range of different estimates and commentary has emerged:

- Synergies estimates an equity beta of 1.0;
- Incenta estimates an equity beta of 1.0, within a range of 0.93 to 1.07; and
- the ESC estimates an asset beta within a range of 0.60 to 0.70.

Question 3: whether the rate of return on the Port's capital base which the Port proposes to adopt in its 2021-22 TCS satisfies the identified cross checks

In our opinion, the Port's proposed WACC of 8.23 per cent satisfies all the cross checks set out in our report. Put another way, the cross checks that we have examined indicate that the Port's adopted rate of return is a commensurate return. It follows that the cross checks in this report provide evidence that the Port's WACC is compliant with the pricing order. Our findings are summarised in the table below.

Cross check	Description	Does cross check provide evidence that the Port's rate of return is a commensurate return?
Regulatory decisions -standardised market parameters	Comparison of the Port's WACC with standardised regulatory WACCs. The Port's gearing and equity beta are adopted.	Yes. We find that applying these adjustments to regulatory decisions results in a cross check WACC range which includes the Port's WACC for 2021-22. In our opinion, this is sufficient for the Port's WACC to be considered a commensurate return when evaluated against this cross check.
Regulatory decisions -firm specific parameters	Comparison of the Port's firm specific parameters with those adopted in comparable regulatory decisions.	Yes. On balance, we consider that this analysis indicates that the Port's proposed parameters are comparable to those adopted by regulators for comparable entities. It follows that the Port's firm specific parameter estimates satisfy this cross check.
Quantitative assessment of risk	Review of the level of systematic risk faced by the Port relative to the average. Indicates whether the Port's equity beta should be greater than or below one.	Yes. Our analysis indicates that demand for the Port's services is highly sensitive to movements in GNI and is substantially higher than the volume betas calculated for numerous other regulated businesses.
The use of other financial models	Consideration of alternative financial models, including the Black CAPM and the Fama French Model.	Yes. We observe that the Port's use of the SL CAPM results in a return on equity that is more conservative than that previously measured using the Fama French Model.
Peer review and sensitivity analysis	External peer reviews from banks, corporate treasuries or consultants.	NA.

1. Introduction

We have been asked to prepare this report by the Port of Melbourne (the 'Port'). The context for this report is the Port's preparation of its Tariff Compliance Statement (TCS) for 2021-22 for submission to the Essential Services Commission of Victoria (ESC) by 31 May 2021.

This report sets out our assessment of several cross checks which identify the appropriate range of a return on capital against which compliance of the Port of Melbourne's (the 'Port') return on capital can be assessed. Consistent with the Essential Services Commission's (ESC) assessment methodology these cross checks assist with an assessment of whether the allowance for the return on the Port's capital base is commensurate with that which would be required by a benchmark efficient entity providing services with a similar degree of risk as that which applies to the Port in respect of the provision of the prescribed services (commensurate return).

In exchange for providing services, businesses set prices which allow the recovery of a rate of return. In the presence of market power, a firm may be able to set a price above the competitive level. To assess whether a business is obtaining returns higher than under desirable conditions, a benchmark is required – the rate of return under workable competition. The relevant rate of return for assessing performance is the rate that reflects what equity and debt security providers could be earning by committing funds to alternative projects with similar risk, ie, the opportunity cost of capital.³

Since companies are typically funded by a combination of debt and equity, most regulators and competition authorities estimate the opportunity cost of capital by means of a weighted average cost of capital (WACC). The WACC is simply the sum of the cost of debt and the cost of equity weighted by the proportion of these two forms of capital finance.

The ESC is responsible for assessing whether the Port has failed to comply with its pricing order, and, if there has been non-compliance, whether that non-compliance is 'significant and sustained'. In relation to the cost of capital, the ESC provides guidance on how it intends to assess whether the Port has complied with the requirements of the pricing order and the objectives of the regulatory regime.⁴ In summary, the ESC's process consists of three stages:

1. an assessment of whether the Port's approach (approaches) to determining the allowed rate of return is (are) 'well accepted' (**the well accepted test**);
2. if the Port passes the well accepted test, an assessment of whether the return on capital outcomes adopted by the Port are commensurate with the return required by a benchmark efficient entity with a similar degree of risk as that which applies to the Port in respect of providing prescribed services (**the benchmark efficient entity test**); and
3. an assessment of whether the Port's approach is consistent with the pricing order and the objectives of the regulatory regime.

In this report, we focus on the second stage of the ESC's process, ie, on determining whether the return on capital adopted by the Port, which is assumed to have passed the well accepted test, is a commensurate return.

In doing so, we provide a systematic assessment of both the rate of return methodologies of other regulators and their assessment of the appropriate compensation for the risk of investing in regulated infrastructure assets. By adopting such a broad assessment, we provide a sound basis for assessing whether the Port's commensurate return is a commensurate return, and so is compliant with its pricing order. Further, we

³ NZ Commerce Commission, *Final Report | Part IV Inquiry into Airfield Activities at Auckland, Wellington, and Christchurch International Airports*, 1 August 2002, p 147.

⁴ ESC, *Statement of regulatory approach*, April 2020, pp 22-23.

identify other cross checks which we consider to be appropriate to utilise in evaluating whether the Port's adopted return on capital is a commensurate return.

1.1 Instructions

We attach a copy of our detailed instructions as Annexure A. In summary, we have been asked by the Port to provide our opinion on numerous matters related to the Tariff Compliance Statement (TCS). The Port's request to us is framed as three questions, ie:

1. Whether the high-level cross-checks the ESC intends to undertake to assess compliance with clause 4.1.1(a) (that is, step 2.1 referred to above) as expressed in the SoRA or its interim commentaries on PoM's annual TCSs are appropriate ways of assessing whether PoM's allowance to recover a return on its capital base is a Commensurate Return.
2. Whether there are any other cross-checks to appropriately assess whether PoM's allowance to recover a return on its capital base is a Commensurate Return.
3. Whether the rate of return on PoM's capital base which PoM proposes to adopt in its 2021-22 TCS satisfies the cross-checks identified in your answers to questions 1 and 2.

1.2 Experience and qualifications

In this section, we provide a summary of our experience and qualifications.

Adrian Kemp

Adrian is a founding Partner of the economic consulting firm HoustonKemp. Over a period of more than twenty years he has accumulated substantial experience as an economist advising on regulation and policy matters affecting the transport, energy, and water industries.

Of relevance to this matter, Adrian has advised clients on matters relating to the cost of capital, including on developments in the methodology for calculating the WACC for regulated infrastructure assets. This includes advising on the regulatory cost of capital methodology and its application whilst employed by the Independent Pricing and Regulatory Tribunal of New South Wales and advising the Essential Services Commission of South Australia on developments in the methodology for calculating the WACC for regulated infrastructure assets.

Adrian holds a Master of Economics from the Australian National University, a Bachelor of Economics with Honours from the University of Western Australia, and a Bachelor of Laws from the University of Western Australia.

Brendan Quach

Brendan has worked as a consulting economist, specialising in network economics and finance in Australia, New Zealand and Asia Pacific region. Over a period exceeding 19 years, Brendan has advised clients on the application of regulatory principles to airports, ports, telecommunications electricity transmission and distribution networks, water networks and gas pipelines. He has provided advice on application of the building block approach, incentive mechanisms, operating and capital allowances, financing, pricing and asset valuation to businesses, a regulators and governments.

Brendan is a specialist in the cost of capital for use in regulatory price reviews and contract arbitrations. He has authored reports on all aspects of the cost of capital including equity estimation techniques, the impact of tax imputation credits, and estimating benchmark debt costs.

Brendan holds a Bachelor of Economics and a Bachelor of Laws, both from the Australian National University.

Acknowledgement

In preparing this report we have been provided with a copy of:

- Form 44A to the Supreme Court (General Civil Procedure) Rules 2015, the Expert Witness Code of Conduct (Code of Conduct); and
- Victorian Civil & Administrative Tribunal Practice Note – PNVCAT2, Expert Evidence (Practice Note).

We acknowledge that:

- we have read and understood the Code of Conduct and the Practice Note, and agree to be bound by them; and
- our opinions set out here are based wholly or substantially upon our specialised knowledge.

We have been assisted in the preparation of this report by our colleague Brydon McLeod. Notwithstanding this assistance, the opinions in this report are our own, and we take full responsibility for them.

1.3 Structure of the report

We have structured our report as follows:

- in section 2, we provide an overview of the ESC's benchmark efficient entity test, detailing:
 - > the indicative cross checks used by the ESC in its interim commentary; and
 - > the shortcomings of the initial cross checks employed by the ESC;
- in sections 3 and 4, we set out our opinion regarding how Australian regulatory decisions should be used to cross check whether the Port's adopted rate of return is a commensurate return;
- in section 5, we describe several alternate cross checks that we consider appropriate to assess whether the Port's adopted rate of return is a commensurate return, and set out our assessment of these cross checks; and
- in section 6, we provide our declaration in accordance with the requirements of the Code of Conduct and the Practice Note.

In Appendix A1, we provide more detail on the approaches used by Australian regulators to determine the WACC market parameters. In Appendix A2, we set out the considerations of Australian regulators on firm specific parameters across several recent decisions.



2. The ESC's benchmark efficient entity test

In November 2016, the ESC was granted the responsibility for assessing the Port's compliance with its pricing order.⁵ The pricing order covers several prescribed services, including:

- services for berthing vessels;
- shipping channels in Port of Melbourne waters;
- short-term storage; and
- access to infrastructure (eg, wharves, roads and rail infrastructure).

The ESC conducts five-yearly reviews of the Port's compliance with its pricing order, which requires that the annual revenue requirement include:⁶

an allowance to recover a return on its capital base, commensurate with that which would be required by a benchmark efficient entity providing services with a similar degree of risk as that which applies to the Port Licence Holder in respect of the provision of the Prescribed Services.

Further, the pricing order requires that this return on capital use 'one or a combination of well accepted approaches that distinguish the cost of equity and debt, and so derive a weighted average cost of capital'.⁷

Under the Port Management Act (1995), the ESC must, within six months after each five-year review period, report to the relevant Minister on whether the port licence holder has complied with the pricing order, and, if there has been non-compliance, whether that non-compliance is 'significant and sustained'. If the ESC finds 'significant and sustained' non-compliance, further processes may then be triggered that could lead to 're-regulation' of prescribed service prices.⁸

In its Statement of Regulatory Approach, dated 28 April 2020 (Version 2.0), the ESC outlines its approach to assessing compliance of the Port's return on capital. This assessment involves applying cross checks, ie:⁹

2. If the port has passed the well accepted test, then we would assess whether the return on capital outcomes determined by the port, when calculating the aggregate revenue requirement, are commensurate with the return required by a benchmark efficient entity with a similar degree of risk as that which applies to the port in respect of providing prescribed services. We refer to this as the 'benchmark efficient entity test'. We would apply this test using two steps.
 - 2.1. We would undertake high-level cross-checks to assess if the overall return on capital used by the port is likely to be commensurate with the returns that would be required by a benchmark efficient entity. Examples of the types of the high-level cross-checks that we may use are set out in Appendix A. If these cross-checks indicate that the return on capital used by the port is commensurate with the returns that would be required by a benchmark efficient entity, then the port is likely to be considered compliant.
 - 2.2. If the cross-checks suggest that the return on capital used by the port is not commensurate with the returns that would be required by a benchmark efficient entity, then we would likely go on to identify specific areas of potential concern—for example, individual parameter estimates that may have been over-estimated or under-estimated, or the way in which

⁵ Refer to the ESC's website, available at <https://www.esc.vic.gov.au/transport/port-melbourne/our-role-administering-port-melbourne-regulatory-regime>, accessed on 17 May 2021.

⁶ Victoria Government Gazette, *Pricing order* – S. 201, 24 June 2016, para 4.1.1(a).

⁷ Victoria Government Gazette, *Pricing order* – S. 201, 24 June 2016, para 4.3.1.

⁸ ESC, *Overview of the Port of Melbourne and Essential Services Commission's regulatory roles*, March 2017, p 24.

⁹ ESC, *Statement of Regulatory Approach – Version 2.0*, Port of Melbourne Pricing Order, April 2020, p 23.

estimates have been combined to determine the overall rate of return— for further investigation.

This report focusses on stage 2.1 of the ESC's assessment, ie, high-level cross-checks to assess if the overall return on capital used by the port is a commensurate return.

The cross checks that the ESC identifies are set out in Appendix A of the Statement of Regulatory Approach, and can be summarised as follows:

- other regulatory decisions for similar industries, such as transport infrastructure primarily used for freight, or other industries with similar risk characteristics;
- surveys of practitioners, with transparent methodologies, relating to particular market-wide components of a weighted average cost of capital;
- estimates of individual WACC parameters used by independent valuation experts ideally relating to firms with comparable characteristics to the port;
- qualitative assessments of whether the systematic risk of the benchmark efficient entity is higher or lower than the systematic risk of the average firm in the market; and
- assessment of whether the cost of debt adopted by the Port is less than the cost of equity.

The ESC has provided limited commentary regarding how it intends to practically apply the cross checks specified in its statement of regulatory approach.

In the remainder of this section, we describe the preliminary cross checks applied by the ESC within the context of its interim commentaries and highlight potential shortcomings of its indicative approach.

2.1 The ESC's commentary on the Port's tariff compliance report

In its December 2020 Interim commentary, the ESC noted that:¹⁰

- the Port's WACC was relatively high, when compared to other regulated businesses;
- this appears to be driven by the market risk premium, asset beta and gamma parameters; and
- the 'high' WACC suggests that in the five-yearly review, a closer examination of the manner in which the WACC has been estimated may be warranted.

The ESC estimated revised WACC parameters which were equal to or lower than the Port's estimates, resulting in a reduced pre-tax nominal WACC – illustrated in table 2.1.

Table 2.1: The ESC's revised WACC parameters

WACC parameters	ESC	Implied ESC range	Port of Melbourne
Market risk premium	Ibbotson range 6.00% to 7.10%	Ibbotson range 6.00% to 7.10%	7.57%
Asset beta	0.60 to 0.70	0.60 to 0.70	0.7
Gamma	0.35 to 0.50	0.35 to 0.50	0.33
WACC (pre-tax nominal)	6.30% to 7.90%	6.49% to 8.47%	8.93%

Source: ESC, *Interim commentary*, December 2020, p 21.

¹⁰ ESC, *Interim commentary*, December 2020, pp 4-5.

The ESC supports its contention that the Port's WACC appears high using several cross checks.¹¹ However, our review of its historical interim commentaries indicate that it places greater emphasis on regulatory precedent as opposed to other cross checks. For example, in a discussion of the appropriate level of gamma, it noted that it considers:¹²

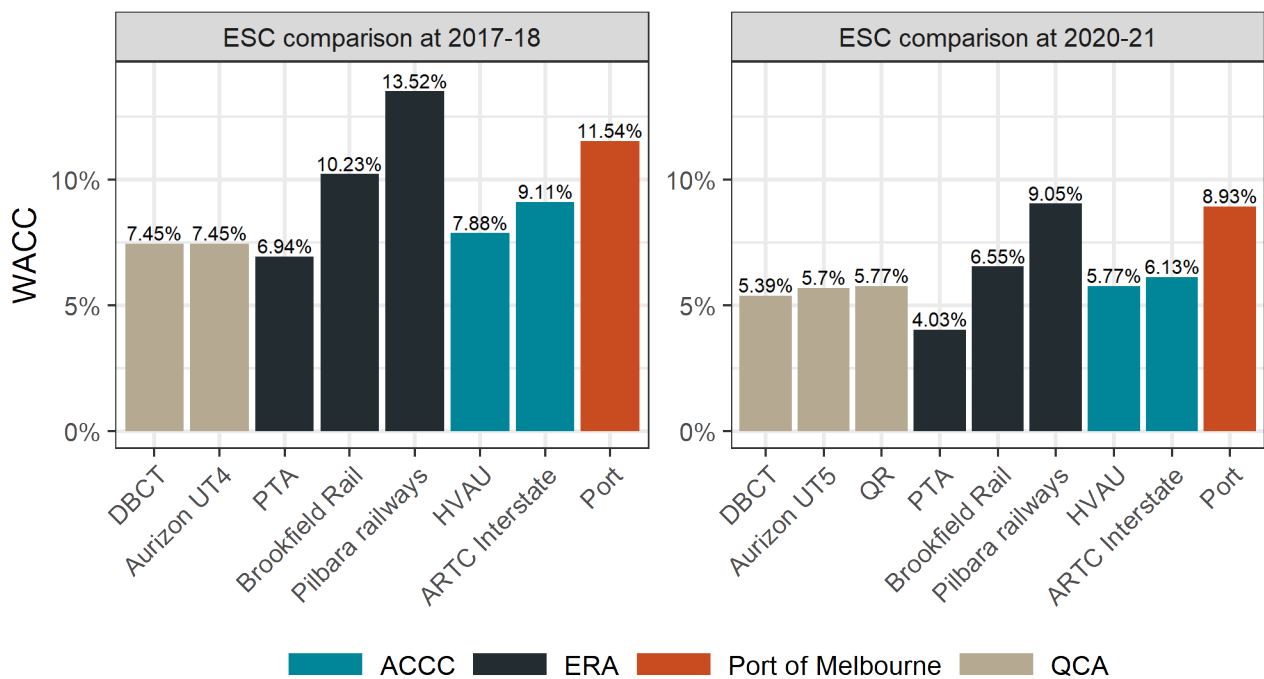
that the aforementioned regulatory decisions and appeal outcomes have been comprehensive, and reflect the accumulation of evidence and expert views including from academia and financial practice. Therefore, they provide considerable guidance on what might be regarded as acceptable in the context of setting regulated rates of return at the present time.

It follows that our discussion of the ESC's use of regulatory precedent as a cross check is the foremost focus of this report.

2.1.1 The ESC's use of regulatory precedent

In its December 2020 Interim commentary, the ESC employed a range of regulatory decisions as cross checks. The initial component of this cross check is a comparison of the Port's WACC (in 2017-18 and 2020-21) with that approved by a range of regulators. It finds that the Port's WACC was the second highest in its sample of decisions in both 2017-18 and 2020-21.¹³

Figure 2.1: The ESC's comparison of the Port's WACC with regulatory benchmarks in the transport infrastructure sector, 2017-18 and 2020-21



Note: This chart illustrates analysis presented by the ESC. Source: ESC, Interim commentary, December 2020, p 8.

¹¹ The ESC has held this contention across numerous interim commentaries. For example, in its 2019-20 interim commentary, the ESC wrote that the 'port's rate of return continues to appear high and, in the commission's interim view, would require further substantial justification to demonstrate compliance with the pricing order'. See: ESC, 2019-20 tariff compliance statement, Interim commentary, p 1.

¹² ESC, Interim commentary – Port of Melbourne tariff compliance statement 2018-19, October 2018, p 78.

¹³ ESC, Interim commentary, December 2020, p 8.

Subsequently, the ESC contrasts the Port's specific WACC components with those of recent regulatory decisions or models – table 2.2. The ESC considers that the market risk premium, equity beta and gamma consistently remain within the range that lends itself to higher WACC estimates.¹⁴

Table 2.2: The ESC's parameter comparison

Entity	IPART	ESCOSA	QCA	ERAWA	ERAWA	ERAWA	Port
Source Date of publication	WACC Model - Rail Aug-20	SA Water Regulatory Determination Jun-20	Gladstone Area Water Board May-20	Public Transport Authority Aug-19	Arc Infrastructure Aug-19	Pilbara Railways Aug-19	TCS 2020-21 May-20
Risk-free rate	2.35%	0.91%	0.90%	1.53%	1.53%	1.53%	0.90%
Market risk premium	7.30%	6.00%	7.00%	5.90%	5.90%	5.90%	7.57%
Equity beta	0.90	0.67	0.73	0.60	0.90	1.30	1.00
Debt risk premium	2.23%	4.18%	2.44%	1.61%	2.08%	3.17%	4.04%
Debt raising costs	0.13%	0.13%	0.11%	0.10%	0.10%	0.10%	0.10%
Gearing	60%	60%	50%	50%	25%	20%	30%
Gamma	0.25	0.59	0.48	0.50	0.50	0.50	0.33
Cost of equity (pre- tax nominal)	11.51%	5.63%	7.11%	5.96%	8.05%	10.82%	10.60%
Cost of debt (pre-tax nominal)	4.70%	5.22%	3.45%	3.24%	3.71%	4.80%	5.04%
WACC (pre-tax nominal)	7.42%	5.38%	5.28%	4.60%	6.96%	9.62%	8.93%
WACC margin	5.07%	4.47%	4.38%	3.07%	5.43%	8.09%	8.03%

Source: ESC, *Interim commentary*, December 2020, pp 9 and 21.

Although the requirement in the pricing order is for the Port to estimate the WACC of a benchmark efficient entity facing similar risk as the Port, the ESC compares the Port's WACC with that of various regulated businesses including regulated water and sewerage service providers and transport service providers. Regarding transport infrastructure, it notes that:¹⁵

...[it] understand[s] that the requirement in the pricing order is for the port to estimate the WACC of a benchmark efficient entity facing similar risk as the port. However, [it] think[s] it is worth comparing the port's WACC with those of regulated businesses in the transport infrastructure sector. The WACC represents the return investors expect from other investments with similar risks. Otherwise, it is unlikely that the port would be able to attract the capital it needs as investors would invest elsewhere. A consistently high WACC relative to other regulated entities in the transport sector suggests that the port appears to assess its risk to be substantially higher than the risk of most of these entities.

Separately, the ESC notes the importance of considering whether a regulator's decision is in effect. For example, in its 2017-18 tariff compliance statement the ESC notes that:¹⁶

[Synergies' estimate of 0.25] compares with the AER's recent decisions to set gamma at 0.4. Two recent decisions by the Australian Competition Tribunal found no error in the AER's decision to adopt a gamma estimate of 0.4. Further, the Full Federal Court found error in a decision by a differently-constituted Australian Competition Tribunal to substitute the AER's gamma estimate of 0.4 with an estimate of 0.25.

¹⁴ ESC, *Interim commentary*, December 2020, p 8.

¹⁵ ESC, *Interim commentary*, December 2020, p 9.

¹⁶ ESC. 2017-18 Port of Melbourne tariff compliance statement, November 2017, p 13.

2.1.2 Other cross checks discussed by the ESC

In this subsection, we provide a description of the other cross checks discussed by the ESC. These include a qualitative assessment of risk, surveys of practitioners and use of valuation experts' estimates.

Qualitative risk assessment of whether systematic risk of the Benchmark Efficient Entity is higher/lower than the market

The ESC's application of qualitative risk assessments is illustrated in its review of the Port's gearing and equity beta. The ESC's assessment of risk was in response to analysis by Synergies which:¹⁷

- found that 'the nature of regulation is unlikely to have any mitigating impact on the Port's systematic risk'; and
- suggested that the Port is 'likely to have its revenues significantly affected by levels of economic activity throughout the lease period'.¹⁸

The ESC suggests that Synergies' finding that the regulatory regime has no impact on the Port's systematic risk contrasts with opinions of regulators when examining separate but similar regimes, including the AER and the QCA.¹⁹ It concludes that:²⁰

Consistent with the findings of other regulators, the presence of regulation will, all else being equal, lower the systematic risk of the benchmark efficient entity providing the port's prescribed services compared to the same entity operating in an unregulated setting.

Although this does not necessarily imply that the ESC considers the Port faces lower than average systematic risk, it indicates that it may consider that the Port is below average risk (all else equal). We discuss the extent to which the regulation applicable to the Port is similar to the firms regulated by the AER and QCA in section 4. In section 5.2, we outline an additional cross check which provides a means of quantitatively assessing the relative risk of the Port.

Surveys of practitioners

In its interim commentaries, the ESC has made some reference to surveys of market practitioners. For example, regarding Synergies' gamma estimate it observed that:²¹

Some surveys of market practice have found that valuation experts do assign some value to imputation credits.

We discuss the appropriateness of this cross check in section 5.1.

Estimates of individual WACC parameters

In its interim commentaries, the ESC has made observations regarding the use of valuation expert findings, including the individual WACC parameters estimated by valuation experts. For example, regarding Synergies' gamma estimate, it observed that:²²

The practice of valuation experts has been considered in regulatory determinations. A main finding (affirmed by the Tribunal) has been that valuation experts may choose to assign no value to

¹⁷ ESC, 2018-19 tariff compliance statement, Interim commentary, October 2018, p 64.

¹⁸ ESC, 2018-19 tariff compliance statement, Interim commentary, October 2018, p 64.

¹⁹ ESC, 2018-19 tariff compliance statement, Interim commentary, October 2018, pp 64-65.

²⁰ ESC, 2018-19 tariff compliance statement, Interim commentary, October 2018, p 65.

²¹ ESC, 2018-19 tariff compliance statement, Interim commentary, October 2018, pp 74-76.

²² ESC, 2018-19 tariff compliance statement, Interim commentary, October 2018, pp 74-76.

imputation credits because of the difficulties in reliably estimating their value, rather than an in-principle or evidence based view that credits have no value to investors.

We discuss the appropriateness of this cross check in section 5.1.

Assessment of whether the cost of debt is less than the cost of equity

Our review of the ESC's interim commentaries indicates that an assessment of whether the cost of debt is less than the cost of equity is not applied by the ESC. While this cross check was relevant during the global financial crisis (GFC), when observed debt yields were higher than allowed equity returns for regulated businesses, we consider that this cross check has diminished relevance in the current market.

Notwithstanding, we observe that the Port's cost of debt estimate is less than its cost of equity estimate.

2.2 Shortcomings of the ESC's use of regulatory decisions

In our opinion the regulatory decision cross checks used by the ESC have several shortcomings.²³ In the subsections below, we discuss these shortcomings. These shortcomings are partly addressed by the cross checks described in sections 3 and 4 below.

2.2.1 A ranged approach is necessary to reflect inherent uncertainty

The ESC's preliminary comparison of the Port's adopted rate of return with regulatory benchmarks indicates that it may intend to apply discretion when assessing whether the Port's return on capital is a commensurate return.²⁴

In our opinion, cross checks should clearly (and without discretion) establish whether or not the Port's return on capital is a commensurate return.

We consider that it is not appropriate for the ESC (or the Port) to be selective on the regulatory decisions used to determine the cross check range, as this provides a second opportunity to review the methodology and parameter choices, which are more appropriately assessed as part of a consideration as to whether the Port's choices are 'well accepted'.

The removal of discretion from the regulatory cross check recognises the imprecise nature of estimating WACC. Indeed, when coupled with asymmetric risks of underinvestment, this represents the reason why the New Zealand Commerce Commission sets a WACC above its mid-point estimate for electricity and gas networks.²⁵

In this way, for a cross check using regulatory decisions to be appropriate, it should provide a rate of return range with which the Port's WACC can be compared. At an aggregate WACC level, this approach allows the Port to make decisions about the methodology used to determine the return on capital and industry specific parameter choices and assess whether the proposed WACC falls within the range established by Australian regulatory decisions.

2.2.2 It is necessary to conduct a 'like for like' comparison

We consider that when comparing regulatory decisions, it is important to recognise that regulators:

- adopt different methodologies to estimate the WACC and estimate different market parameters;

²³ We note that these cross checks are preliminary.

²⁴ We highlight the ESC's approach in section 2.1.1.

²⁵ New Zealand Commerce Commission, *Guidelines for WACC determinations under the cost of capital input methodologies*, 30 April 2018, p 12; New Zealand Commerce Commission, *Amendment to the WACC percentile for price-quality regulation for electricity lines services and gas pipeline services*, Reasons paper.

- make decisions at different dates and so reflect market conditions that are not directly comparable to the estimates adopted by the Port; and
- are often setting the WACC for businesses with different risks compared to the Port.

The difficulties of comparing rate of return methodologies are highlighted by numerous regulators. For example, ESCOSA notes that 'rates of return across jurisdictions should be viewed in the appropriate context and interpreted with caution'. It lists several limitations and risks with undertaking cross jurisdictional comparisons, including that:²⁶

- comparisons require assumptions regarding timing and parameter selection, regulator responses (eg, due to once-off market events, or regarding parameters which are determined using regulator discretion), and can introduce discretion regarding weighting of certain jurisdictions and industries;
- as a matter of law, regulators must use rate of return methodologies that meet their legislative requirements and objectives – these differ by jurisdiction and by industry; and
- there can be different underlying methodologies followed by regulators.

Need to account for different approaches

Australian regulators have adopted a range of approaches to estimating the WACC for regulated businesses. For example:

- some regulators estimate the WACC at the time of a decision and so estimate the prevailing return on debt and equity;
- other regulators have accepted that the WACC should reflect a trailing return on debt to reflect that a benchmark efficient entity periodically issue tranches of debt to minimise refinancing risk; while
- other regulators believe that investors in long lived assets have regard to both the short term and long term cost of capital.

Further, Australian regulators have not reached a consensus on the value of market wide parameters, such as the MRP or gamma.

The divergence of approaches and estimates of market parameters reflects the inherent uncertainty of estimating the cost of capital of infrastructure businesses. We note that the ESC's current regulatory cross check (which we summarise in section 2.1.1) does not systematically analyse the WACC methodology adopted by the Port and whether its approach results in a rate of return that is inconsistent with what would have been allowed by other Australian economic regulators.

Need to account for market conditions and decision timing

The ESC's preliminary analysis reviews a range of decisions that have been made over the previous three years. However, these decisions reflect the market conditions at the time of the decision and consequently are not directly comparable to the Port's WACC. While the ESC has normalised for differences in the risk free rates, different market conditions would also impact the value of the market risk premium and the cost of debt.

We consider that, where regulatory discretion is applied, it is inappropriate to update parameters. Further, although more recent decisions are more likely to reflect updated regulator beliefs, this does not preclude the application of methodologies adopted in previous regulatory decisions. 'Outdated' regulatory decisions may contain valuable information about the considerations made by regulators.

²⁶ ESCOSA, *SA Water final determination*, Reasons, June 2020, pp 277-278.

Controlling for different firm specific characteristics

The ESC compares several regulatory decisions made by regulators, each of which use different firm specific characteristics. If the firm specific parameters underpinning a regulatory decision are significantly different to the Port's characteristics, the resultant WACC range has limited relevance as a cross check.

We consider that the ESC's comparison of firm specific parameters must reflect a consistent consideration of the risks faced by the Port, ie, the arguments made when undertaking a first principles analysis to determine beta should also apply to determining relevant regulatory decisions. However, the ESC's cross check (which we summarise in section 2.1.1) compares the Port's WACC with several regulatory decisions with significantly different risks. These include for:

- government owned rail network infrastructure used to provide passenger transport services (Public Transport Authority);
- rail network infrastructure used to transport freight (Arc Infrastructure);
- rail network infrastructure used to transport iron ore from mines to export terminals (Pilbara Railway);
- infrastructure used to provide urban water and wastewater services (SA Water);
- infrastructure used to provide rural water storage and transport services (Gladstone Area Water Board); and
- a rate of return that is not reflected in any decision by the regulator (see section 2.2.4 below).

We discuss the problem with the regulatory comparisons undertaken by the ESC in section 4 of this report.

2.2.3 Analysis of individual regulator parameter estimates can be misleading

The ESC supports the use of broad cross checks. This is because the use of these cross checks prevents problems that arise when considering individual WACC components in isolation:²⁷

Such broad comparisons or 'cross checks' are standard regulatory practice. They are used to overcome shortcomings in assessing WACC components in isolation that may produce an unreasonable result when aggregated.

In other words, comparing factors in isolation can result in 'cherry picking' of components. This similarly applies to adjusting beta, market risk premium and gamma in isolation. In our opinion, these limitations must be considered when developing cross checks.

2.2.4 Inconsistent inclusion of WACC not associated with a regulatory decision

Our review of the regulatory decision comparator group adopted by the ESC in its cross check of the Port's return on capital (as set out in table 2.2) indicates that the ESC includes a WACC that is not reflected in any published regulatory decision.

Specifically, the ESC's regulatory decision comparator group includes a non-decision since IPART did not decide on the appropriate WACC for a rail network in August 2020. Instead, the ESC has included the rail value set out in the spreadsheet attached to IPART's August 2020 biannual WACC update. However, IPART's last published rail decisions that included a regulatory WACC were:

- Railcorp's Hunter Valley rail network that had a pre-tax nominal WACC of 9.4% (July 2019) – including gearing of 55% and an equity beta 1.0;²⁸ and
- Railcorp's non-Hunter Valley rail network, in which no return on capital is provided.²⁹

²⁷ ESC, 2018-19 tariff compliance statement, Interim commentary, p 11.

²⁸ IPART, *Rate of return and remaining mine life 2019-20*, Final report, July 2019, p 6.

²⁹ IPART, *Compliance statement RailCorp non-HVCN 2017-18*, Fact sheet, July 2019, p 3.

However, the ESC sets out a WACC that is based on a gearing ratio of 60 per cent and an equity beta of 0.90. We note that the values are materially lower than the values determined for Railcorp's Hunter Valley rail network and so do not reflect the return given by IPART in its latest regulatory decisions for rail infrastructure.

3. Comparing market parameters

The return required by a benchmark efficient entity with a similar degree of risk as that which applies to the Port in respect of providing prescribed services cannot be directly observed on either an ex-ante or ex-post basis. This is because both the return on equity and debt depends on the collective expectations of all potential investors and their assessment of 'risk'.

This is the case for all regulators who, due to the unobservable nature of the cost of capital, apply judgement and discretion at almost every step of the rate of return estimation process, ranging from:

- the methodologies adopted to estimate the cost of debt and equity;
- the values adopted for market wide parameters; and
- the values determined for the businesses/industry parameters.

The distinct and diverse approaches adopted by the Australian regulators examined in this report highlight the discretion that is inherent in rate of return decisions.

Notwithstanding, given the resources invested by regulators, regulated businesses and stakeholders, regulatory decisions contain valuable information which can be used to assess whether the Port's rate of return is a commensurate return.

In this section, we detail our assessment of an appropriate cross check which evaluates whether the Port's WACC falls outside the range implied by other regulatory decisions.

3.1 Normalising for firm specific differences to ensure comparability of regulatory decisions

In section 2.2, we highlight that an appropriate cross check using regulatory decisions requires those decisions be made comparable by normalising for firm specific factors that influence the return on capital. To control for variation in the firm specific characteristics adopted in other regulatory decisions, we:

- replace the firm specific parameters adopted in regulatory decisions with those adopted by the Port, ie, an equity beta of 1.0, gearing of 30 per cent and a BBB credit rating;³⁰
- update regulator market parameter estimates to reflect a time period (and by consequence, market conditions) that are consistent with those adopted by the Port;³¹ and
- apply the market based parameters estimated using the relevant regulator methodology.

We consider that the appropriate application of this cross check involves:

- estimating the range of normalised regulator rate of return estimates; and
- assessing whether the Port's adopted rate of return is within this range.

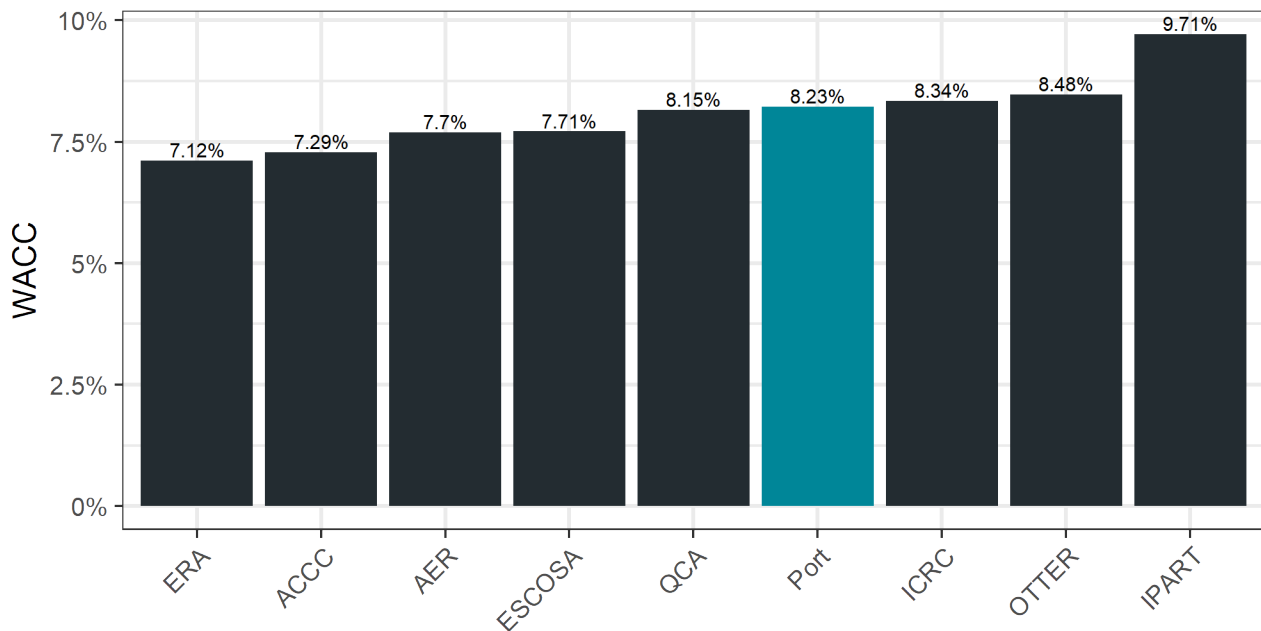
If the Port's adopted rate of return is within the range of normalised regulator WACC estimates, the cross check should be passed, indicating that the rate of return is a commensurate return. However, if the Port's adopted rate of return falls outside the range of normalised regulator rate of return estimates then the cross check should fail, indicating that the Port's adopted rate of return is not a commensurate return.

³⁰ We undertake a cross check of the firm specific parameters in section 4 below.

³¹ Some market parameters are determined using a relatively high degree of regulatory judgement and discretion, ie, the MRP and gamma. By consequence, we do not attempt to update these values to March 2021 terms. Instead, these parameters are held constant from the most recently available decision.

Applying these adjustments to regulatory decisions results in a cross check range which includes the Port's rate of return – Figure 3.1. In our opinion, this is sufficient for the Port's rate of return of 8.23 per cent to be considered a commensurate return when evaluated against this cross check.

Figure 3.1: Comparison of WACC estimates using normalised firm specific parameters



Note: The equity beta and gearing are normalised to be consistent with the Port's estimates.

The composition of the WACC estimates illustrated above is detailed in Table 3.1 below. Notwithstanding the limitation of observing WACC components in isolation described in section 2.2.3, Table 3.1 illustrates that:

- reflecting the recent low yield environment, the cost of debt estimates obtained using:
 - > methods that place weight on historical data, eg, the Port's, the AER's and OTTER's; exceed
 - > the cost of debt estimates formed using on the day approaches such as those used by the QCA and the ERA; and
- reflecting variation in gamma and MRP estimates, there is a wide range of pre-tax return on equity estimates, spanning from 7.12 per cent (obtained using the ERA's methodology) to 9.71 per cent (obtained using IPART's methodology).

Observably, the Port's WACC parameters consistently fall within the range of estimates formed using other regulatory market parameters.



Table 3.1: Summary of market parameter cross check

WACC component	Port	IPART	AER	ACCC	ERA	ESCOSA	QCA	ICRC	OTTER
Cost of debt									
Risk-free rate		2.15%		1.72%	1.57%		1.72%		2.02%
Debt risk premium		1.95%		1.27%	1.54%		1.27%		1.91%
Debt-refinancing costs	0.10%	0.13%		0.10%	0.10%	0.13%	0.11%	0.13%	0.10%
Return on debt	4.80%	4.23%	4.80%	3.09%	3.21%	5.38%	3.10%	4.83%	4.02%
Cost of equity									
Risk-free rate	1.70%	2.15%	1.72%	1.72%	1.57%	1.41%	1.72%	1.57%	2.02%
Market risk premium	6.54%	7.20%	6.10%	6.00%	5.90%	6.00%	7.00%	6.50%	6.50%
Equity beta	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Corporate tax	30%	30%	30%	30%	30%	30%	30%	30%	30%
Gamma	0.50	0.25	0.59	0.50	0.50	0.50	0.48	0.40	0.40
Pre-tax return on equity	9.69%	12.06%	8.93%	9.08%	8.79%	8.71%	10.32%	9.84%	10.39%
Gearing									
Debt proportion	30%	30%	30%	30%	30%	30%	30%	30%	30%
Equity proportion	70%	70%	70%	70%	70%	70%	70%	70%	70%
WACC	8.23%	9.71%	7.70%	7.29%	7.12%	7.71%	8.15%	8.34%	8.48%

Source: HoustonKemp analysis. The assumptions underpinning this analysis are described in Appendix A1.

In the subsections below, we provide a summary of the approaches used by Australian regulators to estimate market parameters, including:

- the Independent Pricing and Regulatory Tribunal (IPART);
- the Australian Energy Regulator (AER);
- the Australian Competition and Consumer Commission (ACCC);
- the Queensland Competition Authority (QCA);
- the Essential Services Commission of South Australia (ESCOSA);
- the Economic Regulation Authority of Western Australia (ERA);
- the Independent Competition and Regulatory Commission (ICRC); and
- the Office of the Tasmanian Economic Regulator (OTTER).

We provide further description of the approaches adopted by other regulators and the corresponding normalised WACC estimates in appendix A1.

3.2 Independent Pricing and Regulatory Tribunal (IPART)

IPART is the independent pricing regulator for rail, water, public transport, and local government in New South Wales. In addition to its regulatory function, IPART also undertakes reviews and investigations into a variety of issues at the request of the NSW government.

The table below provides a summary of IPART's approach to estimating market parameters. Its approach is described in further detail in appendix A1.1.

Table 3.2: Summary of IPART's approach to market parameters

WACC component	Description
	IPART estimates a current and historical WACC. It adopts a midpoint WACC if its uncertainty index is at, or within, one standard deviation of its long-term average.
Cost of debt	
Risk free rate	Calculates the current risk free rate as the average 10 year Commonwealth government bond yield over a 40 working day sampling period. Calculates the historical risk free rate as the average 10 year Commonwealth government bond yield over a 10 year sampling period.
Debt risk premium	Measures monthly credit spreads (broad BBB) of a sample of Australian corporate bonds with a term to maturity of 10 years.
Debt raising/refinancing costs	12.5 basis points.
Return on debt	Adopts a 10-year trailing average for the historical component, and short term trailing average (equal to length of regulatory period) for the current component. It uses a 40-day observation window each year to recalculate the interest rate for that tranche of debt.
Cost of equity	
Risk free rate	The current risk free rate is calculated as the average 10 year Commonwealth government bond yield over a 40 working day sampling period. The historical risk free rate is calculated as the average 10 year Commonwealth government bond yield over a 10 year sampling period.
Market risk premium	Takes the midpoint of the current and historical arithmetic average of excess market returns over the risk-free rate. Places two thirds weight on the median of five DGM parameter estimates and one third weight on its market indicator estimate.
Gamma	0.25.
Return on equity	Estimates the cost of equity as the midpoint between its estimates of the current and historical cost of equity when the uncertainty index is at, or within one standard deviation of its long-term average. Adopts the SL CAPM to calculate the cost of equity.

3.3 Australian Energy Regulator (AER)

The AER is responsible for the economic regulation of electricity and gas transmission and distribution services in eastern and southern Australia under the National Electricity Rules (NER) and the National Gas Rules (NGR).

The table below provides a summary of the AER's approach to estimating market parameters. Its approach is described in further detail in appendix A1.2.

Table 3.3: Summary of the AER's approach to market parameters

WACC component	Description
Cost of debt	
Risk free rate	-
Debt risk premium	-
Debt refinancing/raising costs	Based on the efficient debt raising costs for the benchmark firm, includes refinancing costs within operating costs.
Return on debt	Utilises a 10 year trailing average, updated annually. Presently undertaking a 10 year transition from 'on-the-day' approach to trailing average. Equally weights 10 year termed data sourced from the RBA, Bloomberg and Thomson Reuters.
Cost of equity	
Risk free rate	Adopts the yield to maturity on 10 year Commonwealth government bonds, averaged over a nominated period of between 20 and 60 consecutive trading days.
Market risk premium	6.10%, reflecting its historical excess return estimate. Although it analysed other evidence, it was not persuaded to make any adjustments to this point estimate.
Gamma	0.585.
Return on equity	Estimates the return on equity using the SL CAPM.

3.4 Australian Competition and Consumer Commission (ACCC)

The ACCC is responsible for assessing undertakings made under the National Access Regime in Part IIIA of the *Competition and Consumer Act 2020*. This includes assessing undertakings from ARTC for its:

- interstate rail network, which primarily supports the transport of freight within Australia; and
- Hunter Valley network, which primarily supports the transport of coal mined in the Hunter Valley to be exported from the Port of Newcastle.

The table below provides a summary of the ACCC's approach to estimating market parameters. Its approach is described in further detail in appendix A1.3.

Table 3.4: Summary of the ACCC's approach to market parameters

WACC component	Description
Cost of debt	
Risk free rate	Adopts a 20 day average of 10 year Australian Commonwealth government bonds.
Debt risk premium	Adopts a 20 day average of annualised yield estimates of 10-year benchmark bond using data sourced from the RBA and Bloomberg. Calculates the DRP as annualised yield minus risk free rate.
Debt refinancing/raising costs	9.5 basis points.
Return on debt	Sum of risk-free rate, debt margin (debt risk premium) and debt issuance (raising) costs.
Cost of equity	
Risk free rate	Adopts a 20 day average of 10-year Commonwealth government bonds.
Market risk premium	Adopts a point estimate of 6 per cent, taking into account historical estimates, market surveys and previous regulatory decisions. Greatest reliance placed on historical estimates.
Gamma	0.4 (HVAU) and 0.5 (IAU).
Return on equity	Estimates the return on equity using the SL CAPM.

3.5 Economic Regulation Authority of Western Australia (ERA)

The ERA is required under the *Railways (Access) Code 2000* to determine annually the long-term WACC to be applied in establishing the capital costs of the regulated railways.³² The ERA's current purview extends to the Public Transport Authority network, the Arc Infrastructure network (freight transportation) and the Pilbara Infrastructure Railways network (which links iron ore mines in the Pilbara to Port Hedland).³³ The ERA makes a determination for each of these rail networks.

The table below provides a summary of the ERA's approach to estimating market parameters. Its approach is described in further detail in Appendix A1.4.

Table 3.5: Summary of the ERA's approach to market parameters

WACC component	Description
Cost of debt	
Risk free rate	Calculates the risk free rate as the 40 day average of the yield on 10 year Commonwealth government bonds.
Debt risk premium	Adopts its revised bond yield approach which involves creating a benchmark sample and estimating yield curves using yield data gathered from Bloomberg L.P. The ERA estimates yield curves by applying the Gaussian Kernel, Nelson-Siegel and Nelson-Siegel-Svensson techniques. The ERA has previously adopted a 40 business day averaging period for estimating the on the day DRP.
Debt refinancing costs	0.1 per cent.
Return on debt	Calculates the return on debt as the summation of the risk free rate, debt risk premium and debt raising costs.
Cost of equity	
Risk free rate	Calculates the risk free rate as the 40 day average of the yield on 10 year Commonwealth government bonds.
Market risk premium	Estimates the MRP by reference to the historical market premium and the dividend growth model. The ERA places greater weight on the historical market premium relative to the dividend growth model and does not consider the Wright approach. It uses discretion and all relevant material to select an appropriate final point estimate.
Gamma	0.5.
Return on equity	Estimates the return on equity using the SL CAPM.

³² ERA, *Determination on the 2020 Weighted Average Cost of Capital for the freight and urban railway networks, and for Pilbara railways*, August 2020, p 1.

³³ ERA, *Method for determining the weighted average cost of capital for railway networks*, May 2018, para 2, p 2.

3.6 Essential Services Commission of South Australia (ESCOSA)

The Essential Services Commission of South Australia (ESCOSA) is responsible for regulating a range of industries in South Australia, including water and rail.

The table below provides a summary of ESCOSA's approach to estimating market parameters. Its approach is described in further detail in appendix A1.5.

Table 3.6: Summary of the ESCOSA's approach to market parameters

WACC component	Description
Cost of debt	
Risk free rate	-
Debt risk premium	-
Debt refinancing costs	Assumes that costs of 0.125 per cent reflect the efficient transaction costs associated with raising debt financing in the bond market.
Return on debt	Estimates the return on debt as the 10-year trailing average of the yield on 10-year BBB corporate bonds, as published by the RBA. Adds debt refinancing/raising costs.
Cost of equity	
Risk free rate	Calculates a 60 day average of the yield on 10-year Commonwealth government bonds.
Market risk premium	Adopts an MRP of 6.0 per cent based on long-run data.
Gamma	0.50.
Return on equity	Estimates the return on equity using the SL CAPM.

3.7 Queensland Competition Authority (QCA)

The QCA is responsible for the economic regulation of a range of industries in Queensland, including water and rail businesses.

The table below provides a summary of the QCA's approach to estimating market parameters. Its approach is described in further detail in appendix A1.6.

Table 3.7: Summary of the QCA's approach to market parameters

WACC component	Description
Cost of debt	
Risk free rate	Adopts 20 day average of the yield on 10 year Commonwealth government bonds. Notes that a 40 day average is often used.
Debt risk premium	Estimates the debt risk premium as the 20 day average of the midpoint of Bloomberg's BVAL 10 year BBB series and the RBA BBB rated series, extrapolated to an effective 10 year term and less the risk free rate.
Debt refinancing costs	0.108 per cent.
Return on debt	Calculates the cost of debt as the summation of the risk-free rate, the debt risk premium and debt transaction costs.
Cost of equity	
Risk free rate	Adopts a 20 day average of the yield on 10 year Commonwealth government bonds. Notes that a 40 day average is often used.
Market risk premium	Weights five methods to estimate the MRP, including the Ibbotson, Siegel and Wright methods, survey evidence and the Cornell DDM. Adopts an MRP of 7.0 per cent in Gladstone Area Water Board decision.
Gamma	0.484.
Return on equity	Estimates the return on equity using the SL CAPM.

3.8 The Independent Competition and Regulatory Commission (ICRC)

Constituted under the ICRC Act, the Independent Competition and Regulatory Commission (ICRC) is responsible for regulating and advising government about a range of matters, including pricing and other matters for monopoly, near-monopoly and ministerially declared regulated industries.

The table below provides a summary of the ICRC's approach to estimating market parameters. Its approach is described in further detail in appendix A1.7.

Table 3.8: Summary of the ICRC's approach to market parameters

WACC component	Description
Cost of debt	
Risk free rate	-
Debt risk premium	-
Debt refinancing costs	Adopts a benchmarking margin of 0.125 per cent. However, suggests that it intends to place more weight on more recent estimates of debt-raising costs and give preference to estimation methods that exclude the dealer swap margin.
Return on debt	Estimates the cost of debt using a trailing average approach, which incorporates a transitional arrangement. Estimates the cost of debt using the average of Bloomberg and RBA 10-year BBB yields. Adopts a 12-month averaging period to estimate each annual return on debt.
Cost of equity	
Risk free rate	Adopts a 40 day averaging period over Commonwealth government bonds with a term to maturity of 10 years.
Market risk premium	In 2018 selected an MRP of 6.5 per cent, reflecting its 'benchmarking' approach whereby it scans recent regulatory decisions made by other Australian regulators.
Gamma	0.4. In its 2021 draft Icon Water review of methodologies for the WACC, it noted that it would investigate gamma in its next price investigation.
Return on equity	Estimates the return on equity using the SL CAPM.



3.9 Office of the Tasmanian Economic Regulator (OTTER)

The Tasmanian Economic Regulator (the Regulator) is an independent economic regulator established under the Economic Regulator Act 2009. The Regulator is supported by staff of the Office of the Tasmanian Economic Regulator (OTTER). The Regulator's purview includes a number of monopoly, near-monopoly and specified industries within Tasmania, including businesses in the electricity, gas, water and sewerage, taxi and compulsory third party insurance industries.

The table below provides a summary of OTTER's approach to estimating market parameters. Its approach is described in further detail in appendix A1.8.

Table 3.9: Summary of OTTER's approach to market parameters

WACC component	Description
Cost of debt	
Risk free rate	Estimates the risk free rate as the midpoint of the 10 year trailing average (calculates the last nine years using full year averages, and the present year using a 40 trading day average) and the 40 trading day average of ten year Commonwealth government bonds.
Debt risk premium	Estimates the debt risk premium as the midpoint of the 10 year trailing average (calculates the last nine years using full year averages, and the present year using a 40 trading day average) and the 40 trading day average of ten year monthly corporate credit swap sourced from the RBA.
Debt refinancing costs	Estimates debt issuance costs to be 0.1 per cent.
Return on debt	Calculates the return on debt as the sum of the risk free rate, debt risk premium and debt issuance costs.
Cost of equity	
Risk free rate	As above.
Market risk premium	Adopts an MRP of 6.5 per cent.
Gamma	0.4.
Return on equity	Estimates the cost of equity using the SL CAPM. Estimates both a statutory return on equity for existing assets and a cost of equity for new assets.

4. Comparing firm specific parameters

The cross check described in section 3 serves the purpose of assessing whether, after controlling for firm specific parameters, the Port's WACC falls outside the range implied by the approaches adopted by other regulators. This does not provide an indication of whether the Port's firm specific parameters are consistent with those adopted by other regulators.

In this section, we highlight the extent to which other regulators' firm specific parameter estimates can be used as a cross check, and where applicable, any conclusions that can be made regarding whether the Port's adopted rate of return is a commensurate return.

4.1 Considering firm specific parameters as part of a cross check

In section 2 above, we highlight that it is important to ensure that cross checks appropriately account for the comparability of the firm specific parameters underpinning regulatory decisions. This reflects the requirement that the rate of return outcomes are:³⁴

commensurate with the return required by a benchmark efficient entity with a **similar degree of risk** as that which applies to the port in respect of providing prescribed services [emphasis added]

The firm specific parameters adopted within the context of different regulatory decisions are premised on the specific circumstances of the regulated entity and the activities that it is assumed to undertake. It follows that the appropriateness of a regulatory decision as a cross check will diminish as the entity underpinning the regulatory decision becomes increasingly different to the Port.

Ideally, the firm specific parameter estimates by which the Port's rate of return would be compared would be based on information from regulated Australian container ports. Given there is no such entity in Australia, the Port's firm specific parameter estimates can only be assessed against those adopted by other regulators for entities that have a lesser degree of similarity to the Port.

In our opinion, an appropriate regulatory decision based cross check of firm specific parameters comprises two steps:

- step 1: derive a sample of comparable regulatory decisions; and
- step 2: undertake a comparison of firm specific parameters, allowing for the inherent differences in assumed benchmark efficient entities.

To apply this cross check a sample of relevant regulatory decisions must first be gathered. This analysis, which is akin to the first principles analysis that is undertaken in the context of determining an appropriate equity beta,³⁵ promotes an understanding of the relevance of firm specific parameters determined within regulator decisions.

Variation in the appropriate firm specific parameters adopted in regulatory decisions may reflect a range of factors, including the industry in which the business operates, the extent of monopoly power, the level of subsidisation and the level of regulation. Given that the Port operates in the freight transport supply chain, we consider that:

³⁴ ESC, *Statement of regulatory approach*, April 2020, p 23.

³⁵ In the context of the Port of Melbourne, this has been discussed in the reports authored by Synergies, Incenta and Frontier. See: Synergies, *Determining a WACC estimate for Port of Melbourne*, May 2020; Incenta, *Estimating the Port of Melbourne's equity beta*, May 2020; and Frontier Economics, *Issues in cost of capital estimation for the Port of Melbourne*, December 2019.

- freight rail businesses are, absent a regulatory decision relating to a freight port, most comparable to the Port due to the Port's supply chain, and their exposure to freight demand changes over time;
- coal related port and rail businesses are likely to be weakly comparable to the Port, reflecting their exposure to a single commodity which is driven by overseas demand; and
- natural monopoly businesses providing essential services (eg, water and electricity) are not comparable to the Port.

Having arrived at a sample of relevant decisions, we compare the Port's firm specific parameter estimates with those presented by other regulators, having regard to the relevance of the different estimates. Drawing upon our sample of relevant recent regulatory decisions – illustrated in table 4.1 below – it is observable that:

- the ACCC approved a lower asset beta for ARTC's coal related business when compared to its freight rail business, illustrating a possible beta premium for freight businesses; and
- on average, freight businesses obtain a higher asset beta than coal related businesses.

Table 4.1: Variation in firm specific parameters

	Arc Infrastructure	ARTC Interstate	DBCTM	Aurizon Network	Railcorp - Hunter Valley	ARTC - Hunter Valley
Industry	Freight rail network	Freight rail network	Coal terminal	Coal rail network chain	Coal rail network chain	Coal rail network chain
Regulator	ERA WA	ACCC	QCA	QCA	IPART	ACCC
Decision date	Aug-20	Dec-18	Nov-16	Dec-18	Jul-19	Apr-17
Gearing	25%	50%	60%	55%	45%	52.5%
Credit rating	BBB+	BBB	BBB	BBB+	BBB	BBB
Regulator equity beta	0.90	1.20	0.87	0.73	1.00	0.94
Implied asset beta (using Brealey Myers)	0.68	0.60	0.35	0.33	0.55	0.45

Note: The implied asset beta is calculated by de-leveraging the regulator's equity beta using the Brealey Myers formulae and its gearing estimate.

We understand that the Port's adopted firm specific parameters include:

- gearing of 30 per cent;
- a BBB benchmark credit rating; and
- an equity beta of 1.0; and
- an asset beta of 0.7.

In light of the range of the sample of regulatory decisions highlighted above, it is observable that:

- the Port's credit rating is consistent with those utilised in other relevant regulatory decisions;
- the Port's equity beta is within the range produced by recent freight and coal rail decisions; and
- the Port's asset beta is close to those implied by recent freight rail decisions.

On balance, we consider that this analysis indicates that the Port's proposed parameters are comparable to those adopted by regulators for comparable entities. It follows that the Port's firm specific parameter estimates satisfy this cross check, which provides evidence that the Port's adopted rate of return is a commensurate return.

In the subsections below, we summarise our review of the relevance of firm specific parameters adopted in other regulatory decisions. We describe the firm specific parameters adopted by regulators and the methodologies used to arrive at these estimates in Appendix A2.

4.2 The Port of Melbourne's firm specific characteristics

To compare the firm specific parameters underpinning regulatory decisions to those adopted by the Port, the characteristics of a benchmark efficient entity with a similar degree of risk to the Port's must be established. The risks faced by the Port in providing its prescribed services have been described by Incenta and Synergies in their May 2020 reports.³⁶

The Port provides a range of prescribed services, including:³⁷

the provision of channels (except anchorages) for use by shipping in port of Melbourne waters, including the Shared Channels used by vessels bound either for the port of Melbourne or for the port of Geelong and the Dedicated Channels used by vessels bound for the port of Melbourne;

the provision of berths, buoys or dolphins in connection with the berthing of vessels in the port of Melbourne;

the provision of short-term storage or cargo marshalling facilities in connection with the loading or unloading of vessels at berths, buoys or dolphins in the port of Melbourne;

the provision of access to, or allowing use of, places or infrastructure... on port of Melbourne land for the provision of services to port users;

any other service that is prescribed by the regulations."

We understand that the prescribed services do not include leasing revenue.

In undertaking its prescribed services, the Port is exposed to a relatively broad range of freight, including containers, motor vehicles, export and general cargo trades.³⁸ The Port is also largely dependent on imports.³⁹ Because, all else equal, import levels are more dependent on Australian economic cycles than exports, the Port's business is relatively exposed to economic cycles.

The freight moved by the Port is largely delivered to Victoria and south-eastern Australia. By consequence, it may be subject to limited competition from other ports – through a road, rail and port mix – although, the degree of competition is likely dependent on the type of freight being moved and its destination.

The Port is regulated using price cap regulation, as opposed to cost based regulation. By consequence, the Port may be considered relatively exposed to volume and cost risks.

4.3 Freight rail network decisions

Rail freight transport businesses use railroads to haul a range of cargo, including bulk material, intermodal containers, general freight or specialized freight in purpose-designed cars. Because of freight rail networks' exposure to freight risk and its position in the same supply chain as the Port, we consider that regulatory decisions for freight rail networks are relatively comparable to the Port.

³⁶ Synergies, *Determining a WACC estimate for Port of Melbourne*, May 2020; Incenta, *Estimating the Port of Melbourne's equity beta*, May 2020.

³⁷ Port of Melbourne website, available at <https://www.portofmelbourne.com/regulatory-information/prescribed-services/>, accessed on 18 May 2021.

³⁸ See, for example: Port of Melbourne, *Port of Melbourne trade report Q3 2020-21*, 23 April 2021.

³⁹ See, for example: Port of Melbourne, *Port of Melbourne trade report Q3 2020-21*, 23 April 2021.

However, the breadth of the freight exposure must be considered. A narrow freight exposure, which would typically be the case for a bulk export commodity network, may lead to different risk characteristics. One such example is coal related entities, which we addressed separately in section 4.4.

In the absence of regulatory decisions involving freight ports, regulatory decisions regarding freight rail provide a cross check range for assessing whether the firm specific parameters adopted by the Port promote a commensurate return due to their relatively similar risk characteristics.

We observe that the comparability of railroads and ports has previously been discussed by Australian regulators. For example, the ERA has previously included port comparators in its comparator analysis when determining an equity beta estimate for Arc Infrastructure.⁴⁰

In Appendix A2.1, we detail the firm specific parameters adopted in various recent freight rail network related decisions.

4.4 Coal related decisions

Unlike the Port, which is exposed to a wide array of cargo and significant quantities of imports, coal related entities are exposed narrowly to an export commodity. Specifically, these firms have different risk profiles to the Port due to their exposure to international thermal and coking coal markets, as well as the prevalence of take-or-pay contracts regarding the provision of transport infrastructure services in this sector. It follows that coal related businesses are likely to be less comparable to the Port than freight rail.

There is evidence that regulators consider that coal related ports and rail face different (lower) systematic risk when compared to freight ports and rail. For example:

- the QCA did not consider that rail freight transportation businesses are appropriate comparators for Aurizon Network, ie:⁴¹

The QCA considers that the freight rail transportation group is exposed to materially higher systematic risk than Aurizon Network. Freight rail transportation businesses are subject to competitive pressures from parallel railroads and alternative transport modes, and transport freight that is highly sensitive to GDP shocks. Furthermore, the regulatory regime for freight rail transportation businesses does not insulate cash flows from the volatility arising from market shocks in the same manner as that of Aurizon Network's regulatory framework. Therefore, the QCA considers that freight rail transportation businesses' cash flows will be more pro-cyclical than the cash flows of Aurizon Network.

While freight rail transportation companies have similar physical industry characteristics, it is unclear how these industry similarities affect the extent to which these firms' earnings are exposed to movements in the economy. As outlined above, Aurizon Network has a different market position, customer base and regulatory framework than that of the freight rail transportation businesses sample. Therefore, the QCA considers that the firms' exposure to systematic risk will be markedly different as a result.

- the QCA notes that differences between the regulatory framework and customer base faced by Arc Infrastructure (then Brookfield Rail) suggests it would have higher systematic risk to that of Aurizon Network;⁴²
- in its 2019 determination, the ERA considers that Aurizon and Arc Infrastructure had different risk profiles:⁴³

⁴⁰ ERA, *2018 and 2019 weighted average cost of capital for the freight and urban networks, and the Pilbara Railways*, Final, 22 August 2019, p 55.

⁴¹ QCA, *Aurizon Network's 2017 draft access undertaking*, December 2018, p 70 and 100-101.

⁴² QCA, *Aurizon Network's 2017 draft access undertaking*, December 2018, p 119.

⁴³ ERA, *2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, Final Determination, 22 August 2019, p 59.

The Aurizon network was not a directly comparable company to Arc Infrastructure. There were differences in the operations of the businesses which meant that it was likely that the Aurizon network would have a lower risk than that of the Arc Infrastructure network. Therefore, while Aurizon may have some value as a comparator, it was likely that Arc Infrastructure's asset beta would be higher.

- in its ARTC interstate decision, the ACCC considered that:⁴⁴

...a coal network could be expected to have more stable cash flows than a rail network that carries general intermodal freight and may face more competition from other forms of transport.

In appendix A2.2, we detail the firm specific parameters adopted in various recent coal related decisions.

4.5 Other decisions

There are an array of other decisions involving benchmark efficient entities which we do not consider relevant to the Port for the purpose of undertaking this cross check. This reflects the substantially different systematic risk faced by these businesses, which are natural monopoly businesses with substantial market power and operate in an entirely different supply chain.

Specifically, regulatory decisions about the firm specific parameters for these regulated businesses are unlikely to reflect similar risk characteristics when compared to the Port. In regulated industries that provide essential services and have strong natural monopoly characteristics (such as energy and water transmission and distribution) the regulatory regime acts to smooth revenues and the demand is sufficiently inelastic that movements are not anticipated. This was highlighted by Incenta in its 2020 report for the Port:⁴⁵

Where revenue cap or price cap regulation has been imposed on businesses (such as energy and water distribution and transmission) with a high degree of market power this has had a buffering effect on cash flows, and a consequently a lower asset beta is observed. We would not expect the regulatory regimes typical of ports and the other sectors that we analyse as comparators, and the context of those sectors, to imply a material buffering of cash flows

It follows that the firm specific parameters adopted by these businesses have previously been treated as a lower bound or disregarded when estimating the regulated rate of return. For example:

- in its Queensland Rail draft decision, the QCA considers the asset beta for regulated energy and water businesses as a lower bound:⁴⁶

The conclusion from our draft decision was that the asset beta for West Moreton coal was likely to be less than the asset beta of toll roads but greater than the asset beta of regulated energy and water businesses.

- in its 2020-25 Gladstone Area Water Board (GAWB) price monitoring report, the QCA considers that Aurizon Networks and Queensland Rail were not comparable regulated entities to GAWB:⁴⁷

We do not consider Aurizon Network and Queensland Rail to be relevant comparators, as these are fundamentally different businesses, which do not operate as water utilities. Moreover, Aurizon Network and Queensland Rail both operate under different pricing structures, compared to GAWB. For example, Aurizon Network is subject to a pure revenue cap and Queensland Rail is subject to a price cap for the West Moreton reference tariff.

In our opinion, water and energy related decisions should be omitted from an appropriate cross check of whether the Port's adopted firm specific parameters are in line with those adopted in regulatory decisions. Decisions which should be omitted include:

⁴⁴ ACCC, *Australian Rail Track Corporation's 2018 Interstate access undertaking*, Draft decision, 20 December 2018, pp 143-144.

⁴⁵ Incenta, *Estimating the Port of Melbourne's equity beta*, May 2020, p 16.

⁴⁶ QCA, *Queensland Rail's 2020 draft access undertaking*, Draft decision, April 2019, p 35.

⁴⁷ QCA, *Gladstone Area Water Board price monitoring 2020-25*, Final, May 2020, p 105.

- water decisions, ie:
 - > ESCOSA's SA Water decision;
 - > the QCA's Gladstone Area Water Board decision;
 - > OTTER's TasWater decision; and
- energy decisions, ie:
 - > the AER's electricity and gas transmission and distribution network decisions;
 - > the ERA's electricity and gas decisions; and
- the ERA's public transport authority decision.

5. Other cross checks

In this section we discuss the other cross checks highlighted in the ESC's Statement of Regulatory Approach. In addition, we identify and assess other appropriate cross checks.

5.1 Use of data from market practitioners

In section 2, we highlight that the cross checks specified in the Statement of Regulatory Approach include:

- surveys of practitioners; and
- estimates of individual WACC parameters used by independent valuation experts.

In our opinion, surveys that ask individuals about their opinions on individual parameters such as the MRP face numerous limitations including:

- they often do not explain how those surveyed were chosen;
- a majority of those surveyed typically do not respond;
- it is unclear what incentives are provided to individuals contacted by surveys to ensure that respondents will provide accurate responses;
- it is generally unclear whether respondents believe that they should supply estimates of the MRP that they base on arithmetic means or geometric means;
- it is often unclear what value respondents place on imputation credits;
- it is often unclear what risk-free rate respondents use; and importantly
- it is unclear how relevant some surveys are because of changes in market conditions since the time at which the surveys were conducted.

The need to treat survey estimates of the MRP with caution is highlighted by the Australian Competition Tribunal in its review of the Australian Energy Regulator's (AER's) decision for Envestra, which observed that:⁴⁸

Surveys must be treated with great caution when being used in this context. Consideration must be given at least to the types of questions asked, the wording of those questions, the sample of respondents, the number of respondents, the number of non-respondents and the timing of the survey. Problems in any of these can lead to the survey results being largely valueless or potentially inaccurate.

When presented with survey evidence that contains a high number of non-respondents as well as a small number of respondents in the desired categories of expertise, it is dangerous for the AER to place any determinative weight on the results.

It follows that in our opinion, surveys of practitioners should likely be given little weight in cross checking the Port's individual WACC parameters.

We consider that the use of independent expert reports (that are used in the context of recent actual comparable commercial transactions) are relevant evidence, ie, insights from valuation reports for comparable Australian container ports in the context of a market transactions will be relevant and possibly provide useful evidence as a cross check.

⁴⁸ Australian Competition Tribunal, Application by Envestra Limited (No 2) [2012] ACompT 3, 11 January 2012, paras 162-163.

Notwithstanding, we are not aware of any recent relevant independent expert reports of comparable Australian container ports.

The AER has previously endorsed the use of independent expert reports to compute an estimate of the MRP. For example, the AER states, in its September 2012 Multinet Draft decision, that:⁴⁹

expert valuers ... apply the MRP, so the AER considers (they) can make informed judgments about the MRP. McKenzie and Partington supported this view in their February 2012 MRP report.

However, we do not believe that independent expert reports should be used as evidence of the value of WACC parameters, and specifically the MRP. The use of CAPM parameters in independent expert reports was investigated by Incenta in 2014 in which it found over the period 27 April 2013 to 20 April 2014.⁵⁰

Of the 20 cost of equity estimates made by independent experts over approximately 12 months, 16 (80 per cent) made some adjustment to a mechanistic application of the Sharpe-Lintner CAPM (i.e. they either adjusted the risk free rate above the spot rate, and / or applied a market risk premium above 6 per cent, and / or applied an additional risk factor). Hence, for the vast majority of independent experts the mechanistic Sharpe-Lintner CAPM is only the starting point for the estimation of the cost of equity.

Many independent experts add an additional explicit risk factor to the cost of equity estimate obtained from a mechanistic application of the Sharpe-Lintner CAPM. A number of independent experts added a 'size premium'. For firms with a market capitalisation in the range of \$1 billion to \$4 billion, independent expert Leadenhall indicates that it will increase the cost of equity by 1 per cent over the value obtained from a mechanistic version of the Sharpe-Lintner CAPM. In addition to the size factor, a number of other independent experts referred to other additional risk factors to justify a return on equity uplift (over the mechanistic application of the Sharpe-Lintner CAPM), including stranding risk, legislative / regulatory risk, increased competition, and changing technology.

5.2 Average market risk

In section 2, we highlight that one cross check specified in the Statement of Regulatory Approach is a qualitative assessment of whether the systematic risk of the benchmark efficient entity is higher or lower than the systematic risk of the average firm in the market.

The equity beta utilised in the SL CAPM model measures how an individual asset moves when the overall stock market increases or decreases, ie, its level of volatility relative to the market portfolio. By consequence, an equity beta of one means that the systematic risk of the benchmark efficient entity is equal to the systematic risk of the average firm in the market.

Alternatively, the asset beta (unlevered beta) measures the market risk of the company absent the impact of debt. It follows that the asset beta reflects the risk due to company assets alone. Adopting an estimate of average gearing of 22 per cent implies that the asset beta of the average firm in the market is 0.78.⁵¹

In its 2021-22 tariff compliance statement, the Port adopts an equity beta of 1.0 and gearing of 30 per cent, implying an asset beta of 0.7.⁵² It follows that the asset beta adopted by the Port is below average. Together, the Port's beta estimates indicate that its systematic risk is approximately equal to (or lower than) the average systematic risk of the market.

⁴⁹AER, *Draft decision | Multinet 2013–17 | Draft decision appendices*, September 2012, p 32.

McKenzie, M. and G. Partington, *Supplementary report on the MRP*, SIRCA Limited, February 2012, p 17.

⁵⁰Incenta, *Update of evidence on the required return on equity from independent expert reports*, A report for Jemena Gas Networks (NSW), May 2014, pp 3-4.

⁵¹We estimate average gearing using a point estimate of the average debt and market capitalisation for constituents of the S&P/ASX 200. The equity beta is leveraged using the Brealey-Myers formulae. Data is gathered from Bloomberg L.P.

⁵²*Letter of instructions to Houston Kemp*, 24 May 2021.

In section 2 above, we highlight commentary by the ESC which suggests that it considers the Port to be below average market risk, ie, because the regulatory regime smooths revenue. This argument is often made by regulators. For example, the QCA previously relied on the existence of economic regulation and the application of regulatory controls on revenue as the primary factor by which to identify comparable companies. This reflected its view that:⁵³

...cost-based regulation insulates the business from earnings variations that would otherwise be pro-cyclical, resulting in a lower asset beta relative to the absence of cost-based regulation.

In support of this guiding principle the QCA cited studies that suggested beta was lower in regulated industries, as compared with unregulated industries.⁵⁴ These studies did not examine the effect of regulation *within* a particular industry, eg, with and without regulation. Notwithstanding the criticism that this argument has been exposed to in the context of the Port,⁵⁵ we consider that a quantitative cross check provides a robust means of checking the relative riskiness of the Port's prescribed services.

We consider that the estimation of the extent to which the Port's systematic risk correlates with the market's using a 'volume beta' provides an appropriate cross check of the relative riskiness of the Port's prescribed services. The volume beta (or accounting beta) is often utilised in the context of Airport regulation,⁵⁶ and captures the relationship between the extent to which the volume of sales / revenue of a businesses activity is associated with movements in the market overall.⁵⁷ Specifically, the volume beta is estimated by comparing the Port's year on year growth in trading volumes with Australia's economic growth.

The significance of a volume beta is that because a port has a relative high degree of fixed costs, the volatility of the Port's returns can be attributed to volatility in demand. Specifically, the volume beta measures the volatility of demand for port freight services at the Port resulting from business cycle fluctuations in the level of real GDP.

Consequently, a firm whose demand volumes are generally insensitive to GDP shocks will therefore be expected to have a low asset beta, while firms whose demand volumes are highly sensitive to GDP shocks are expected to have higher than average asset betas.

Adopting data spanning 1990 to 2019, we use a linear regression to estimate that the Port's volume beta is equal to 1.67.⁵⁸ This reflects the regression of the Port's total trade (revenue tonnes) on real gross national income.⁵⁹ This relationship is illustrated in figure 5.1 below, which indicates that the Port's volumes are sensitive to changes in real GDP, in other words the Port's trade is more volatile to real GDP shocks than the economy as a whole. This suggests that the Port's trading volume (and so underlying asset beta) has exposure to greater risk than the average Australian business.

In our opinion, this cross check indicates that the Port's return on capital is a commensurate return. Further, it contradicts the ESC's preliminary qualitative analysis that suggested the Port has below average systematic risk.

⁵³ QCA, Appendices, *Aurizon Network's 2017 draft access undertaking*, December 2018, p 76.

⁵⁴ Incenta Economics, *Aurizon Network's WACC for the 2017 DAU | A report for the QCA*, December 2017, p 28.

⁵⁵ For example, see: Synergies, *Determining a WACC estimate for Port of Melbourne*, May 2020, p 347.

⁵⁶ See: Commerce Commission of New Zealand, *Review of Christchurch International Airport's pricing decisions and expected performance (July 2017 – June 2022)*, Final report, November 2018, pp 93-95.

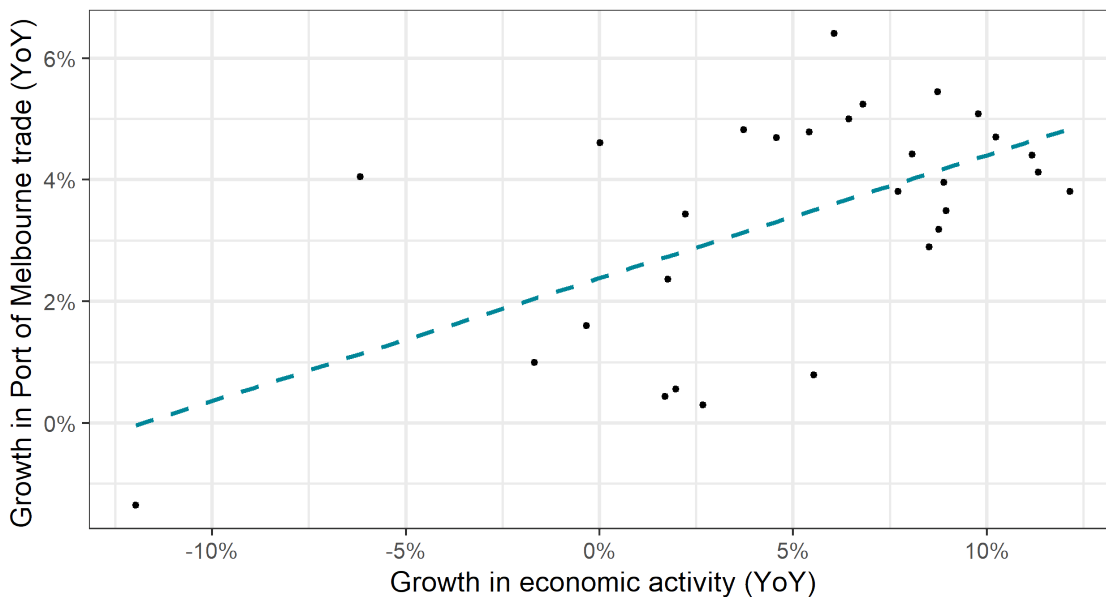
⁵⁷ The measurement of the extent to which the volume of sales/revenue is associated with movements in the market was suggested by Dr Martin Lally. See: Lally, M T, *The cost of equity capital and its estimation*, 2000, McGraw Hill, Sydney.

⁵⁸ We regress the Port's total trade (revenue tonnes) on real gross national income. The revenue tonnes data relied upon was provided by the Port.

This estimate is statistically different from zero, ie, the p-value associated with the estimated coefficient is less than 5 per cent. Put another way, it is less than 5 per cent likely that the estimate was random and so it is unlikely that the beta estimate obtained was due to chance alone. We have not found evidence that the beta estimate differs from or exceeds one at the 5 per cent level of significance, ie, we cannot conclude with sufficient confidence that the beta estimate is different from one.

⁵⁹ The revenue tonnes data relied upon was provided to us by the Port.

Figure 5.1: Visualisation of volume beta estimation



To check the robustness of this result, we repeat this exercise for four Victorian comparators, which we expect to have low systematic risk given they provide essential services to a large and diverse customer base. We observe that:

- the volume beta for Melbourne Water (as measured using growth in annual water consumption) is negative and significant, possibly reflecting water saving initiatives implemented in the early-late 2000s;
- the volume beta for buses is positive and significant, but less than one (however, not significantly so); and
- the volume beta for heavy and light rail is not significantly different from zero.

The alignment of the estimates produced using the volume beta analysis with expectations, indicates that our analysis is robust. Our findings are summarised in Table 5.1 below.

Table 5.1: Alternate volume beta analysis

	Growth in water consumption	Growth in bus patronage (passenger kms)	Growth in heavy rail patronage (passengers)	Growth in light rail patronage (passengers)
Coefficient (standard error) on economic growth	-1.60 (0.59)	0.61 (0.24)	0.26 (0.35)	0.012 (0.44)
Result is statistically different from zero?	✓	✓	✗	✗
Result is statistically different from one?	✓	✗	✓	✓

Note: We note that a result is 'statistically different from' zero [one] when the associated p-value is less than 5 per cent. If the p-value is small, this suggests that the probability that an observed difference could have occurred by chance alone is small, ie, the result is not easily explained by chance alone. When the p-value associated with the estimated coefficient and null hypothesis is high, it suggests the result may be due to chance alone.

Source: HoustonKemp analysis of BITRE and Melbourne Water data. Water consumption data spans FY2000 to FY2019, bus data spans FY1977 to FY2019, heavy rail data spans FY1980 to FY2018, and light rail data spans FY1980 to FY2019.

5.3 Debt vs equity costs

In section 2, we highlight that one cross check specified in the Statement of Regulatory Approach is the assessment of whether the cost of debt adopted by the port is less than the cost of equity. We consider that such an assessment may be appropriate in certain circumstances.

However, it is important to ensure that a like for like comparison of prevailing (trailing) cost of equity with prevailing (trailing) cost of debt is made.

Our observation of the Port's cost of debt and equity indicate that this cross check is met.

5.4 Other financial models to estimate the cost of equity

A potential problem with relying on the SL CAPM is that over the past 50 years it has become well known that empirical versions of the SL CAPM tend to underestimate returns to low-beta assets and overestimate returns to high-beta assets.⁶⁰ This empirical regularity suggests that the SL CAPM will tend to underestimate the cost of equity for a low-beta asset such as regulated water utilities.

The problems with the SL CAPM are well highlighted by Synergies in its 2020 report for the Port.⁶¹ However, despite these problems there is persistent use of the SL CAPM in the Australian regulatory setting. As the SL CAPM is a single measure of the return on equity, and models are subject to error, there are benefits from deploying other financial models as cross checks when assessing whether the Port's adopted return on capital is a commensurate return.

In its 2020 report for the Port, Synergies considered the Black CAPM and Fama-French Model as cross checks.⁶² In our opinion, these models provide a useful source to cross check the return on equity calculated using a well-accepted methodology. We observe that the Port's 2020-21 submission references a Synergies report, in which Synergies estimated a return on equity using:⁶³

- the Black CAPM, which results in a return on equity of 10.60 per cent (ie, equal to that estimated using the SL CAPM because the equity beta is equal to one); and
- the Fama French Model, which results in a return on equity of 11.77 per cent (ie, greater than that estimated using the SL CAPM).

This illustrates that the Port's use of the SL CAPM in 2020/21 results in a return on equity that is more conservative than that measured using the Fama French Model. Given that the Port's 2021/22 proposed return on equity is again estimated using the SL CAPM but with more conservative estimates of the MRP it is reasonable to assume that the Fama French Model would continue to estimate a higher return on equity.

⁶⁰ See, for eg, Black, F., M.C. Jensen and M. Scholes, *The Capital Asset Pricing Model: Some empirical tests*, in *Studies in the Theory of Capital Markets*, M.C. Jensen, ed., Praeger, 1972; and Mehrling, Perry, *Fischer Black and the revolutionary idea of finance*, Wiley, 2005.

⁶¹ Synergies, *Determining a WACC estimate for Port of Melbourne*, May 2020, p 78.

⁶² Synergies, *Determining a WACC estimate for Port of Melbourne*, May 2020, p 16.

⁶³ Synergies, *Determining a WACC estimate for Port of Melbourne*, May 2020, p 24.

5.5 Peer review and sensitivity analysis

External peer reviews from banks, corporate treasuries or consultants provide a possible cross check on the WACC estimate and has previously been used by IPART.⁶⁴ The consultation and tariff submission process provides the opportunity for the cost of capital and WACC parameters to be subject to scrutiny and criticism. For example, the Port's beta estimate has been reviewed by:

- the ESC;
- Frontier Economics;
- Incenta; and
- Synergies.

The use of peer reviews provides different opinions as to appropriate parameters and estimation processes adopted. Peer review and consultation provide provides both a sense check of the overall appropriateness of the WACC and parameters, and an opportunity to assess the sensitivity of different parameter estimates to changing assumptions.⁶⁵ For example, in assessing beta, a range of different estimates and commentary has emerged:

- Synergies estimate an equity beta of 1.0;⁶⁶
- Incenta estimates an equity beta of 1.0, within a range of 0.93 to 1.07;⁶⁷ and
- the ESC estimates an asset beta within a range of 0.60 to 0.70.⁶⁸

Given the information above, this cross check indicates that the Port's asset beta is likely to promote a commensurate return, ie, the cross check is satisfied in regards to equity and asset beta. We consider that this cross check will be, and is in the process of being, completed by way of appropriate consultation.

⁶⁴ IPART, *Review of method for determining the WACC*, Other industries – discussion paper, December 2012, p 71.

⁶⁵ IPART has previously listed the use of sensitivity analysis as a cross check. See: IPART, *Review of method for determining the WACC*, Other industries – discussion paper, December 2012, p 71.

⁶⁶ Synergies, *Determining a WACC estimate for Port of Melbourne*, May 2020, p 254.

⁶⁷ Incenta, *Estimating the Port of Melbourne's equity beta*, May 2020, p 29.

⁶⁸ ESC, *Interim commentary*, December 2020, p 21.

6. Declaration

In accordance with the requirements of the Code of Conduct, we declare that we have made all inquiries that we believe are desirable and appropriate, and that no matters of significance that we regard as relevant have, to our knowledge, been withheld from the Court. We declare that we have read the Code of Conduct and agreed to be bound by it.

In accordance with the requirements of the Practice Notice, we declare that we have made all the inquiries that we believe are desirable and appropriate and that no matters of significance which we regard as relevant have to our knowledge been withheld from the Tribunal. We declare that we have read the Practice Notice and agreed to be bound by it.



Adrian Kemp

27 May 2021



Brendan Quach

27 May 2021

A1. Appendix - Review of regulatory approaches to estimating market parameters

This appendix describes the market parameters adopted by Australian regulators which informs the development of the regulatory WACC cross check range, set out in section 3. Specifically, it sets out:

- the methodology and market parameters adopted by Australian regulators to estimate the WACC, including:
 - > the Independent Pricing and Regulatory Tribunal (IPART);
 - > the Australian Energy Regulator (AER);
 - > the Australian Competition and Consumer Commission (ACCC);
 - > the Queensland Competition Authority (QCA);
 - > the Essential Services Commission of South Australia (ESCOSA);
 - > the Economic Regulation Authority of Western Australia (ERA);
 - > the Independent Competition and Regulatory Commission (ICRC); and
 - > the Office of the Tasmanian Economic Regulator (OTTER).
- the application of the market parameters adopted by Australian regulators to the firm specific parameters adopted by the Port, ie:
 - > a benchmark credit rating of BBB;
 - > an equity beta of 1.0; and
 - > a gearing of 30 per cent.

A1.1 Independent Pricing and Regulatory Tribunal (IPART)

IPART is the independent pricing regulator for rail, water, public transport, and local government in New South Wales. In addition to its regulatory function, IPART also undertakes reviews and investigations into a variety of issues at the request of the NSW government.

A1.1.1 WACC methodology

IPART has undertaken comprehensive reviews of its WACC methodology in 2013 and 2018. The latest review has retained the core elements of its 2013 methodology, but with some refinements to specific parameters.

IPART's WACC methodology centres around its definition of a benchmark efficient entity, ie, 'a firm operating in a competitive market and facing similar risks to the regulated business'.⁶⁹ This definition of benchmark efficient entity differs from those used by other regulators such as the AER and the QCA.

Other components of IPART's WACC methodology also differs from other regulators. IPART's WACC range is based at one end on current market data estimated over a forward looking period equal to the regulatory period, and at the other end an estimate developed from historical market data. IPART's conventional practice is to select the midpoint of these two estimates as the rate of return for the regulatory period. However, it explicitly provides for discretion to move away from the mid-point when market conditions are not normal.⁷⁰

⁶⁹ IPART, *Review of our WACC method*, February 2018, p 19.

⁷⁰ The definition of normal market conditions is governed by IPART's uncertainty index, see: IPART, *Review of our WACC method*, February 2018, p 67.

IPART also publishes a biannual update of its WACC in February and August of each year together with its supporting model. The most recent update was published in February 2021.⁷¹

Cost of equity

IPART adopts the SL CAPM to calculate the cost of equity.⁷² However, unlike other regulators IPART's methodology involves estimating both the historical and current cost of equity. The cost of equity that applies over the regulatory period is the midpoint of these two values.

To calculate the cost of equity, IPART:

- estimates the historical and current risk-free rate;
- estimates the historical and current MRP; and
- estimates the equity beta and gearing levels based upon a sample of proxy companies.

While IPART currently sets the cost of equity using the SL CAPM, it is actively assessing the suitability of the Fama-French three factor model for setting the cost of equity for regulated businesses.⁷³ The methodology IPART uses to estimate the risk-free rate and MRP are described below.

Risk-free rate

IPART uses data on coupon-paying Commonwealth government bonds to calculate the risk-free rate, with varying averaging approaches to determine the historical and current risk-free rate. To estimate:

- the historical risk-free rate, IPART calculates a ten-year average of daily yields for Commonwealth government bonds with a ten-year tenor; and
- the current risk-free rate, IPART adopts an on-the-day approach whereby it averages the yield of the previous 40 working days as at the review date.

Market risk premium

IPART's approach to estimating the historical MRP uses a range of values that have a midpoint of six per cent. The rationale for this methodology is that over lengthy periods the average MRP has been steady at six per cent.⁷⁴

The calculation of the prevailing MRP involves extensive analysis using several alternative approaches, specifically:⁷⁵

- the Damodaran 2013 method;
- the Bank of England 2002 method;
- the Bank of England 2010 method;
- the Bloomberg method;
- the SFG (now Frontier Economics) analysts forecast method; and
- the SFG (now Frontier Economics) market indicator method.

⁷¹ IPART, *Review of our WACC method*, February 2018.

⁷² While IPART currently uses the Sharpe-Lintner CAPM, it is monitoring the effect that adopting the Fama-French model would have had on its estimate of the WACC.

⁷³ IPART, *Review of our WACC method*, February 2018, p 47.

⁷⁴ IPART, *Review of our WACC method*, February 2018, p 51.

⁷⁵ IPART, *Review of our WACC method*, February 2018, p 52.

The first four of these methods are variations of the dividend discount model (DDM) and all adopt forward-looking approaches. While the analyst forecast method is also a variant of the DDM, it incorporates the forecasts of stock market analysts for individual stocks. Finally, the market indicator method comprises four indicators that can be used to indirectly estimate the MRP.

To combine the six estimates of the MRP into a single estimate of the cost of equity, IPART calculates the median estimate produced across the various DDMs. The resulting figure is given a weight of two-thirds, while the remaining one-third weight is given to the market indicator method. The MRP is then the weighted average of these two estimates.

Gamma

Under IPART's framework, gamma is the amount by which the total allowed return on equity is reduced to reflect the imputation credits that investors receive. As IPART adopts a post-tax WACC formulation, it does not directly use gamma in its calculations. However, it notes that gamma has an influence over the current MRP estimate it adopts.⁷⁶ IPART adopts a gamma of 0.25.

IPART has adopted a gamma of 0.25 since its December 2011 pricing decision for the Sydney Desalination Plant (SDP), which was determined using a dividend drop-off study by SFG Consulting (Frontier Economics) that was completed for the Australian Competition Tribunal (ACT). This value was reconfirmed by a follow-up report by SFG, completed for Jemena Gas Networks in 2015.⁷⁷

In its 2018 review, IPART addressed concerns that its gamma value was lower than other regulatory decisions. Specifically, it noted that in 2016 SA Power Networks (SAPN) appealed the AER's final determination that the value attributed to gamma should be 0.4 to the ACT. IPART acknowledged the ACT's decision in favour of the AER's use of a gamma of 0.4. However, it noted that this was not sufficient evidence to adopt a different value of gamma as:⁷⁸

while the ACT found that the AER's decision-making process for arriving at its value of gamma was not unreasonable in the circumstances, this does not necessarily infer that the ACT endorsed the AER's decision.

Cost of debt

IPART calculates the cost of debt as the sum of the risk-free rate, the debt risk premium and debt raising costs. The risk-free rate is calculated using data on the yields of ten-year Commonwealth government bonds, while the debt risk premium is calculated using Reserve Bank of Australia (RBA) data. Specifically, the debt risk premium is calculated as the spread between ten-year BBB rated corporate bond yields and ten-year Commonwealth government bonds.

IPART calculates both historical and current estimates of the cost of debt. The cost of debt applied at the start of the regulatory period is the midpoint of these two values, provided there is no significant economic uncertainty.⁷⁹

Until recently, the cost of debt determined at the beginning of the regulatory period would apply for its duration. However, as part of its 2018 review, IPART refined its methodology to calculate the cost of debt on a trailing average basis, ie, annual updating. The historical cost of debt is calculated using a ten-year trailing average approach, while the current cost of debt is calculated using a short-term trailing average approach (ie, the length of the trailing average equals that of the regulatory period). For example, assuming a five-year regulatory period, the current cost of debt would be calculated as the average cost of debt over the

⁷⁶ IPART, *Review of our WACC method*, February 2018, p 81.

⁷⁷ IPART, *Review of our WACC method*, February 2018, p 81.

⁷⁸ IPART, *Review of our WACC method*, February 2018, p 83.

⁷⁹ IPART selects the midpoint of the historical and current values when the measure of its uncertainty index is at, or within, one standard deviation of the long-term average. See IPART, *Review of our WACC method*, February 2018, p 67, for an overview of IPART's uncertainty index.

preceding five years. The cost of each tranche of debt (ie, each year's debt) is calculated by averaging a 40-day period determined by IPART.⁸⁰

IPART considers that the trailing average approach mimics the staggered tranches debt portfolio strategy that any prudent borrower would employ.⁸¹

A1.1.2 Impact of IPART's methodology

Table A.1 provides an indication of how using IPART's WACC methodology and the Port's firm specific factors would affect the Port's rate of return range. The firm specific parameters (ie, equity beta, gearing and the relevant credit rating) reflect the Port's 2021-22 tariff compliance statement.

Table A.1 illustrates that IPART's methodology leads to a pre-tax nominal WACC range midpoint of 9.71 per cent – 1.49 percentage points above the Port's estimate of 8.23 per cent.

Table A.1: Applying IPART's methodology with the Port's firm specific parameters

WACC component	Port of Melbourne WACC	Current data	IPART market parameters	
			Long term	Mid-point
Cost of debt				
Risk-free rate		1.60%	2.70%	2.15%
Debt risk premium		1.40%	2.50%	1.95%
Debt-refinancing costs	0.10%	0.13%	0.13%	0.13%
Return on debt	4.80%	3.13%	5.33%	4.23%
Cost of equity				
Risk-free rate	1.70%	1.60%	2.70%	2.15%
Market risk premium	6.54%	8.40%	6.00%	7.20%
Equity beta	1.00	1.00	1.00	1.00
Corporate tax	30%	30%	30%	30%
Gamma	0.50	0.25	0.25	0.25
Return on equity	9.69%	12.90%	11.23%	12.06%
Gearing				
Debt proportion	30%	30%	30%	30%
Equity proportion	70%	70%	70%	70%
WACC	8.23%	9.97%	9.46%	9.71%

A1.2 Australian Energy Regulator (AER)

The AER is responsible for the economic regulation of electricity and gas transmission and distribution services in eastern and southern Australia under the National Electricity Rules (NER) and the National Gas Rules (NGR). Within this context, the AER determines the allowed return on capital for electricity and gas

⁸⁰ IPART, *Review of our WACC method*, February 2018, p 32.

⁸¹ IPART, *Submission on draft report, SA Water regulatory determination 2020*, April 2020, p 2.

transmission and distribution services. Since 2018, the NER and NGR were amended to replace the previously non-binding rate of return guidelines with a binding rate of return instrument.⁸²

When making its determination, the AER is required by the National Electricity Law (NEL) to:

- do so in a manner that is likely to contribute to the achievement of the National Electricity Objective (NEO), including the promotion of efficient investment in network infrastructure;⁸³ and
- take into account the principle that a regulated network service provider (NSP) should be provided with a reasonable opportunity to recover at least its efficient costs.⁸⁴

It follows that the AER is required to 'promote efficient investment in, and efficient operation and use of, the relevant electricity or gas services, for the long term interests of consumers with respect to the price, quality, safety, reliability and security of supply'.⁸⁵

A1.2.1 WACC methodology

The AER's rate of return instrument requires the rate of return to be calculated at the time of each determination and updated annually. The AER considers efficient financing costs are reflected in the prevailing market cost of capital (or WACC) for an investment with a similar degree of risk as that which applies to a service provider in respect of the provision of regulated services.⁸⁶ This is because the market for capital finance is competitive.⁸⁷

In December 2018, the AER released its rate of return instrument and associated explanatory statement.⁸⁸ This detailed its methodology for estimating the WACC.

In addition, the AER publishes annual updates to its rate of return instrument with the purpose of providing stakeholders with regular information on rate of return data, illustrating changes since the publication of the 2018 instrument.⁸⁹ Most recently, the AER released an update in December 2020.⁹⁰

It is noted that the AER is currently undertaking a review of some aspects of its WACC methodology as part of its process of developing its 2022 rate of return instrument. For example, in its December 2020 final working paper regarding the use of CAPM and alternative return on equity models, it did not propose to include the dividend growth model (at the return on equity level) as a secondary model and did not endorse the use of a multiple model approach.⁹¹

Cost of equity

The AER calculates the cost of equity using the SL CAPM, which involves determining:

- the risk free rate;
- the equity beta; and

⁸² AER, *Rate of return instrument*, Explanatory statement, December 2018, p 11.

⁸³ NEL sections 7 and 16(1).

⁸⁴ NEL sections 7A and 16(2)(a).

⁸⁵ AER, *Rate of return instrument*, Explanatory statement, December 2018, p 29.

⁸⁶ The NGR and NER contain an allowed rate of return objective which provides that the 'allowed rate of return is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of its regulated services'. AER, *Rate of return instrument*, Explanatory statement, December 2018, p 29.

⁸⁷ AER, *Rate of return instrument*, Explanatory statement, December 2018, p 33.

⁸⁸ AER, *Rate of return instrument*, Explanatory statement, December 2018, p 11.

⁸⁹ AER, *Rate of return*, Annual update, December 2020, p 4.

⁹⁰ AER, *Rate of return*, Annual update, December 2020.

⁹¹ AER, *CAPM and alternative return on equity models*, Final working paper, December 2020, p 4.

- the MRP.

Risk free rate

The AER calculates the risk-free rate as the average return on Commonwealth government bonds with a term of 10 years, over a period nominated by the regulated business. This averaging period must:⁹²

- start no earlier than seven months prior to the commencement of the regulatory period;
- end no later than three months prior to the commencement of the regulatory period;
- include between 20 and 60 consecutive business days in the period between the nominated start and end date; and
- be nominated prior to the start of the averaging period and contained in the initial proposal by the regulated business.

Market risk premium

The AER adopts a fixed, point estimate of 6.1 per cent as its estimate of the MRP.⁹³ Its decision reflects a range of considerations, including:⁹⁴

- the observed arithmetic MRP (from historical excess returns) since 1988, which was estimated to equal 6.1 per cent and was given high weight relative to other considerations;⁹⁵
- analysis of current market conditions and intertemporal MRP patterns;
- other potential methods of forward estimation of the MRP; and
- its opinion that the estimate provides investors with an opportunity to recover their efficient costs and contributes to achieving the national gas and electricity objectives and revenue and pricing principles.

Gamma

The AER adopts a gamma of 0.585, which is the product of its estimated utilisation rate of 0.65 and its estimated distribution rate of 0.90.⁹⁶ This estimate reflects the AER's consideration that the value of imputation credits within the building block revenue framework is effectively an estimate of the proportion of company tax which is expected to be returned to investors through the utilisation of imputation credits.⁹⁷

Cost of debt

The methodology applied by the AER to estimate the cost of debt reflects a gradual transition from the "on the day" approach, which the AER historically adopted, to the "trailing average" approach, by updating 10 per cent of the debt portfolio over 10 years.⁹⁸ Specifically:

- the on the day approach involves estimating the prevailing cost of debt as close as possible to the start of the regulatory period; and

⁹² AER, *Rate of return instrument*, Explanatory statement, December 2018, p 125.

⁹³ AER, *Rate of return instrument*, Explanatory statement, December 2018, p 220.

⁹⁴ AER, *Rate of return instrument*, Explanatory statement, December 2018, pp 220-221.

⁹⁵ AER, *Rate of return instrument*, Explanatory statement, December 2018, p 221.

⁹⁶ AER, *Rate of return instrument*, Explanatory statement, December 2018, p 307.

⁹⁷ The AER provides an extensive discussion of its reasons for selection this value in its explanatory statement. AER, *Rate of return instrument*, Explanatory statement, December 2018, p 308-381.

⁹⁸ AER, *Rate of return instrument*, Explanatory statement, December 2018, p 276.

- the trailing average approach involves estimating an average of the cost of debt over 10 years (and is annually updated) using the simple average of three third party data sources: Bloomberg, the RBA and Thomson Reuters.⁹⁹

In addition, the AER adopts a benchmark term of 10 years.¹⁰⁰

A1.2.2 Impact of AER's methodology

Table A.2 provides an indication of how using the AER's WACC methodology with the Port's firm specific parameters would affect the Port's rate of return range. The firm specific parameters (ie, equity beta, gearing and the relevant credit rating) have been based on the Port's 2021-22 tariff compliance statement.

Table A.2 illustrates that the AER methodology leads to a pre-tax nominal WACC of 7.70 per cent – 0.53 percentage points below the Port's estimate of 8.23 per cent.

Table A.2: Applying the AER's methodology with the Port's firm specific parameters

WACC component	Port of Melbourne WACC	AER market parameters
Cost of debt		
Risk-free rate		
Debt risk premium		
Debt-refinancing costs		
Trailing average return on debt (with transition)	4.80%	4.80%
Cost of equity		
Risk-free rate	1.70%	1.72%
Market risk premium	6.54%	6.10%
Equity beta	1.00	1.00
Corporate tax	30%	30%
Gamma	0.50	0.59
Return on equity	9.69%	8.93%
Gearing		
Debt proportion	30%	30%
Equity proportion	70%	70%
WACC	8.23%	7.70%

Note: We have not obtained data from Thompson Reuters. Because the Port's approach to estimating the cost of debt is similar to the AER's (and is transitioning to a trailing average) we assume that the AER's cost of debt estimate is equal to the Port's estimate.

A1.3 Australian Competition and Consumer Commission (ACCC)

The ACCC is responsible for assessing undertakings made under the National Access Regime in Part IIIA of the *Competition and Consumer Act 2020*. This includes assessing undertakings from ARTC for its:

- interstate rail network, which primarily supports the transport of freight within Australia; and

⁹⁹ AER, *Rate of return instrument*, Explanatory statement, December 2018, pp 277-278.

¹⁰⁰ AER, *Rate of return instrument*, Explanatory statement, December 2018, pp 278-279.

- Hunter Valley network, which primarily supports the transport of coal mined in the Hunter Valley to be exported from the Port of Newcastle.

A1.3.1 WACC methodology

In its regulation of the aforementioned ARTC networks, the ACCC reviews ARTC's proposed WACC and considers appropriate adjustments. The WACC ultimately determines the ceiling limit for prices that ARTC can charge its customers. In the context of the Interstate Network, the ACCC considers that an appropriate WACC will promote the economically efficient operation of, use of, and investment in the Interstate Network, which allows for ARTC to receive a return on its investment that is commensurate with the regulatory and commercial risks it faces as well as recognising the interests of those seeking access to its network.¹⁰¹

Cost of equity

The ACCC calculates the cost of equity using the SL CAPM, which involves determining:

- the risk free rate;
- the equity beta; and
- the MRP.

Risk-free rate

The ACCC calculates the risk-free rate as the 20-day average of ten-year Commonwealth government bond yields using RBA data.

Market risk premium

The ACCC has regard to the following factors when determining an appropriate estimate of the MRP:

- historical estimates;
- market surveys; and
- previous regulatory decisions.

Historical estimates of the MRP are a key component of the ACCC's methodology, since it considers that a long term average of historical premiums provides a robust measure of the expected future MRP. The ACCC argues that this is a prudent approach since:¹⁰²

- realised premiums are likely to fluctuate around an average, meaning a long term average will produce an accurate measure of the future MRP; and
- investor expectations regarding the future MRP are likely inherently linked to the observed historical difference between the return to equity and bond holders.

Based on this reasoning, the ACCC calculates both the arithmetic and geometric means of historical excess returns over various sampling periods. This methodology yields a range of the MRP of between five to six-and-a-half per cent, with the ACCC adopting six per cent.¹⁰³

The ACCC complements its historical analysis by examining survey evidence and recent regulatory decisions to assess whether the historical average provides an appropriate estimate of the MRP.

¹⁰¹ ACCC, *Australian Rail Track Corporation's 2018 interstate access undertaking | Draft decision*, 20 December 2018, p vi.

¹⁰² ACCC, *Australian Rail Track Corporation's 2018 interstate access undertaking | Draft decision*, 20 December 2018, p 130.

¹⁰³ ACCC, *Australian Rail Track Corporation's 2018 interstate access undertaking | Draft decision*, 20 December 2018, pp 130-131.

Gamma

The ACCC adopts a gamma of:

- 0.4 for ARCT's Hunter Valley network;¹⁰⁴ and
- 0.5 for ARCT's interstate rail network.¹⁰⁵

To arrive at its gamma estimate for the Hunter Valley network, the ACCC references analysis and decisions made by the AER and the QCA. Specifically, it notes that:¹⁰⁶

- in 2015, the AER selected a gamma of 0.4 from a range of 0.3 to 0.5 reflecting analysis of utilisation and distribution rates; and
- the QCA selected a gamma of 0.47 for Aurizon Network reflecting advice from Dr Martin Lally.

In its decision for ARTC's interstate rail network, the ACCC references its 2018 Hunter Valley decision, its 2008 interstate network access undertaking decision and analysis and decisions made by the AER and the QCA. Specifically, it notes that:¹⁰⁷

- in its draft 2018 rate of return guidelines, the AER considered a gamma of 0.5 reasonable from a range of 0.3 to 0.6, reflecting advice from Dr Martin Lally and its own analysis; and
- the QCA selected a gamma of 0.47 for Aurizon network reflecting advice from Dr Martin Lally and its own analysis.

Cost of debt

The ACCC calculates a prevailing cost of debt as the sum of the risk-free rate, debt risk premium and debt issuance costs. The methodology that the ACCC applies to determine the risk-free rate is set out above.

The ACCC calculates the DRP as the difference between bond yields and the risk-free rate. To calculate bond yields, the ACCC:

- uses both RBA and Bloomberg data;
- converts the yield into an effective annual rate; and
- calculates the 20-business day average.

Acknowledging the relative strengths and weaknesses of each dataset, the cost of debt is calculated as the average of the bond yields derived from each dataset, less the risk-free rate.

In addition, the ACCC adopts an estimate of debt issuance costs of 0.095%.¹⁰⁸

A1.3.2 Impact of the ACCC's methodology

Table A.3 provides an indication of how using the ACCC's WACC methodology with the Port's firm specific parameters would affect the Port's rate of return range. The firm specific parameters (ie, equity beta, gearing and the relevant credit rating) have been based on the Port's 2021-22 tariff compliance statement.

¹⁰⁴ ACCC, *Australian Rail Track Corporation's 2017 Hunter Valley access undertaking*, Draft decision, 20 April 2017, p 134.

¹⁰⁵ ACCC, *Australian Rail Track Corporation's 2018 interstate access undertaking*, Draft decision, 20 December 2018, p 125.

¹⁰⁶ ACCC, *Australian Rail Track Corporation's 2017 Hunter Valley access undertaking*, Draft decision, 20 April 2017, pp 160-162.

¹⁰⁷ ACCC, *Australian Rail Track Corporation's 2018 interstate access undertaking*, Draft decision, 20 December 2018, pp 141-142.

¹⁰⁸ We note that there is a typographical error in the ACCC's presentation of the estimate in its Hunter Valley report.

Table A.3 illustrates that the ACCC's methodology leads to a pre-tax nominal WACC of 7.29 per cent – 0.94 percentage points below the Port's estimate of 8.23 per cent.¹⁰⁹

Table A.3: Applying the ACCC's methodology with the Port's firm specific parameters

WACC component	Port of Melbourne WACC	ACCC market parameters
Cost of debt		
Risk-free rate		1.72%
Debt risk premium		1.27%
Debt-refinancing costs	0.10%	0.10%
Return on debt	4.80%	3.09%
Cost of equity		
Risk-free rate	1.70%	1.72%
Market risk premium	6.54%	6.00%
Equity beta	1.00	1.00
Corporate tax	30%	30%
Gamma	0.50	0.50
Return on equity	9.69%	9.08%
Gearing		
Debt proportion	30%	30%
Equity proportion	70%	70%
WACC	8.23%	7.29%

Source: HoustonKemp analysis. Note: We assume that the ACCC's gamma estimate is 0.5 in line with the relative recency of the ARTC Interstate decision.

A1.4 Economic Regulation Authority of Western Australia (ERA)

The ERA is Western Australia's independent economic regulator and is responsible for ensuring that Western Australian consumers and businesses have a fair, competitive and efficient environment. Within this role, it regulates a range of rail, gas and electricity businesses.

The ERA is required under the *Railways (Access) Code 2000* (the Code) to determine annually the long-term WACC to be applied in establishing the capital costs of regulated railways.¹¹⁰ The ERA's current purview extends to the Public Transport Authority Network, the Arc Infrastructure network (freight transport) and the Pilbara Infrastructure Railways network (which links iron ore mines in the Pilbara to Port Hedland).¹¹¹ The ERA makes a determination for each of these rail networks.

¹⁰⁹ We note that the ACCC released a decision regarding the Australian Postal Corporation on December 2019. In this decision it adopted an MRP of 6.1 per cent and a gamma of 0.585, implying a standardised WACC of 7.18 per cent. See: ACCC, *Decision on Australian Postal Corporation 2019 price notification*, December 2019, pp 37-38.

¹¹⁰ ERA, *Determination on the 2020 Weighted Average Cost of Capital for the freight and urban railway networks, and for Pilbara railways*, August 2020, p 1.

¹¹¹ ERA, *Method for determining the weighted average cost of capital for railway networks*, May 2018, para 2, p 2.

A1.4.1 WACC methodology

The Code describes the WACC as the target long-term weighted average cost of capital appropriate to the relevant railway infrastructure.¹¹² Under the Code, the ERA is required to undertake public consultation every fifth year before determining the WACC values for that year. The ERA last undertook this process prior to its August 2019 WACC determination.¹¹³ In line with its annual WACC determination, the ERA updated its WACC estimates in 2020 following the method set out in its 2018 and 2019 rail WACC final determination.¹¹⁴

We focus our discussion on the process used by the ERA to estimate the appropriate WACC for rail businesses. Notwithstanding, we note that there are differences between how the ERA regulates gas and electricity businesses. For example, in its final gas rate of return guidelines it:¹¹⁵

- estimates the return on debt using a hybrid trailing average approach – as compared to the on-the-day approach adopted in the context of rail decisions; and
- allows for hedging costs in estimating the return on debt – which are not included in its rail decisions.

Cost of equity

To determine the cost of equity, the ERA places full weight on an estimate of the return on equity derived using the SL CAPM.¹¹⁶ This involves determining:

- the risk free rate;
- the equity beta; and
- the MRP.

Risk-free rate

The ERA determines its estimate of the risk-free rate based on the observed yield of the ten-year Commonwealth government bonds. The use of ten-year tenor is motivated by the ERA's opinion that this is consistent with a long term estimate of the WACC.¹¹⁷

The risk-free rate is re-estimated for each annual determination of the WACC. The ERA calculates the risk-free rate using the 40 business day averaging period as at 30 June.¹¹⁸

Market risk premium

In its past determinations, the ERA relied on a combination of three models to determine its estimate of the MRP, ie:¹¹⁹

- the Ibbotson method;
- the DGM (both the ERA's own two-stage DGM and more recent DGM studies); and
- the Wright method.

¹¹² Ibid., p 9.

¹¹³ ERA, *Determination on the 2020 Weighted Average Cost of Capital for the freight and urban railway networks, and for Pilbara railways*, August 2020, p 1.

¹¹⁴ ERA, *2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, Final Determination, 22 August 2019.

¹¹⁵ ERA, *Final gas rate of return guidelines explanatory statement*, December 2018, p 92.

¹¹⁶ ERA, *2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, Final Determination, 22 August 2019, p 37.

¹¹⁷ Ibid., pp 21-22.

¹¹⁸ Ibid., p 21.

¹¹⁹ ERA, *2018 weighted average cost of capital at 30 June 2018 for the freight and urban networks, and the Pilbara railways | Draft determination*, 2 May 2019, paras 190-194, pp 40-41.

However, recent criticisms of the ERA's use of the Wright method have prompted the ERA to abandon its use.¹²⁰ The ERA now uses regulatory judgement to select the MRP from a range that is bounded between the Ibbotson approach and the DGM. However, weaknesses associated with the DGM approach have led the ERA to place greater weight on the historical estimate (ie, the Ibbotson approach) as opposed to the forward-looking approach (the DGM).¹²¹ This led it to estimate an MRP of 5.90 per cent.

The ERA fixes the MRP until its next rail WACC method review.¹²²

Gamma

The ERA adopts a gamma of 0.5 which remains fixed until the following five yearly method review.¹²³ The ERA considers that this update was necessary to reflect:¹²⁴

- the Tribunal and Federal Court judicial reviews which support the use of the utilisation approach;
- that ATO data should not be applied to all aspects of the imputation system;
- the findings from new reports and analysis provided by Dr Lally which improve gamma calculations; and
- there being no observable market price for gamma, specifically its consideration that the dividend drop off approach is flawed and produces unreliable estimates.

To determine gamma, the ERA adopts the Monkhouse formula, in which:

- the distribution rate:
 - > represents the proportion of imputation credits generated by a benchmark efficient entity that is expected to be distributed to investors, specifically the ERA considers that the distribution rate is a firm specific rather than a market wide parameter; and
 - > is estimated from financial reports of the 50 largest ASX listed firms;
- the utilisation rate:
 - > is the weighted average over the utilisation rates of individual investors, which it considers to be a market wide rather than a firm specific parameter; and
 - > is estimated using the equity ownership approach.

Cost of debt

The ERA estimates the return on debt at the summation of the risk-free rate, debt risk premium and debt raising costs.¹²⁵ The methodology that the ERA applies to determine the risk-free rate is highlighted in the discussion above.

To estimate the debt risk premium, the ERA considers that a 10-year term is appropriate, reflecting the 'long term nature of rail assets and its regulatory framework'.¹²⁶ In addition, it applies separate credit ratings to each rail business, reflecting the differing operational and risk profiles of the individual businesses.¹²⁷ To determine the appropriate credit rating, for each business it reviews a benchmark sample of relevant

¹²⁰ ERA, *2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, Final Determination, 22 August 2019, pp 44-46.

¹²¹ *Ibid.*, p 52.

¹²² *Ibid.*, p 53.

¹²³ *Ibid.*, p 78.

¹²⁴ *Ibid.*, p 77.

¹²⁵ *Ibid.*, para 247, p 20.

¹²⁶ *Ibid.*, p 20.

¹²⁷ *Ibid.*, p 23.

entities.¹²⁸ With these parameters established, the ERA determines the debt premium using its revised bond yield approach.¹²⁹

The revised bond yield approach is summarised in six steps:¹³⁰

Step 1: Determining the benchmark sample – Identifying a sample of relevant corporate bonds that reflect the credit rating of the benchmark efficient entity.

Step 2: Collecting data and converting yields to Australian dollar equivalents – Converting the bond yields from the sample into Australian dollar equivalent yields inclusive of Australian swap rates.

Step 3: Averaging yields over the averaging period – Calculating an average Australian dollar equivalent bond yield for each bond across the averaging period.

Step 4: Estimating curves - Estimating yield curves on this data by applying the Gaussian Kernel, Nelson-Siegel and Nelson-Siegel-Svensson techniques.

Step 5: Estimating cost of debt - Calculating the 10-year cost of debt estimate for each of the yield curves in the benchmark sample and augmented benchmark sample. Adjusting the bias of cost of debt estimates from the augmented sample.

Step 6: Calculating the debt risk premium – Calculating the debt risk premium by subtracting the 10-year risk free rate from the 10-year cost of debt.

The debt risk premium for each benchmark efficient entity is re-evaluated each year.¹³¹ We note that the estimate produced in the context of electricity and gas decisions differs from that produced in rail decisions. Specifically, the process adopted in rail decisions involves a bias correction (see step 5 above).¹³² For example, if BBB rated bonds are included in the sample for the purpose of increasing sample size, the yield estimates for a BBB+ rated bond would likely be biased upward. To correct for this, the ERA selects the minimum estimates formed via its three statistical approaches (ie, Gaussian Kernel, Nelson-Siegel and Nelson-Siegel-Svensson techniques).

Finally, the ERA applies an allowance of 0.1 per cent for debt raising costs, reflecting its review of literature and recent regulatory decisions.¹³³ The ERA fixes its allowance for debt-raising costs until the next rail WACC method review.¹³⁴

A1.4.2 Impact of the ERA's methodology

Table A.4 provides an indication of how using the ERA's WACC methodology with the Port's firm specific parameters would affect the Port's rate of return range. The firm specific parameters (ie, equity beta, gearing and the relevant credit rating) have been based on the Port's 2021-22 tariff compliance statement.

Table A.4 illustrates that the ERA's methodology leads to a pre-tax nominal WACC of 7.12 per cent – 1.11 percentage points below the Port's estimate of 8.23 per cent.

¹²⁸ Ibid., pp 23-25.

¹²⁹ ERA, *Determination on the 2020 Weighted Average Cost of Capital for the freight and urban railway networks, and for Pilbara railways*, August 2020, p 14.

¹³⁰ ERA, *2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, Final Determination, 22 August 2019, p 26.

¹³¹ ERA, *2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, Final Determination, 22 August 2019, p 27.

¹³² ERA, *2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, Final Determination, 22 August 2019, p 26.

¹³³ Ibid., pp 32-34.

¹³⁴ Ibid., p 34.

Table A.4: Applying the ERA's methodology with the Port's firm specific parameters

WACC component	Port of Melbourne WACC	ERA market parameters
Cost of debt		
Risk-free rate		1.57%
Debt risk premium		1.54%
Debt-refinancing costs	0.10%	0.10%
Return on debt	4.80%	3.21%
Cost of equity		
Risk-free rate	1.70%	1.57%
Market risk premium	6.54%	5.90%
Equity beta	1.00	1.00
Corporate tax	30%	30%
Gamma	0.50	0.50
Return on equity	9.69%	8.79%
Gearing		
Debt proportion	30%	30%
Equity proportion	70%	70%
WACC	8.23%	7.12%

Source: HoustonKemp analysis. Note: the debt risk premium is estimated using a sample of BBB rated bonds and the mid point of estimation approaches.

A1.5 Essential Services Commission of South Australia (ESCOSA)

ESCOSA is responsible for regulating a range of industries in South Australia, including water and rail.

In 2020, pursuant to the provisions of the *Water Industry Act (2012)* and the *Essential Services Commission Act (2002)*, ESCOSA made a regulatory determination in relation to the maximum revenue that the South Australian Water Corporation (SA Water) can recover from the provision of drinking water and sewerage retail services.

ESCOSA is also responsible for regulating railways – as described in Box A.1 below. However, it has not undertaken a detailed review of the appropriate WACC for railways in recent years. By consequence, our discussion of ESCOSA's WACC methodology focuses on its regulation of SA Water.

Box A.1: ESCOSA's regulation of railways

The *Railways (Operations and Access) Act (1997)* – the ROA – establishes a negotiate-arbitrate framework to facilitate access by accredited rail operators to below-rail services on fair commercial terms. In essence, the regime provides a backstop to commercial negotiations.¹³⁵

¹³⁵ ESCOSA, *South Australian rail access regime review*, Issues paper, February 2020, p 1.

Under the ROA, ESCOSA is required to monitor and ensure compliance, setting requirements for information provision, conciliation and arbitration of access disputes. ESCOSA is also required to periodically review the access regime and report to the Minister for transport and infrastructure on whether the regime should continue for the next prescribed period (five years). In accordance with the ROA, a regulation was made on 15 October 2020 to extend the operation of the access regime for the five years commencing on 31 October 2020.

In this context, ESCOSA has published 'access information and pricing principle' guidelines relating to its interstate rail access regime.¹³⁶ It specifies that the post-tax real WACC, which reflects all regulatory and commercial risks involved, must comprise:¹³⁷

- (a) a capital asset pricing model ("CAPM") method of determining the cost of equity; and
- (b) a debt to equity ratio which would be considered prudent for the Operator's business in relation to the railway by reputable lenders; and
- (c) an appropriate adjustment (beta) factor to the equity risk margin appropriate for investment in railway infrastructure.

ESCOSA has not undertaken a detailed review of comparable businesses for numerous years. However, in 2015 it undertook a 10-year review of the revenues of the Tarcoola Darwin Railway in which it reviewed other regulators' recent decisions and adopted a pre-tax rate of return of 5.25 per cent as the lower bound of its reasonable range.¹³⁸ However, it noted that the commercial rate of return (which is used for pricing) would likely be higher than this lower bound.¹³⁹

A1.5.1 WACC methodology

In the context of its regulation of SA Water, ESCOSA estimates the WACC on a post tax basis.¹⁴⁰

Cost of equity

ESCOSA calculates the nominal cost of equity using the CAPM.¹⁴¹ This involves determining:

- the risk free rate;
- the equity beta; and
- the MRP.

Risk free rate

ESCOSA determines its estimate of the risk-free rate based on the annualised observed yield of 10-year Commonwealth government bonds. This reflects its opinion that the 10-year term to maturity approximates the long lived nature of the infrastructure assets being regulated, which corresponds with the term used by regulators and investment practitioners.¹⁴²

¹³⁶ ESCOSA, *Interstate rail access regime: Access information and pricing principles guideline*, October 2019.

¹³⁷ ESCOSA, *Interstate rail access regime: Access information and pricing principles guideline*, October 2019, para 3.3.11.

¹³⁸ ESCOSA, *Tarcoola-Darwin railway: 10-year review of revenues*, August 2015., p 39.

¹³⁹ ESCOSA, *Tarcoola-Darwin railway: 10-year review of revenues*, August 2015., p 39.

¹⁴⁰ ESCOSA, *SA Water final determination*, Reasons, June 2020, p 35.

¹⁴¹ ESCOSA, *SA Water final determination*, Reasons, June 2020, p 217.

¹⁴² ESCOSA, *SA Water final determination*, Reasons, June 2020, p 218.

In the context of its SA Water determination, ESCOSA calculates the risk free rate using a 60 business day averaging period.¹⁴³ It notes that:¹⁴⁴

Overall, while there is likely to be limited improvement in forecast accuracy between the use of a 20-day and 60-day average, the Commission has accepted SA Water's proposal as there is no compelling evidence against the proposal.

Market risk premium

ESCOSA adopts an MRP of 6 percent.¹⁴⁵ ESCOSA estimates a single figure for the MRP based on long-run data, which it uses as a forecast for the regulatory horizon.¹⁴⁶

To support its use of a historical approach to estimating the MRP, ESCOSA notes that all MRP methodologies (eg, DGM, surveys and econometric models) encompass some error and have limitations.¹⁴⁷ Further, it notes recent regulatory decisions including the AER's consideration that the long-run average method is reasonable given a paucity of robust evidence.¹⁴⁸

ESCOSA's selection of an MRP of 6.0 per cent reflects its consideration of the longest available arithmetic and geometric averages.¹⁴⁹

Gamma

ESCOSA adopts a gamma of 0.50.¹⁵⁰ In a previous guidance paper, ESCOSA noted that recent studies vary in their conclusions on gamma.¹⁵¹ It stated that it would review such evidence before making a decision on whether or not to depart from its current gamma estimate of 0.5.

ESCOSA also noted the different means of adopting gamma. For example, it notes that 'in the post-tax revenue modelling approach, gamma is accounted for as a separate cash flow as part of the tax allowance of the building block approach, rather than as part of the regulatory rate of return'.¹⁵²

Cost of debt

To determine the applicable return on debt, ESCOSA adopts a 10-year trailing average of the yield on 10-year BBB corporate bonds.¹⁵³ This reflects its considerations that the 10-year bond term reflects the long lived nature of the regulated assets, the limited liquidity of corporate bonds in Australia beyond a 10-year maturity, and that investment practitioners, academics, regulators and government agencies often use or refer to the 10-year term as the benchmark for both the risk free rate and the cost of debt.¹⁵⁴

It adds 0.125 per cent to reflect the efficient transaction costs associated with raising debt finances in the bond market.¹⁵⁵

¹⁴³ ESCOSA, *SA Water final determination*, Reasons, June 2020, p 219.

¹⁴⁴ ESCOSA, *SA Water final determination*, Reasons, June 2020, p 219.

¹⁴⁵ ESCOSA, *SA Water final determination*, Reasons, June 2020, p 206.

¹⁴⁶ ESCOSA, *SA Water final determination*, Reasons, June 2020, p 296.

¹⁴⁷ ESCOSA, *SA Water final determination*, Reasons, June 2020, p 221.

¹⁴⁸ ESCOSA, *SA Water final determination*, Reasons, June 2020, p 296.

¹⁴⁹ ESCOSA, *SA Water final determination*, Reasons, June 2020, pp 296-297.

¹⁵⁰ ESCOSA, *SA Water final determination*, Reasons, June 2020, p 248.

¹⁵¹ ESCOSA, *SA Water regulatory determination 2020: Guidance paper 5*, The cost of funding and using assets, November 2018, p 20.

¹⁵² ESCOSA, *SA Water regulatory determination 2020: Guidance paper 5*, The cost of funding and using assets, November 2018, p 20.

¹⁵³ As published by the RBA in statistical table F3. ESCOSA, *SA Water final determination*, Reasons, June 2020, p 216.

¹⁵⁴ ESCOSA, *SA Water final determination*, Reasons, June 2020, p 216.

¹⁵⁵ ESCOSA, *SA Water final determination*, Reasons, June 2020, p 216.

A1.5.2 Impact of ESCOSA's methodology

Table A.5 provides an indication of how using ESCOSA's WACC methodology with the Port's firm specific parameters would affect the Port's rate of return range. The firm specific parameters (ie, equity beta, gearing and the relevant credit rating) have been based on the Port's 2021-22 tariff compliance statement.

Table A.5 illustrates that ESCOSA's methodology leads to a pre-tax nominal WACC of 7.71 per cent – 0.51 percentage points below the Port's estimate of 8.23 per cent.

Table A.5: Applying ESCOSA's methodology with the Port's firm specific parameters

WACC component	Port of Melbourne WACC	ESCOSA market parameters
Cost of debt		
Risk-free rate		
Debt risk premium		
Debt-refinancing costs	0.10%	0.13%
Trailing average return on debt	4.80%	5.38%
Cost of equity		
Risk-free rate	1.70%	1.41%
Market risk premium	6.54%	6.00%
Equity beta	1.00	1.00
Corporate tax	30%	30%
Gamma	0.50	0.50
Return on equity	9.69%	8.71%
Gearing		
Debt proportion	30%	30%
Equity proportion	70%	70%
WACC	8.23%	7.71%

Source: HoustonKemp analysis

A1.6 Queensland Competition Authority (QCA)

The QCA is responsible for the economic regulation of a range of industries in Queensland, including water and rail businesses. Recent decisions made by the QCA include its:

- final report on the price monitoring of the Gladstone Area Water Board, dated May 2020;
- final decision on Queensland Rail's draft access undertaking, dated February 2020;
- final decision on Aurizon network's draft access undertaking, dated December 2018; and
- final decision on draft access undertaking of DBCTM, dated November 2016.

In the following section we set out the QCA's methodology for estimating the cost of equity and cost of debt.

A1.6.1 WACC methodology

The QCA's current methodological approach reflects a combination of historical and forward-looking perspectives, but has not come about through consideration of the competing objectives implicit in those perspectives. By way of example, the QCA:

- estimates the MRP using a combination of current and historical data;
- combines that MRP with an estimate of the prevailing risk-free rate; and
- applies the resulting cost of equity alongside a prevailing cost of debt and, in potential future decisions, this may be a historical average cost of debt.

Cost of equity

The QCA relies solely on the SL CAPM to estimate the cost of equity. The SL CAPM comprises three elements, ie:

- the risk-free rate;
- the equity beta; and
- the MRP.

Risk-free rate

To estimate the risk-free rate, the QCA adopts an 'on-the-day' approach whereby it averages the yield on ten-year Commonwealth government bonds using the 20 business days prior to a specified end date.¹⁵⁶

The use of ten-year Commonwealth government bonds represents a departure from the QCA's previous methodology of using bonds with a tenor equal to the length of the regulatory period. In implementing the change, the QCA cited the prevalence of ten-year tenors amongst other Australian regulators. In particular, the QCA noted that other regulators had accepted the proposition that the term of the bond should be a proxy for the life of the regulated asset. It also noted that a longer-term bond may better reflect the expectations of investors.¹⁵⁷

Market risk premium

The QCA's approach to estimating the MRP involves a variety of estimation techniques, in which it weighs the evidence of each based on their relative strengths and weaknesses. This reflects the QCA's opinion that:¹⁵⁸

Finding an appropriate estimate of the market risk premium requires judgement, as the market risk premium is not observable and there is no single estimation technique that can produce a 'correct' estimate. Therefore, it is useful to look at estimates from a number of valid methodologies.

In particular, the QCA has regard to five methods:¹⁵⁹

- the Ibbotson method, which emphasises historical excess returns;
- the Siegal method, which emphasises historical excess returns that are adjusted for inflation;
- the Wright method, which emphasises historical real returns;
- the Cornell dividend growth model (DGM), which is a forward-looking approach; and

¹⁵⁶ QCA, *Gladstone Area Water Board price monitoring 2020-25 Part A: Overview*, Final report, pp 90-91.

¹⁵⁷ QCA, *Queensland Rail 2020 draft access undertaking*, Decision, February 2020, pp 41-42.

¹⁵⁸ QCA, *Gladstone Area Water Board price monitoring 2020-25 Part A: Overview*, Final report, p 87.

¹⁵⁹ QCA, *Gladstone Area Water Board price monitoring 2020-25 Part A: Overview*, Final report, p 89.

- surveys and independent expert reports.

To form its assessment of an appropriate estimate of the MRP, the QCA calculates a weighted average of each of the estimates derived from the methods set out above. For instance, the QCA notes that a credible set of weights for these methods would include:¹⁶⁰

- 25 per cent for both the Ibbotson and Cornell DGM methods;
- 20 per cent for surveys and independent expert evidence; and
- 15 per cent for both the Siegal and Wright methods.

The credible weightings set out above indicate that the QCA primarily has regard to a combination of historical excess returns and forward-looking approaches.

The QCA adopts an MRP estimate of 7.0 per cent in its recent GAWB decision.¹⁶¹

Gamma

The QCA considered a gamma of:

- 0.484 appropriate for Queensland Rail in 2020;¹⁶²
- 0.484 appropriate for the Gladstone Area Water Board in 2020;¹⁶³
- 0.48 appropriate for Aurizon in 2018;¹⁶⁴ and
- 0.47 appropriate for DBCTM in 2016.¹⁶⁵

The QCA estimates gamma as the product of the distribution rate and utilisation rate. Its choice of gamma is discussed in detail in the Aurizon DAU, where it notes that it places 100 per cent weight on the equity ownership estimate and gives no weight to ATO statistics in forming its estimate. Further, it states that it considers it appropriate that the distribution rate is based on the average distribution rate of the 20 largest ASX companies.¹⁶⁶

Cost of debt

The QCA calculates the cost of debt as the summation of the risk-free rate, the debt risk premium and debt transaction costs. The risk-free rate employed by the QCA is described above.

The QCA has previously estimated the DRP through an econometric approach.¹⁶⁷ This approach involves developing a portfolio and undertaking regression analysis.¹⁶⁸

Alternatively, the QCA has used third-party data from the RBA and Bloomberg. This had previously been used as a cross check on the estimate generated from its econometric approach.¹⁶⁹ In particular, the QCA

¹⁶⁰ QCA, *Gladstone Area Water Board price monitoring 2020-25 Part A: Overview*, Final report, p 89 (footnote 287).

¹⁶¹ QCA, *Gladstone Area Water Board price monitoring 2020-25 Part A: Overview*, Final report, p 86.

¹⁶² QCA, *Queensland Rail 2020 draft access undertaking*, Decision, February 2020, p 30.

¹⁶³ QCA, *Gladstone Area Water Board price monitoring 2020-25 Part A: Overview*, Final report, p 78.

¹⁶⁴ QCA, *Aurizon Network's 2017 draft access undertaking*, Appendices, December 2018, p 186

¹⁶⁵ QCA, *DBCT Management's 2015 draft access undertaking*, Final, November 2016, p v.

¹⁶⁶ QCA, *Aurizon Network's 2017 draft access undertaking*, Appendices, December 2018, p 174 and 177.

¹⁶⁷ See, for example: QCA, *Aurizon Network's 2017 draft access undertaking*, Decision, December 2018, p 78.

¹⁶⁸ This methodology, and its limitations, is described in QCA, *Aurizon Network's 2017 draft access undertaking*, Appendices, December 2018, p 146.

¹⁶⁹ QCA, *Queensland Rail 2020 draft access undertaking*, Decision, February 2020, pp 42-43.

implements an 'on-the-day' approach (using an averaging period of the 20 business days prior to a specified end date) to calculate the DRP in each dataset and averages the two.

In its recent GAWB decision, no further adjustments were made to this estimate. However, in its final decision for Queensland Rail, the QCA made a further adjustment to reflect the potential for short-term volume uncertainty.¹⁷⁰

To ensure consistency with its estimate of the DRP, the QCA solely considers the Australian corporate bond market when assessing the benchmark debt-financing transaction costs. In its Gladstone Area Water Board decision, it adopted debt issuance costs of 0.108 per cent.

A1.6.2 Impact of the QCA's methodology

Table A.6 provides an indication of how using the QCA's WACC methodology and the Port's firm specific factors would affect the Port's rate of return range. The firm specific parameters (ie, equity beta, gearing and the relevant credit rating) have been based on the Port's 2021-22 tariff compliance statement.

Table A.6 illustrates that the QCA's methodology leads to a pre-tax nominal WACC of 8.15 per cent – 0.07 percentage points below the Port's estimate of 8.23 per cent.

Table A.6: Applying the QCA's methodology with the Port's firm specific parameters

WACC component	Port of Melbourne WACC	QCA market parameters
Cost of debt		
Risk-free rate		1.72%
Debt risk premium		1.27%
Debt-refinancing costs	0.10%	0.11%
Return on debt	4.80%	3.10%
Cost of equity		
Risk-free rate	1.70%	1.72%
Market risk premium	6.54%	7.00%
Equity beta	1.00	1.00
Corporate tax	30%	30%
Gamma	0.50	0.48
Return on equity	9.69%	10.32%
Gearing		
Debt proportion	30%	30%
Equity proportion	70%	70%
WACC	8.23%	8.15%

Note: We do not adjust for volume uncertainty and adopt the QCA's third-party data approach. Source: HoustonKemp analysis.

¹⁷⁰ QCA, Queensland Rail 2020 draft access undertaking, Decision, February 2020, pp 43-45.

A1.7 The Independent Competition and Regulatory Commission (ICRC)

The ICRC is responsible for regulating and advising government about a range of matters, including pricing and other matters for monopoly, near-monopoly and ministerially declared regulated industries.

In the following section we set out the ICRC's methodology for estimating the cost of equity and cost of debt.

A1.7.1 WACC methodology

The ICRC specifies the rate of return based on the efficient financing costs of a benchmark firm, rather than the actual costs of an individual business. It estimates the allowed rate of return by applying a WACC. Specifically, this is the nominal vanilla post-tax WACC.

In its 2021 draft review of methodologies for the WACC, the ICRC also considered the regulatory treatment of inflation given observed interrelationships between forecast inflation and the return on debt and equity.¹⁷¹

The approach outlined in its draft report was confirmed in its 2021 final review of methodologies for the WACC.¹⁷²

Cost of equity

The ICRC uses the SL CAPM to estimate the return on equity, which is a function of the:

- the risk-free rate;
- the equity beta; and
- the MRP.

Risk-free rate

The ICRC estimates the risk-free rate by applying a 40-day averaging period to yields on 10-year Commonwealth government bonds.¹⁷³

In its 2021 draft review of methodologies for the WACC for Icon Water, the ICRC notes that Icon Water submitted that a risk-free rate calculated in October 2020 would lead to a net loss for the benchmark utility. The ICRC found:¹⁷⁴

that the modelling used by Icon Water is done on a cash basis and excludes the capital gain earned by Icon Water on its RAB due to inflationary gains, which is accounted for at the end of the regulatory period. This capital gain on Icon Water's RAB is important to factor in as it allows Icon Water to earn a higher return on equity in future periods as the WACC is applied to a higher RAB.

¹⁷¹ ICRC, *Review of methodologies for the weighted average cost of capital*, Draft report, February 2021, p 1.

¹⁷² ICRC, *Review of methodologies for the weighted average cost of capital*, Final report, April 2021.

¹⁷³ ICRC, *Review of methodologies for the weighted average cost of capital*, Draft report, February 2021, p 25.

¹⁷⁴ ICRC, *Review of methodologies for the weighted average cost of capital*, Draft report, February 2021, p 25.

Market risk premium

The ICRC's current approach to determining the MRP is to use a benchmarking approach, which involves reviewing the approaches of other Australian regulators and deciding on the most appropriate estimate to use. The ICRC reconsiders the MRP each regulatory period, analysing other regulators' estimates.

The ICRC currently adopts an MRP estimate of 6.5 per cent, reflecting a previous MRP estimate developed by the AER. It notes that:¹⁷⁵

...the AER's approach to estimating the MRP was most appropriate because at the time, it used a range of theoretical and empirical evidence that gave weight to both past and present market conditions. In the Commission's view, an appropriate regulatory approach to determining the MRP would give consideration to a range of estimates and use other evidence as a cross-check. The Commission considers that the methods used to determine these estimates should reflect both forward-looking and historical data in order to reflect prevailing conditions and provide regulatory stability.

Gamma

The ICRC uses a post-tax framework for estimating the rate of return. The post-tax WACC framework requires separate estimates of taxation expenses. Under this framework, the value of imputation credits (gamma) is not an input parameter for calculating the WACC. Instead, it is a direct input into the calculation of tax liability for Icon Water, via the corporate tax component of the building block model.

By consequence, the ICRC does not presently estimate gamma. However, it notes that it may estimate gamma in the future reflecting that the value of imputation credits is correlated with the MRP.¹⁷⁶

We understand that it considered that a gamma of 0.4 was acceptable in its most recent decision.¹⁷⁷

Cost of debt

The ICRC estimates the cost of debt using a trailing average approach, with a margin of 0.125 per cent for debt raising costs.

The ICRC considers that the use of a trailing average approach is consistent with contemporary regulatory practice and that it represents a shift away from the previous 'on-the-day' approach. The ICRC notes that the 'on-the-day' approach is no longer used on its own by other Australian regulators as it does not closely align with the efficient debt financing practices of regulated businesses, ie:¹⁷⁸

assumes that regulated firms refinance 100 per cent of their debt at a single point in time at the beginning of the regulatory period. In practice, most infrastructure businesses hold a diversified portfolio of debt with staggered maturity dates. This means that a regulated firm will only have to refinance a portion of its debt at any point in time. Australian regulators moved to a trailing average approach because it more closely aligns with the efficient debt financing practices of regulated businesses.

To implement its approach, the ICRC's 2018 decision incorporated a transitional arrangement over 10 years. In the first year, the ICRC set the allowed return on debt using the on-the-day approach. In each following year of the transition, the ICRC assumes that one-tenth of the debt is refinanced at the prevailing market rate for that year. By the end of the transition period, the approach will provide Icon Water with an allowed return on debt that reflects an average of interest rates over a 10-year period.¹⁷⁹

¹⁷⁵ ICRC, *Review of methodologies for the weighted average cost of capital*, Draft report, February 2021, p 17.

¹⁷⁶ ICRC, *Review of methodologies for the weighted average cost of capital*, Draft report, February 2021, p 14.

¹⁷⁷ ICRC, *Regulated water and sewage services price 2018-23*, Final report, p 127.

¹⁷⁸ ICRC, *Review of methodologies for the weighted average cost of capital*, Draft report, February 2021, p 27.

¹⁷⁹ ICRC, *Review of methodologies for the weighted average cost of capital*, Draft report, February 2021, p 27.

Specifically, the approach involves:

- a term to maturity of 10 years, reflecting the ICRC's view that long lived assets are usually financed using long term debt;
- a benchmark credit rating of BBB, which it notes is consistent with that adopted by other jurisdictional regulators for regulated water utilities;
- a return on debt estimated as a simple average of RBA and Bloomberg's 10-year BBB yields; and
- an averaging period between two months and 12 months nominated prior to the start of the relevant regulatory period.

A1.7.2 Impact of the ICRC's methodology

Table A.7 provides an indication of how using the ICRC's WACC methodology and the Port's firm specific factors would affect the Port's rate of return range. The firm specific parameters (ie, equity beta, gearing and the relevant credit rating) have been based on the Port's 2021-22 tariff compliance statement.

Table A.7 illustrates that the ICRC's methodology leads to a pre-tax nominal WACC of 8.34 per cent – 0.11 percentage points above the Port's estimate of 8.23 per cent.

Table A.7: Applying the ICRC's methodology with the Port's firm specific parameters

WACC component	Port of Melbourne WACC	ICRC market parameters
Cost of debt		
Risk-free rate		
Debt risk premium		
Debt-refinancing costs	0.10%	0.13%
Trailing average return on debt (with transition)	4.80%	4.83%
Cost of equity		
Risk-free rate	1.70%	1.57%
Market risk premium	6.54%	6.50%
Equity beta	1.00	1.00
Corporate tax	30%	30%
Gamma	0.50	0.40
Return on equity	9.69%	9.84%
Gearing		
Debt proportion	30%	30%
Equity proportion	70%	70%
WACC	8.23%	8.34%

Source: HoustonKemp analysis. Note: Because the Port's approach to estimating the cost of debt is similar to the ICRC's (and is transitioning to a trailing average) We assume that the ICRC's cost of debt estimate is equal to the Port's estimate. We adjust for the difference in debt refinancing costs.

A1.8 Office of the Tasmanian Economic Regulator (OTTER)

The Tasmanian Economic Regulator is an independent economic regulator established under the *Economic Regulator Act 2009*. The Tasmanian Economic Regulator is supported by staff of OTTER.¹⁸⁰ The Tasmanian Economic Regulator's purview includes a number of monopoly, near-monopoly and specified industries within Tasmania, including businesses in the electricity, gas, water and sewerage, taxi and compulsory third party insurance industries.

In the following section we set out OTTER's methodology for estimating the WACC.

A1.8.1 WACC methodology

Under the *Industry Act*, there are effectively two separate WACCs applicable:

- on assets transferred to the previous regulated entities before 1 July 2011, to incorporate a commercial rate of return on debt and a pre-tax rate of return of three per cent on equity; and
- for all other regulated assets, the rate of return must incorporate a commercial risk-based rate of return on both debt and equity.

OTTER adopts a vanilla WACC to determine the return on capital for both new assets and existing assets.

In its 2018 water and sewerage price determination, OTTER described its methodology for estimating the WACC. The price determination for the third regulatory period applies until June 2022, reflecting an extension related to COVID-19.¹⁸¹ It noted that, while it previously adopted a real pre-tax WACC, following a proposal for change made by TasWater it was willing to adopt a vanilla WACC. This reflected its consideration that this was most commonly used by other Australian regulators.¹⁸²

Cost of equity

OTTER uses the SL CAPM to estimate the return on equity. This necessitates the estimation of:

- the risk-free rate;
- the equity beta; and
- the MRP.

Risk-free rate

OTTER calculates the risk-free rate using ten-year Commonwealth government bond data. Specifically, it calculates the risk-free rate using the following steps:¹⁸³

- Step 1 – Calculate the 40-trading day average of ten-year Commonwealth government bonds.
- Step 2 – Calculate the daily average of the last nine, eight, seven, six, five, four, three, two, one year of yields on the ten-year Commonwealth government bonds used in step 1.
- Step 3 – Calculate the average of the value in step 1 and the values in step 2.
- Step 4 – Calculate the midpoint of the values calculated in steps 1 and 3.

¹⁸⁰ We refer to the two interchangeably.

¹⁸¹ See the Economic Regulator's website, available: <https://www.economicregulator.tas.gov.au/water/pricing/price-determination-investigations/2018-water-and-sewerage-price-determination-investigation>, accessed on 13 April 2021.

¹⁸² Economic Regulator, *2018 water and sewerage price determination investigation*, Final report, May 2018, p 162.

¹⁸³ Economic Regulator, *2018 water and sewerage price determination investigation*, Final report, May 2018, p 166.

Market risk premium

Although OTTER previously adopted an MRP estimate of 6.0 per cent, TasWater proposed an MRP of 6.5 per cent. This reflected its consideration that state-owned regulated network monopolies should have the same MRP, and that the AER applied a MRP of 6.5 per cent for TasNetworks and other electricity network business.¹⁸⁴ In response, OTTER adopted an MRP of 6.5 per cent.

Gamma

OTTER adopts a gamma of 0.4. As at May 2018, it considered this the best estimate of gamma for a business operating in Australia.¹⁸⁵

In determining its gamma estimate, OTTER responded to TasWater's assertion that as it has council shareholders that cannot benefit from imputation credits, TasWater should receive a gamma of 0. OTTER considered TasWater's argument to be invalid, noting that the:¹⁸⁶

attempt to simulate the returns that an efficiently managed business would generate in an efficient, competitive market. By referring to a notional benchmark efficient privately owned business the advantages of public ownership are eliminated. The corollary of unknown ownership is that the tax status of the owners is also unknown. Therefore, contrary to TasWater's assertion, the Economic Regulator is not determining the ownership structure of a regulated business. Furthermore, gamma is not specific to any particular market or individual business and applies to the overall Australian market.

Cost of debt

OTTER calculates the cost of debt as the sum of the risk-free rate, a DRP and debt issuance costs.

OTTER estimates the DRP using RBA's corporate credit spread/swap data. Specifically, it calculates the DRP using the following steps:¹⁸⁷

- Step 1: Calculate the 40 trading day (ie, the previous two months) average of ten year spreads.
- Step 2: Calculate the daily average of the last nine, eight, seven, six, five, four, three, two, one year of ten-year spreads used in step 1.
- Step 3: Calculate the average of the value in step 1 and the values in step 2.
- Step 4: Calculate the midpoint of the values calculated in steps 1 and 3.

In response to its approach, TasWater suggested that while regulatory precedent for estimating the WACC is inconsistent, OTTER's approach is not used by any other regulator. However, OTTER considers that the inconsistency in methods to calculate the WACC parameters reflects that it is a forward looking variable. By consequence, no one method can definitely predict future interest rates.¹⁸⁸

It supported its opinion with reference to the ACT, which in its decision in the Dampier to Bunbury Natural Gas Pipeline case, stated:¹⁸⁹

And, as is the case with the MRP, there is no one single empirical method that is universally accepted as providing the "right" value for the DRP at any point of time or for any specific regulated firm. Consistent with the use of an expected, not historical, cost of equity, the DRP is an estimate.

¹⁸⁴ Economic Regulator, *2018 water and sewerage price determination investigation*, Final report, May 2018, 169.

¹⁸⁵ Economic Regulator, *2018 water and sewerage price determination investigation*, Final report, May 2018, p 171.

¹⁸⁶ Economic Regulator, *2018 water and sewerage price determination investigation*, Final report, May 2018, p 171.

¹⁸⁷ Economic Regulator, *2018 water and sewerage price determination investigation*, Final report, May 2018, p 166.

¹⁸⁸ Economic Regulator, *2018 water and sewerage price determination investigation*, Final report, May 2018, p 167.

¹⁸⁹ Economic Regulator, *2018 water and sewerage price determination investigation*, Final report, May 2018, p 167.

It also considers that although using current market rates is the most theoretically sound approach to estimating the risk free rate and DRP, regulatory decisions involve judgement as to whether to apply a purely theoretical approach or to combine theoretical and practical considerations.¹⁹⁰ It considers that Australian regulators' decision to move away from a point in time approach reflects an unrealistic simplification of real world debt management practises, leading to a discrepancy between debt funding costs of regulated and unregulated businesses, ie:¹⁹¹

...businesses not subject to regulation are likely to have different debt funding costs compared to the notional benchmark efficient business and regulated businesses are incentivised to have debt funding costs no higher than the regulatory cost of debt. Therefore, the use of historic rates may result in a business being over compensated for the cost of debt when prevailing market rates are below the regulated rate and undercompensated when prevailing market rates are above the regulated rates and producing a commensurate bias towards over investment and under investment respectively.

OTTER further supported its methodology, noting that:¹⁹²

[given] the lack of consistency or consensus among jurisdictional regulators regarding the calculation of the cost of debt, the Economic Regulator has decided to retain its proposal from its Draft Report as it considers its method is an appropriate compromise between the forward looking aspects of the point in time methodology and the actual borrowing costs aspect of incorporating a historical component.

Finally, OTTER acknowledges debt-raising transaction costs incurred in refinancing a business' debt portfolio and allows costs of 0.1 per cent.¹⁹³

A1.8.2 Impact of OTTER's methodology

Table A.8 provides an indication of how using OTTER's WACC methodology and the Port's firm specific factors would affect the Port's rate of return range. The firm specific parameters (ie, equity beta, gearing and the relevant credit rating) have been based on the Port's 2021-22 tariff compliance statement.

Table A.8 illustrates that OTTER's methodology leads to a pre-tax nominal WACC of 8.48 per cent – 0.25 percentage points above the Port's estimate of 8.23 per cent.

Table A.8: Applying OTTER's methodology with the Port's firm specific parameters

WACC component	Port of Melbourne WACC	OTTER market parameters
Cost of debt		
Risk-free rate		2.02%
Debt risk premium		1.91%
Debt-refinancing costs	0.10%	0.10%
Return on debt	4.80%	4.02%
Cost of equity		
Risk-free rate	1.70%	2.02%
Market risk premium	6.54%	6.50%

¹⁹⁰ Economic Regulator, 2018 water and sewerage price determination investigation, Final report, May 2018, p 168.

¹⁹¹ Economic Regulator, 2018 water and sewerage price determination investigation, Final report, May 2018, p 168.

¹⁹² Economic Regulator, 2018 water and sewerage price determination investigation, Final report, May 2018, p 169.

¹⁹³ Economic Regulator, 2018 water and sewerage price determination investigation, Final report, May 2018, p 165.

Equity beta	1.00	1.00
Corporate tax	30%	30%
Gamma	0.50	0.40
Return on equity	9.69%	10.39%
Gearing		
Debt proportion	30%	30%
Equity proportion	70%	70%
WACC	8.23%	8.48%

Source: HoustonKemp analysis.

A2. Appendix - Review of firm specific parameters adopted in previous regulatory decisions

This appendix details the firm specific parameters adopted by regulators in recent regulatory decisions. Specifically, these decisions relate to:

- regulated freight rail businesses; and
- regulated coal businesses.

A2.1 Freight rail network decisions

In section 4.3 we highlight our opinion that decisions for freight rail networks are relatively comparable to the Port. This subsection sets out the firm specific parameters adopted in various recent freight rail network decisions, including:

- the ERA's regulation of Arc Infrastructure; and
- the ACCC's regulation of ARTC interstate network.

A2.1.1 Arc Infrastructure

The ERA is responsible for regulating Arc Infrastructure and determines the rate of return by reference to a benchmark efficient entity which it defines as:¹⁹⁴

A 'pure-play' regulated rail facility operating within Australia without parental ownership, with a similar degree of risk as that which applies to the service provider in respect of the provision of the rail services.

Arc Infrastructure is a 'below' rail freight infrastructure provider that manages Western Australia's rail freight network. This involves operating and maintaining a railway spanning over five thousand kilometres. Arc Infrastructure's network transports a wide array of commodities including grain, alumina, bauxite, iron ore and interstate freight – as well as passengers on the Perth to Kalgoorlie and Perth to Bunbury lines.

The subsections below highlight the ERA's determination of the firm specific parameters applicable to Arc Infrastructure, and the implications of applying the Port's estimation methodology to these parameters.

Firm specific parameters

The ERA reviews the firm specific parameters applicable to Arc Infrastructure at each rail WACC method review, ie, every five years.¹⁹⁵ In its 2019 determination, the ERA adopted:

- a capital structure comprising 25 per cent debt;
- an asset beta of 0.7 and an equity beta of 0.9; and
- a credit rating of BBB+.

¹⁹⁴ ERA, 2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways, Final, 22 August 2019, p 13.

¹⁹⁵ ERA, 2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways, Final Determination, 22 August 2019, pp 19 and 63.

Gearing

In its 2019 final determination, the ERA adopted a gearing ratio of 25 per cent for Arc Infrastructure.¹⁹⁶

To determine gearing for each regulated business, the ERA constructs a separate benchmark sample of relevant entities. The ERA measures gearing over a 10-year timeframe.¹⁹⁷ Reflecting the lack of close comparators to regulated rail networks, in its 2019 review the ERA considered that regulatory discretion was needed to estimate the relevant benchmark efficient gearing for each rail network.¹⁹⁸ In addition, given the imprecision of benchmark gearing estimates, the ERA rounded the gearing estimate to the nearest five per cent.¹⁹⁹

Asset and equity beta

In its 2019 final determination, the ERA adopted an asset beta of 0.70 for Arc Infrastructure.²⁰⁰

The ERA estimates the equity beta based on a benchmark sample of businesses.²⁰¹ It estimates the asset betas for each firm in the benchmark sample using a 10-year period, and a range of methods including:²⁰²

- the least absolute deviations (LAD) method;
- the ordinary least squares (OLS) method;
- the maximum likelihood robust (MM) method; and
- the Theil-Sen (T-S) method.

It then estimates the average asset beta for each sample business (ie, averages the asset beta estimated using each method), and estimates an average asset beta per geography and across the benchmark sample.²⁰³ Subsequently, the ERA uses its regulatory discretion to select the asset beta,²⁰⁴ which is then re-levered with the benchmark gearing to determine the final equity beta using the Brealey-Myers formula.²⁰⁵ Its discretion reflected commentary highlighting its opinion that:²⁰⁶

- Aurizon was likely the most comparable company to Arc Infrastructure, given it operated in Australia and transported a similar mix of bulk commodities and general freight, but there were differences between the

¹⁹⁶ ERA, *2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, Final Determination, 22 August 2019, p 19.

¹⁹⁷ ERA, *2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, Final Determination, 22 August 2019, p 15.

¹⁹⁸ ERA, *2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, Final Determination, 22 August 2019, p 15.

¹⁹⁹ ERA, *2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, Final Determination, 22 August 2019, p 19.

²⁰⁰ ERA, *2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, Final Determination, 22 August 2019, p 62.

²⁰¹ This sample included overseas railway network operators, reflecting its opinion that there was a lack of comparable Australian rail companies. ERA, *2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, Final Determination, 22 August 2019, p 55.

²⁰² ERA, *2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, Final Determination, 22 August 2019, p 55.

²⁰³ ERA, *2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, Final Determination, 22 August 2019, p 56.

²⁰⁴ For example, in determining the asset beta for ARC Infrastructure, it used its discretion to select a relevant asset beta close to the benchmark sample average across regions but higher than that of Aurizon. ERA, *2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, Final Determination, 22 August 2019, p 60.

²⁰⁵ ERA, *2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, Final Determination, 22 August 2019, p 55.

²⁰⁶ ERA, *2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, Final Determination, 22 August 2019, pp 59-60.

networks, particularly the reliance of Arc Infrastructure on local grain supply which implied that Aurizon likely had lower risk exposure than Arc Infrastructure;

- the ERA considered that non-rail operators were a less valid proxy company compared to the rail operators, but offered 'some value' as comparators;
- the ERA considered that overseas rail operators would possess a higher level of systematic risk than Australian operators, noting higher competition from other means of transport (eg, road); and
- the ERA expected the New Zealand port comparator to have a lower level of systematic risk, given the diverse nature of port operations covering road, rail and shipping.

Credit rating

The ERA determines the benchmark credit rating applicable to Arc Infrastructure by applying discretion to an analysis of the credit ratings of a benchmark sample of businesses.²⁰⁷

In its 2019 final determination, the ERA adopted a credit rating of BBB+ for Arc Infrastructure.²⁰⁸

A2.1.2 ARTC Interstate

The ACCC is responsible for regulating the ARTC Interstate network. In its most recent draft decision, dated December 2018, it did not consider that the 2018 interstate access undertaking was appropriate to accept.²⁰⁹

The subsections below highlight the ACCC's determination of the firm specific parameters applicable to the ARTC Interstate network, and the implications of applying the Port's estimation methodology to these parameters.

Firm specific parameters

The ACCC released its draft decision on the ARTC interstate rail network in December 2018. In the decision, the ACCC determined:

- a capital structure comprising 50 per cent debt and 50 per cent equity;
- an asset beta of 0.6 and an equity beta of 1.20; and
- a credit rating of BBB.

The arguments underpinning each of these determinations are detailed below.

Gearing

The ACCC determined the gearing level of 50 per cent for ARTC's interstate network based on its consideration of regulatory precedent and its own opinions at the time of the 2008 access undertaking.²¹⁰ In particular, the ACCC expressed the view that a coal network would likely have more stable cash flows than general intermodal freight as a result of the potential for greater competition. Based on this reasoning, the ACCC viewed that the gearing level determined for the Hunter Value Coal Network (HVCN) would not be appropriate for the interstate network. Reflecting this position, the ACCC determined a lower gearing ratio of 50 per cent, compared to the 52.5 per cent gearing of the HVCN.

²⁰⁷ ERA, *2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, Final Determination, 22 August 2019, p 24

²⁰⁸ ERA, *2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, Final Determination, 22 August 2019, p 25.

²⁰⁹ ACCC, *Australian Rail Track Corporation's 2018 Interstate Access Undertaking*, Draft decision, 20 December 2018, p 143.

²¹⁰ ACCC, *Australian Rail Track Corporation's 2018 Interstate access undertaking*, Draft decision, 20 December 2018, p 143.

The ACCC sets a level of gearing that is designed to be reflective of the long-term gearing for an efficient benchmark firm in the industry. In determining the benchmark gearing level, the ACCC has regard to relevant regulatory decisions as well as previous observations it has made in earlier determinations.

Asset and equity beta

In determining an appropriate asset beta (and therefore equity beta) of ARTC's interstate network, the ACCC had regard to:²¹¹

- ARTC's risk profile as observed at the 2008 access undertaking;
- the current operating environment;
- the asset betas of comparable companies; and
- other relevant regulatory determinations.

In particular, the ACCC formed the view that ARTC's systematic risk had not markedly changed since the last determination. Despite the exit of Aurizon from the intermodal business, the ACCC deemed it was too soon to have sufficient information regarding the long-term effect of Aurizon's exit. Coupled with a review of comparable companies' asset betas and relevant regulatory determinations, the ACCC deemed that an asset beta of 0.60 was appropriate. This also reflected its consideration that:²¹²

ARTC's assumed steady state perpetual RAB directly informs its expectations of the volatility of its future cash flows... On this basis, other below-rail infrastructure providers, whose assets are not assumed to be perpetual nor at a steady state, may be exposed to greater systematic risk compared to ARTC's Interstate Network. Therefore, the ACCC consider ARTC's beta for the 2018 IAU should be comparable to, or even at the lower bound of, the comparator set of beta estimates provided above.

The ACCC converted its asset beta estimate to an equity beta using the Monkhouse formula.²¹³

Credit rating

The ACCC determined the credit rating of BBB for ARTC's interstate network. This reflected its consideration of the credit rating of other major above and below rail operators, as well as its review of the ARTC's overall credit rating as provided by Moody's. It considered that if the Interstate Network were to be excluded, the revised credit rating for the HVCN would likely increase. Therefore, a revised credit rating for the Interstate Network would like decrease towards BBB.²¹⁴

A2.2 Coal related decisions

In section 4.4 we highlight our opinion that decisions for coal businesses are likely less comparable to the Port than freight rail. This subsection sets out the firm specific parameters adopted in various recent coal related decisions, including:

- the QCA's regulation of DBCTM;
- IPART's regulation of Railcorp;
- the ACCC's regulation of Hunter Valley; and

²¹¹ ACCC, *Australian Rail Track Corporation's 2018 Interstate access undertaking*, Draft decision, 20 December 2018, p 136.

²¹² ACCC, *Australian Rail Track Corporation's 2018 Interstate access undertaking*, Draft decision, 20 December 2018, p 139.

²¹³ $\beta_e = \beta_a + (\beta_a - \beta_d) \times \left\{ 1 - \left[\frac{R_d}{(1+R_d)} \right] \times T \times (1 - \gamma) \right\} \times \frac{D}{E}$, see: ACCC, *Australian Rail Track Corporation's 2018 Interstate Access Undertaking*, Draft decision, 20 December 2018, p 124.

²¹⁴ For example, see: ACCC, *Australian Rail Track Corporation's 2018 Interstate Access Undertaking*, Draft decision, 20 December 2018, p 128.

- the QCA's regulation of Aurizon Network.

A2.2.1 Dalrymple Bay Coal Terminal

The QCA regulates the Dalrymple Bay Coal Terminal (DBCT), which is a common-user coal export terminal servicing mines in the Goonyella system of the Bowen Basin coal fields. It is owned by the Queensland government, but leased to Dalrymple Bay Coal Terminal Management (DBCTM) for 50 years, with an option for a further 49 years.

Since March 2001, the handling of coal at the terminal has been a 'declared service' and so is subject to economic regulation by the QCA under the *Queensland Competition Authority Act* (QCA Act). The QCA Act requires access providers of declared services to negotiate with, and in certain circumstances provide access to, third parties seeking access to that service.

The terms and conditions upon which access will be granted to access seekers is determined by the QCA via its approval and review of access undertakings.

We note that the QCA used energy networks, water utilities and toll roads as comparators for DBCT, a coal export terminal subject to a revenue cap form of regulation. The revenue cap form of regulation, which was a major factor motivating the QCA's choice of comparator, is not applicable to the Port (or its benchmark efficient entity).²¹⁵

Firm specific parameters

In the November 2016 DAU, the QCA adopts the following firm specific WACC parameters for DBCTM:²¹⁶

- gearing of 60 per cent;
- an asset beta of 0.45 and an equity beta of 0.87; and
- a BBB credit rating.

The following sections provide an overview of the QCA's rationale in determining each of these firm specific WACC parameters.

Gearing

The QCA determined the 60 per cent benchmark debt gearing ratio drawing upon an assessment of comparator companies. In particular, Incenta examined the volatility of cash flows and gearing levels of firms in related industries, finding that a 60 per cent gearing level was an appropriate capital structure for DBCTM, and was consistent with regulated Australian water and energy businesses.²¹⁷

Asset and equity beta

For the 2015 DAU final decision, the QCA commissioned Incenta to estimate an appropriate value for an asset/equity beta. Regarding DBCTM's risk profile, Incenta had regard to:

- the competitiveness of Australian metallurgical coal production;
- factors which contribute to DBCTM's monopoly position over the course of the coming regulatory cycle;
- adverse movements in credit rating; and
- the expiry of take-or-pay contracts.

²¹⁵ QCA, *DBCT Management's 2015 draft access undertaking*, Final Decision, November 2016, pp 86-87.

²¹⁶ QCA, *DBCT Management's 2015 draft access undertaking*, Final Decision, November 2016, pp 47, 62, 93 and 107.

²¹⁷ QCA, *DBCT Management's 2015 draft access undertaking*, Final Decision, November 2016, p 60.

Further, Incenta undertook a first principles analysis to determine appropriate comparator businesses. It found that DBCTM's asset beta should be similar to the asset beta of regulated energy and water businesses as:²¹⁸

- unlike the demand for container ports' services, which it considered to be linked to the Australian economic cycle, there was no relationship between DBCTM's contracted capacity and coal shipments and Australian income levels which reflected the fact that the growth in the seaborne metallurgical coal trade was being driven by industrialisation and urbanisation in Asia;
- the fundamental principle regarding the nature of the customer was whether there is demand sensitivity to changes in market returns or real GDP. In the case of DBCTM, it considered that even if the economic cycle turns against coal miners and the price of coal falls, as long as the miners are at the lower end of the international cost curve, they have an incentive to continue shipments as long as they are still making a surplus over cash costs;
- DBCTM's revenue cap regulatory framework makes its asset beta fundamentally the same as regulated energy and water businesses as the revenue cap results in a smooth revenue stream – unlike container ports;
- DBCTM has take-or-pay contracts and a cost-based regulatory framework, while container ports have unregulated prices and considerable cyclical volume risk; and
- DBCTM's monopoly position relative to shippers remains strong.

Finally, Incenta conducted empirical analysis, calculating median and average asset betas for a number of possible comparator industries, including: coal mining, rail, container ports, toll roads, regulated energy, and regulated water. In light of its first principles analysis, Incenta recommended an asset beta of 0.40 for DBCTM based on the asset betas of regulated energy and water firms.²¹⁹

The QCA exercised regulatory judgment to adopt an asset beta of 0.45, reflecting its opinion that the potential for large changes in beta estimates between regulatory periods to cause investment uncertainty.²²⁰

Credit rating

Given that a firm's capital structure and credit rating are inherently linked, the QCA also commissioned Incenta to determine an appropriate credit rating for DBCTM. To do so, Incenta took the determined benchmark gearing level and forecast credit metrics under a range of scenarios. In conjunction with the credit metric results, Incenta accounted for the business risk profile and financial risks profile matrix used by Standard and Poor's.²²¹

A2.2.2 Railcorp – Hunter Valley

IPART is responsible for enforcing the NSW Rail Access Undertaking, which provides for third party access to the rail networks in NSW. These networks are owned by RailCorp, the Australian Rail Track Corporation (ARTC) and Transport for NSW (TfNSW).

As part of its obligations, IPART is required to review the rate of return and remaining mine life of the Hunter Valley coal mines serviced by the rail networks. These networks provide both passenger train services, as well as coal transport and other freight services.

²¹⁸ QCA, *DBCT Management's 2015 draft access undertaking*, Final Decision, November 2016, p 86-87.

²¹⁹ QCA, *DBCT Management's 2015 draft access undertaking*, Final Decision, November 2016, p 87.

²²⁰ QCA, *DBCT Management's 2015 draft access undertaking*, Final Decision, November 2016, p 87.

²²¹ QCA, *DBCT Management's 2015 draft access undertaking*, Final Decision, November 2016, pp 61-62.

Only RailCorp is covered by the IPART review, with the ACCC responsible for the ARTC network in the Hunter Valley. IPART's review is required to be undertaken every five years, with the latest review occurring in 2019.²²²

Firm specific parameters

IPART determines the rate of return by reference to a benchmark efficient entity, described as a firm operating in a competitive market and facing similar risks to the regulated business. Applying this definition in its 2019 determination for RailCorp's Hunter Valley rail network, IPART determined:²²³

- a gearing structure of 45 per cent debt;
- an asset beta of 0.64 and an equity beta of 1.0; and
- a credit rating of BBB-rated bonds.

The arguments underpinning each of these determinations are detailed below.

Gearing

To determine its gearing estimate, IPART utilises a proxy company analysis.²²⁴ IPART estimates gearing using a benchmark sample of 10 transport infrastructure companies gathered from Thomson Reuters.²²⁵ In addition, it reviewed regulatory precedent noting that these decisions were based on a broader sample of comparator firms which it considered are not wholly representative of the risk profile of RailCorp and the other networks under the Undertaking.²²⁶

Asset and equity beta

IPART estimates the equity beta based on a group of proxy firms of listed companies that face similar risk to the regulated firm. In determining the group of proxy firms, IPART endeavours to use the broadest selection of companies possible, provided that the firm does not have a thinly traded stock. IPART has also moved to increase transparency of the proxy selection by:²²⁷

- publishing the criteria for proxy selection and the list of comparator companies that meet the criteria at the start of the relevant review period; and
- give stakeholders the opportunity to propose additional comparable industries that meet the criteria, but not individual stocks.

In the context of its NSW Rail access final report released in July 2019, IPART determined the list of proxy firms using a search in the Thomson Reuters Datastream that restricted the sample to:²²⁸

- firms that operate in the 'Industrial transportation – Railroads' industry; and
- firms which undertake their activities in markets that are sufficiently similar to Australia.

It further excluded firms which traded in insufficiently liquid markets, firms that are no longer trading, thinly traded stocks, and firms that do not earn revenue predominately in the nominated industry.²²⁹

²²² IPART, *NSW Rail access – Rate of return and remaining mine life*, Final report, July 2019.

²²³ IPART, *NSW Rail access – Rate of return and remaining mine life*, Final report, July 2019, pp 7-8.

²²⁴ IPART, *NSW Rail access – Rate of return and remaining mine life*, Final report, July 2019, p 8.

²²⁵ IPART, *NSW Rail access – Rate of return and remaining mine life*, Final report, July 2019, pp 8-10.

²²⁶ IPART, *NSW Rail access – Rate of return and remaining mine life*, Final report, July 2019, p 10.

²²⁷ IPART, *Review of our WACC method*, February 2018, p 52.

²²⁸ IPART, *NSW Rail access – Rate of return and remaining mine life*, Final report, July 2019, p 34.

²²⁹ IPART, *NSW Rail access – Rate of return and remaining mine life*, Final report, July 2019, p 34.

For each proxy company included in the analysis, IPART estimates the equity beta using a market model regression with the Vasicek adjustment. This process enables IPART to derive an asset beta using the company's gearing ratio. IPART then reviews these asset betas and determines an appropriate asset beta for the regulated firm. The asset beta is then re-levered with the benchmarked gearing to determine the final equity beta (ie, using the Brealey Myers formula).

Credit rating

IPART assumes a BBB credit rating. This reflects its opinion that:²³⁰

- it is practical to adopt a single credit rating for all industries; and
- it considers a BBB credit rating is most appropriate because the BBB rating will, on average, provide an efficient estimate of the WACC,²³¹ and that the gearing ratio for individual firms can be adjusted because the gearing ratio and the credit rating are endogenous.

A2.2.3 ARTC – Hunter Valley

The ACCC regulates the ARTC's Hunter Valley network, which is predominantly used for the transport of coal from coal mines to the Port of Newcastle for export. However, it is also used to transport coal to domestic customers and provides passenger and non-coal freight services across the Hunter Valley.

The Hunter Valley Coal Network (HVCN) is regulated under an Access Undertaking, which covers the terms and conditions of access to the below rail network operated by ARTC within the Hunter Valley region of New South Wales.

Firm specific parameters

The ACCC released its draft decision on the ARTC HVCN in April 2017. In its decision, the ACCC determined:

- a capital structure comprising 52.5 per cent debt and 47.5 per cent equity;
- an asset beta of 0.45 and an equity beta of 0.94; and
- a credit rating of BBB.

The arguments underpinning each of these determinations are detailed below.

Gearing

The ACCC accepted ARTC's view that a gearing level of 52.5 per cent was an appropriate measure for the benchmark efficient entity. In reaching this conclusion, the ACCC had regard to:²³²

- the ACCC's position paper regarding the 2010 Hunter Valley access undertaking;
- the 2014 Aurizon DAU; and
- the agreement between ARTC and Hunter Rail Access Task Force (HRATF) on the level of gearing.

The ACCC had previously considered the appropriate level of gearing in its 2010 position paper. In the position paper, the ACCC determined that a gearing level of 52.5 per cent was appropriate. The ACCC

²³⁰ IPART, *Review of our WACC method*, Final report, February 2018, p 45-46.

²³¹ IPART considers that a higher credit rating would mean that the benchmark firm would need to rely on a higher proportion of relatively expensive equity. It adds that, if the benchmark firm was sub investment grade, that increase in debt market would likely more than offset the reduction in equity costs. IPART, *Review of our WACC method*, Final report, February 2018, p 46.

²³² ACCC, *Australian Rail Track Corporation's 2017 Hunter Valley access undertaking*, Draft decision, 20 April 2017, p 164.

considered that, since the position paper, ARTC's financial risk had not markedly changed and therefore gearing of 52.5 per cent remained appropriate.

Noting the similarities between the HVCN and Aurizon's rail operations, the ACCC also considered the assessment of gearing as part of the Aurizon 2014 DAU. The ACCC acknowledged the QCA's comparator approach and viewed that Aurizon's gearing of 55 per cent indicated that 52.5 per cent was appropriate for the ARTC's network.

These considerations, coupled with the fact that ARTC and HRATF had agreed upon the gearing of 52.5 per cent, led the ACCC to deem such a capital structure appropriate.

Asset and equity beta

In determining an appropriate asset beta (and therefore equity beta) for ARTC, the ACCC considered:²³³

- the first principles of what an asset and equity beta represent;
- the ACCC's view on the asset beta in its position paper for the 2010 access undertaking and any subsequent changes; and
- a comparison between the Aurizon network and the ARTC's HVCN.

In taking guidance from first principles, the ACCC noted that a benchmark asset beta should be selected by reference to a set of comparable firms. Once this comparison is undertaken, further adjustments can be undertaken to reflect firm specific factors that mitigate systematic risk. In the case of ARTC's HVCN, the ACCC considered that, as a regulated entity, cash flows are regulated to ensure economic cost recovery. It follows that the HVCN would be affected less by economic cycles, meaning the asset beta of comparable firms would overstate its systematic risk.

The ACCC then reflected on whether there had been any changes to the systematic risk faced by ARTC, relative to the 2010 position paper. Ultimately, it was deemed that there had not been a substantial change in the risk profile of ARTC. Based on this assessment, the ACCC considered that there was no basis to adjust the asset beta from 0.45.

Finally, again recognising the similarities between the Aurizon network and ARTC's network, the ACCC considered the QCA's 2014 determination. The ACCC formed the view that ARTC likely had a better ability to mitigate systematic risk and therefore should have a lower asset beta than Aurizon – reaffirming the appropriateness of the determined asset beta.

The ACCC estimates the equity beta by adjusting the asset beta using the Monkhouse method. To determine the asset beta, the ACCC undertakes an analysis of comparable companies while also drawing upon regulatory precedent.

Credit rating

The ACCC determined the credit rating of the benchmark efficient entity with reference to:²³⁴

- ARTC's current credit rating and any recent changes to the credit rating;
- competitive neutrality for government owned businesses;
- credit ratings for major above rail and below rail operators; and
- the proposed duration of the regulatory period.

²³³ ACCC, *Australian Rail Track Corporation's 2017 Hunter Valley access undertaking*, Draft decision, 20 April 2017, p 154.

²³⁴ ACCC, *Australian Rail Track Corporation's 2017 Hunter Valley access undertaking*, Draft decision, 20 April 2017, p 140.

The consideration of these factors led to the ACCC's determination that a BBB rated bond with a tenor equal to the length of the regulatory period was appropriate.

A2.2.4 Aurizon Network

Aurizon operates and manages Australia's largest export coal rail network, the Central Queensland Coal Network and is regulated by the QCA.

This 2,670 kilometre multi-user track network comprises four major coal systems and one connecting system serving Queensland's Bowen Basin coal region: Newlands, Goonyella, Blackwater and Moura with Goonyella Abbot Point Expansion the connecting system link.

Aurizon Network's operations are governed by a 99-year lease with the State of Queensland. Access to the rail network is managed under a detailed process approved by the QCA.

Access seekers (including miners and rail operators) seek access to the rail network through the process set out in Aurizon Network's Access Undertaking, which defines the regime for open access to the rail infrastructure.

By consequence of its significant exposure to coal, Aurizon's firm specific characteristics are not likely comparable to the Port. Indeed:

- in its 2020 report for the Port, Synergies notes that:²³⁵

Frontier Economics agreed with our assessment that certain features of Aurizon's coal business meant it carried different systematic risk from other freight railways or ports. On this basis, and given that Aurizon earns only a small share of revenue from its intermodal containerised business, Frontier Economics concluded Aurizon is not an obvious or close comparator to the BEE.
- in its 2020 report for the Port, Incenta notes that:²³⁶

We also agree with Frontier that Aurizon Holdings should be excluded from the rail freight comparator group since it is primarily a coal transport business that is subject to *ex ante* cost-based price regulation with a revenue cap.

Firm specific parameters

The QCA released its final decision on the Aurizon Network in December 2018. In its decision, the QCA determined:

- gearing of 55 per cent;
- an asset beta of 0.42 and an equity beta of 0.73; and
- credit rating of BBB+.

The arguments underpinning each of these determinations are detailed below.

Gearing

The QCA adopts a benchmark gearing level of 55 per cent for Aurizon Network.²³⁷ This reflected its consultant's (Incenta) consideration that:

- Australian regulators have applied a benchmark gearing level of 60 per cent to energy and water businesses;

²³⁵ Synergies, *Determining a WACC estimate for Port of Melbourne*, May 2020, p 189.

²³⁶ Incenta, *Estimating the Port of Melbourne's equity beta*, May 2020, p 26.

²³⁷ QCA, *Aurizon Network's 2017 draft access undertaking*, Appendices, December 2018, p 134.

- Aurizon Network will exhibit greater (non-systematic) cash flow variability than regulated energy and water businesses owing to such factors as weather and the regulatory revenue cap adjustment (which operates with a 2-year lag), thus its benchmark gearing level may be expected to be lower than that of regulated energy and water businesses; and
- Aurizon Network's actual gearing level was close to the benchmark, and the business has stated an aim of approximating the benchmark level of 55 per cent gearing.

Asset and equity beta

The QCA considers that an equity beta of 0.73 is commensurate with the commercial and regulatory risks in Aurizon Network's provision of access to its declared service.²³⁸ In arriving at this estimate, the QCA considered that:

- regulated energy and water businesses sample provides the most appropriate set of comparators for Aurizon Network;
- North American pipelines should not be included in the sample; and
- its beta estimate did not conflict with the need for regulatory certainty.

The QCA also noted that estimating betas with a high degree of precision is 'inherently difficult'. It added that it considers that adjusting the WACC to account for the risk of imprecision is best reflected as part of the overall WACC, rather than the uplift of a single parameter.²³⁹

Credit rating

The QCA accepted a BBB+ benchmark credit rating for Aurizon Network.²⁴⁰

In arriving at this credit rating, the QCA responded to a comment from Aurizon Network's advisor EY that a BBB+ credit rating is appropriate based on actuals, and that it was targeting a BBB+ rating. However, the QCA considered that its benchmarking approach is not based on actuals, noting that Aurizon Network's actual financing arrangements are not necessarily deterministic of an appropriate credit rating.

The QCA utilises its credit metrics assessment to determine whether the regulatory cash flows obtained by Aurizon Network are within a reasonable range of that for the benchmark entity to meet the benchmark credit rating. It considered that a BBB+ rating was reasonable given its assessment, which included a review of:²⁴¹

- the average FFO/Debt metric for the regulatory period; and
- the average FFO/Interest cover metric for the regulatory period.

²³⁸ QCA, *Aurizon Network's 2017 draft access undertaking*, Appendices, December 2018, p 70.

²³⁹ QCA, *Aurizon Network's 2017 draft access undertaking*, Appendices, December 2018, p 74.

²⁴⁰ QCA, *Aurizon Network's 2017 draft access undertaking*, Appendices, December 2018, p 135.

²⁴¹ QCA, *Aurizon Network's 2017 draft access undertaking*, Appendices, December 2018, p 137.

Annexure A



JOHNSON WINTER & SLATTERY

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24 May 2021

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BY EMAIL

Dear Sirs

Port of Melbourne

We act for the Port of Melbourne (**PoM**) in relation to the preparation of its Tariff Compliance Statement (**TCS**) for 2021-22 for submission to the Essential Services Commission of Victoria (**ESC**) by 31 May 2021. The TCS is required to be provided to the ESC pursuant to a Pricing Order made under the *Port Management Act 1995* (Vic) (**PMA**).

PoM wishes to engage you to prepare an expert report in connection with the TCS. This letter sets out the matters which PoM wishes you to address in your report and the requirements with which the report must comply.

1 Background and framework

PoM is subject to a form of “compliance” regulation under a Pricing Order made by the Governor in Council under section 49A of the PMA. A copy of the Pricing Order is enclosed with this letter.

The ESC is responsible for overseeing a number of economic regulatory functions applicable to PoM, including monitoring and reporting on PoM’s compliance with the Pricing Order.

In particular, under section 49I of the PMA, the ESC must, within 6 months of the end of each five year review period, conduct and complete an inquiry and report to the Minister responsible for administering the *Essential Services Commission Act 2001* (Vic) (**ESC Act**):

- as to whether a provider of prescribed services to whom a Pricing Order applies has complied with the Order during the review period; and
- if there was non-compliance with the Pricing Order, whether that non-compliance was, in the ESC’s view, non-compliance in a significant and sustained manner.

The first review period for PoM will end on 1 July 2021.

Clause 2.1.1(a) of the Pricing Order provides that Prescribed Service Tariffs are to be set so as to allow the Port Licence Holder (that is, PoM) a reasonable opportunity to recover the efficient cost of providing all Prescribed Services, determined by application of an accrual building block methodology. Prescribed Services provided by PoM include shipping channels, wharves and berthing facilities.

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Pursuant to clause 4.1.1 of the Pricing Order, the accrual building block methodology applied by PoM must comprise:

- an allowance to recover a return on its capital base, commensurate with that which would be required by a benchmark efficient entity providing services with a similar degree of risk as that which applies to PoM in respect of the provision of the Prescribed Services;
- an allowance to recover the return of its capital base; and
- an allowance to recover its forecast operating expenses, commensurate with that which would be required by a prudent service provider acting efficiently; less
- an indexation allowance.

Clause 4.3.1 of the Pricing Order also requires that, in determining a rate of return on capital for the purposes of clause 4.1.1(a), PoM “*must use one or a combination of well accepted approaches that distinguish the cost of equity and debt, and so derive a weighted average cost of capital*”. This must be determined on a pre-tax, nominal basis (clause 4.3.2).

The objectives of the regulatory regime, as set out in section 48 of the PMA, are:

- to promote efficient use of, and investment in, the provision of prescribed services for the long-term interests of users and Victorian consumers; and
- to protect the interests of users of prescribed services by ensuring that prescribed prices are fair and reasonable whilst having regard to the level of competition in, and efficiency of, the regulated industry; and
- to allow a provider of prescribed services a reasonable opportunity to recover the efficient costs of providing prescribed services, including a return commensurate with the risks involved; and
- to facilitate and promote competition between ports, between shippers, and between other persons conducting other commercial activities in ports; and
- to eliminate resource allocation distortions by prohibiting a State sponsored port operator from providing a relevant service at a price lower than the competitively neutral price for that service.

As set out in section 8 of the ESC Act:

- in performing its functions and exercising its powers, the objective of the ESC is to promote the long term interests of Victorian consumers (the **objective**); and
- in performing its functions and exercising its powers in relation to essential services, the ESC must, in seeking to achieve the objective, have regard to the price, quality and reliability of essential services.

2 Terms of Reference

In its *Statement of Regulatory Approach – version 2.0* dated 28 April 2020 (**SoRA**) – a copy of which is enclosed with this letter – the ESC states that it intends to apply a three-stage process in assessing whether PoM has complied with the Pricing Order in relation to the rate of return of its capital base:

1. The first step involves assessing whether the approach or approaches used by PoM to determine the allowed rate of return are ‘well accepted’.
2. If PoM has passed the ‘well accepted’ test, the second step involves assessing “*whether the return on capital outcomes determined by the port, when calculating the aggregate revenue requirement, are commensurate with the return required by*

a benchmark efficient entity with a similar degree of risk as that which applies to the port of respect of providing prescribed services". The ESC states that it would apply this test in two steps:

- 2.1 undertaking "high-level cross-checks to assess if the overall return on capital used by the port is likely to be commensurate with the returns that would be required by a benchmark efficient entity", examples of which are set out in Appendix A to the SoRA; and
 - 2.2 if the cross-checks suggest the return on capital used by the PoM is not commensurate with the returns that would be required by a benchmark efficient entity, likely going on to identify "specific areas of potential concern" (such as individual parameter estimates) for further investigation.
3. The third step involves assessing whether PoM's approach is consistent with the Pricing Order and the objective of the regulatory regimes.¹

The ESC has also addressed these issues, and undertaken some cross-checks and comparisons of PoM's proposed rate of return against selected benchmarks, in a preliminary manner in its annual interim commentaries on PoM's TCSs. The latest such interim commentary was published by the ESC on 16 December 2020 in relation to PoM's 2020-21 TCS.

PoM wishes to engage you to prepare an expert report which, having regard to clause 4.1.1(a) of the Pricing Order and the requirement that the allowance for the return on PoM's capital base be commensurate with that which would be required by a benchmark efficient entity providing services with a similar degree of risk as that which applies to PoM in respect of the provision of the Prescribed Services (referred to below as a **Commensurate Return**), provides your opinion on:

1. Whether the high-level cross-checks the ESC intends to undertake to assess compliance with clause 4.1.1(a) (that is, step 2.1 referred to above) as expressed in the SoRA or its interim commentaries on PoM's annual TCSs are appropriate ways of assessing whether PoM's allowance to recover a return on its capital base is a Commensurate Return.
2. Whether there are any other cross-checks to appropriately assess whether PoM's allowance to recover a return on its capital base is a Commensurate Return.
3. Whether the rate of return on PoM's capital base which PoM proposes to adopt in its 2021-22 TCS satisfies the cross-checks identified in your answers to questions 1 and 2.

For the purposes of question 3 above, you should assume that PoM proposes to adopt the following rate of return on capital in its 2021-22 TCS:

Cost of debt²	
Risk free rate ³	1.70%
Debt risk premium	1.32%
Debt raising cost allowance	0.10%
<i>Return on debt (pre-tax)</i>	<i>4.80%</i>

¹ SoRA, pp22-23.

² Transitioning to a trailing average, commencing in 2017-18. As such, the 2021-22 return on debt is calculated as a weighted average of the 'on the day' return on debt from 2017-18 (5.45% with 60% weighting), 2018-19 (4.58% with 10% weighting), 2019-20 (4.21% with 10% weighting), 2020-21 (3.42% with 10% weighting) and 2021-22 (3.12% with 10% weighting).

³ The 20 day average of 10 year CGS as at 31 March 2021.

Cost of equity⁴	
Risk free rate	1.70%
Market risk premium ⁵	6.54%
Equity beta	1.0
Corporate tax	30%
Gamma	0.5
<i>Return on equity (pre-tax)</i>	<i>9.69%</i>
<i>Gearing</i>	<i>30%</i>
WACC (pre-tax, nominal)	8.23%

To assist in your analysis, we also enclose historical trading volume data for the port for the period 1989-90 to 2019-20.

It is intended that your report will be submitted to the ESC with PoM's 2021-22 TCS. The report may be provided by the ESC to its own advisors. The report may also be considered by an appeal body, court or tribunal in the event that a relevant proceeding is commenced under the ESC Act.

The report will be reviewed by PoM's legal advisers and will be used by them to provide legal advice as to its respective rights under the Pricing Order and the PMA.

3 Compliance with the Expert Witness Code of Conduct

Enclosed are copies of:

- Form 44A to the *Supreme Court (General Civil Procedure) Rules 2015*, the Expert Witness Code of Conduct (**Code of Conduct**); and
- Victorian Civil & Administrative Tribunal Practice Note – PNVCAT2, *Expert Evidence* (**Practice Note**).

Please read and familiarise yourself with the Code of Conduct and the Practice Note and comply with them at all times in preparing your report and in the course of your engagement by PoM. Your report should contain a statement to the effect that the author of the report has read the Code of Conduct and the Practice Notice and agreed to be bound by them.

Your report must also clearly state your opinion(s) and the reasons for them and include the information and declarations required specifically by clause 3 of the Code of Conduct and clause 11 of the Practice Note.

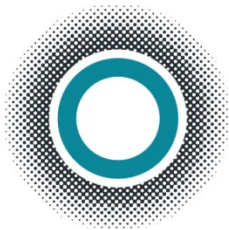
Please also attach a copy of this letter of instruction to the report.

Yours faithfully



⁴ Determined using the Sharpe-Lintner CAPM.

⁵ Determined with an 85% weighting on the Ibbotson approach (6.48%), and a 15% weighting on dividend discount models (6.90%).



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