QueenslandRail

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Our Ref: MCR-19-711

Professor Flavio Menezes
Chair
Queensland Competition Authority
GPO Box 2257
Brisbane QLD 4000

Dear Professor Menezes

Queensland Rail's Draft Access Undertaking 2 (DAU2)

I am pleased to attach Queensland Rail's submission in response to the Queensland Competition Authority's (**QCA**) request for collaborative submissions on the DAU2.

Queensland Rail supports the QCA's objective to have an appropriate undertaking ready to replace Queensland Rail's existing undertaking when it terminates in June 2020. We appreciate the QCA's support for collaboration between stakeholders, and the extension of time to allow that process to continue.

Queensland Rail considers that the collaborative process to date has resulted in positive outcomes that will assist the QCA in its consideration of DAU2. The policy and drafting positions discussed and agreed are outlined in Queensland Rail's submission.

The attached submission also contains further information in support of Queensland Rail's application for approval of DAU2.

If you have any questions in relation to the submission, please do not hesitate to contact Mr Douglas Jasch, Queensland Rail's Manager Policy and Regulation, via telephone on 3072 0544.

Yours sincerely

[redacted]

Nick Easy
Chief Executive Officer

27 September 2019

Response to industry comments on the QCA's Draft Decision on Queensland Rail's Draft Access Undertaking 2

(**Collaborative Submissions**)

Commercial-In-Confidence

27 September 2019

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Executive Summary

The Queensland Competition Authority (**QCA**) released its Draft Decision (**Draft Decision**) on '*Queensland Rail's Draft Access Undertaking 2*' (**DAU2**) on 29 April 2019, seeking submissions from interested parties by 11 July 2019.

The QCA published stakeholder submissions on 15 July 2019, and sought collaborative submissions from interested parties by 13 August 2019. Queensland Rail and various stakeholders jointly requested that the due date for collaborative submissions be extended to 27 September 2019, with the extension being approved by the QCA.

This submission provides:

- drafting agreed between Queensland Rail and stakeholders;
- policy positions agreed between Queensland Rail and stakeholders; and
- further information for the QCA in support of Queensland Rail's application for approval of DAU2.

Queensland Rail will continue its engagement with the QCA and industry through to the approval of DAU2.

Substantial agreement has been reached with stakeholders on policy positions and drafting through the collaborative process. Table 1 and Table 2 below summarise the agreed matters.

Table 1: Agreed Policy Positions and Drafting — Standard Access Agreement (SAA) Specific

Item	Brief Description
Good faith obligations in SAA	Agreed to reinstate references to "good faith" in the SAA, as per drafting, with no definition.
Consideration of productivity and efficiency variations)	Reciprocal requirement to consider variations to increase productivity and efficiency. Expand the scope of issues to be considered.
Security Amount	Maximum security amount of six months' access charges.

Table 2: Agreed/Partially Agreed Policy Positions and Drafting — DAU2 Other

Item	Brief Description
Access application	Clarification to ensure consistency.
Preliminary steps in Access Application	Queensland Rail required to keep Preliminary Information and Capacity Information current and accurate.
Operating Requirements Manual (ORM)	Reinstate ORM as a schedule to DAU2. Process overseen by the QCA to provide a limited degree of flexibility to amend ORM without a draft amending access undertaking (**DAAU**).
Regional Network User Groups – productivity and operational improvements	Agreed to establish user groups for the West Moreton, North Coast Line and Mount Isa rail systems to measure, analyse and plan to improve operational rail service parameters.

A detailed description of agreed drafting (and positions not agreed) is set out in section 3, with the specific terms of Queensland Rail's proposed drafting for the DAU2 and SAA provided in **Attachment 1**.

Additional information is also included in this submission to assist the QCA with its assessment of DAU2. A summary of the issues raised is provided below.

West Moreton System — Forecast Tonnes and Reference Tariffs

The coal tonnage forecast for the West Moreton System for the DAU2 period remains uncertain. The likelihood of New Hope having its approvals in time to transition to its New Acland Stage 3 Mine (**NAS3**) at the commencement of the DAU2 period is increasingly less likely. [redacted].

Queensland Rail proposes to base the starting reference tariff on 2.1mtpa and to provide future DAAUs as additional tonnes are added to the West Moreton System, and when the timing and volumes of these events are known.

West Moreton System Reference Tariff Cost Allocations

Queensland Rail considers that the QCA should retain the cost allocation methodology proposed in DAU2 for the allocation of efficient fixed common network costs to the West Moreton reference tariff. Costs should be allocated according to the proportion of paths available for contracting by coal services.

HoustonKemp has undertaken an assessment of the approaches to the allocation of fixed costs in the West Moreton System and assessed their effect on economic efficiency. This report is provided to the QCA in **Attachment 2** for the QCA's consideration.

West Moreton System Reference Tariff WACC — Overall

In recent draft and final decisions, the QCA has demonstrated a willingness to consider alternative approaches to calculating the Weighted Average Cost of Capital (**WACC**) than the method it has adopted previously. However, while the QCA has had regard to the methodologies adopted by other regulators, in doing so it focused on component elements of the WACC rather than the overall rate of return.

Queensland Rail considers that the QCA should undertake a 'top down' systematic examination of the rate of return methodologies adopted by other regulators and their assessment of the required compensation for the risk of investing in rail infrastructure, to further assist in the assessment of whether the overall DAU2 WACC is appropriate, having regard to all of the relevant factors in s. 138(2) of the *Queensland Competition Authority Act 1997* (Qld) (**QCA Act**). Queensland Rail sought the advice of HoustonKemp in relation to this (refer **Attachment 3**)

West Moreton Reference Tariff WACC — Inflation

Queensland Rail requested HoustonKemp to review the approach to inflation adopted in the Draft Decision and DAU2 as it applies to WACC (refer **Attachment 4**). HoustonKemp's expert report tests forecast inflation over both a five year and 10 year period. HoustonKemp concludes that the approach adopted by the QCA (the RBA forecasting method) does not produce superior inflation forecasts, and recommends that the QCA use an average of the RBA forecasting method and indexed bond method.

DAU2 Pricing Principles and Non-Coal Pricing

Queensland Rail has provided further information in relation to non-coal pricing matters raised in stakeholder submissions.

1. Introduction

Queensland Rail submitted DAU2 to the QCA in August 2018 in response to an initial undertaking notice. DAU2, once approved, will replace the current access undertaking (**AU1**) upon expiry on 30 June 2020. In developing DAU2 Queensland Rail made a commitment to:

- actively engage industry in ongoing consultation both prior to lodgement and throughout the QCA approval process; and
- adopt a targeted approach to DAU2. With AU1 being in effect for only a short time after a lengthy regulatory process, it is not considered necessary to embark upon a complete rewrite for DAU2, but rather to use AU1 as the foundation.

Industry has confirmed its support for this approach in their submissions.

2. Collaboration

Queensland Rail welcomes the QCA's collaborative submissions process as part of its ongoing engagement with stakeholders. Queensland Rail appreciates the time period provided by the QCA for collaborative submissions as well as industry's efforts to seek mutually beneficial outcomes during this time. The additional consultation period has enabled Queensland Rail to work with industry to propose improved drafting of a number of provisions of the undertaking and standard access agreement.

Key areas of consultation were the Standard Access Agreement and operational improvements.

Queensland Rail's collaborative engagement included individual customer meetings, workshops and the provision of information to stakeholders. This has led to positive outcomes which are detailed in this submission. Separate workshops were held by Queensland Rail for:

- the West Moreton stakeholders (New Hope, Yancoal and Aurizon Coal); and
- general freight stakeholders (Aurizon Bulk, Pacific National (**PN**), Glencore and Incitec Pivot).

Queensland Rail remains committed to reaching further agreement with stakeholders.

3. Policy Positions and Drafting

Stakeholders generally supported the principle of limiting changes from AU1. During the collaborative period, Queensland Rail has continued to progress its engagement with industry to reach agreed positions, where issues are amenable to the collaboration process.

Set out below is a description of the issues discussed with New Hope, Yancoal and Aurizon Coal (West Moreton Stakeholders), and Pacific National, Aurizon Bulk, Glencore and Incitec Pivot, identifying the agreed positions. Specific terms of Queensland Rail's proposed drafting is provided in **Attachment 1**. At the date of drafting this submission, some stakeholders have indicated that they are still considering some of the issues and will respond by way of their own submissions.

3.1 Good Faith Obligations

The SAA imposes a number of 'good faith' obligations. Queensland Rail proposed deleting the references to 'good faith' in relation to those obligations on the basis that, in the context in which they are applied, the concept is not defined and is ambiguous and uncertain.

Industry generally objected to that proposal. In response, Queensland Rail proposed to insert a definition of the term. Following discussions, it was agreed with all stakeholders consulted to revert to the current AU1 position, with references to good faith reinstated, without definition.

Queensland Rail supports this position as consistent with the principle of limiting changes from AU1.

3.2 Productivity and Efficiency Variations

The SAA requires Queensland Rail to give good faith consideration to variations proposed by the access holder or operator during the term of the agreement, where those variations are intended to facilitate productivity and efficiency.

Queensland Rail proposed amendments to those provisions, to include criteria to be considered, which were designed to require a focus on productivity and efficiency gains to all parties to the agreement.

Stakeholders expressed concern that the proposed amendments were unclear, and limited Queensland Rail's obligation to fully consider variations.

To address those concerns, Queensland Rail proposed amended drafting to make the ability to propose and the obligation to consider productivity and efficiency proposals, and to participate in discussions about amending the agreement, reciprocal.

Yancoal proposed additional drafting to expand the list of matters to be specifically considered in proposed variations to include efficiency in any element of the logistics/supply chain, and an obligation to do all things reasonably necessary to give effect to proposed amendments.

Queensland Rail has adopted the proposed drafting, including amendments proposed by stakeholders. The resulting amended drafting is supported by Glencore, New Hope, Aurizon Coal, PN and Yancoal. Aurizon Bulk agrees in principle, but is still to consider the drafting.

3.3 Security Amount

Queensland Rail proposed an increased security amount of at least six months' access charges (increased from a maximum amount of three months in the AU1 SAA), to reflect Queensland Rail's risk exposure for the payment of access charges, relinquishment fees or other amounts payable and to align with security amounts approved in Aurizon's access undertaking.

Industry was concerned about the amount being defined as a minimum amount. In response to those concerns, Queensland Rail proposes to amend the relevant clauses in DAU2 so that the security amount is an amount in the range of zero to six months access charges, in appropriate cases and having regard to the parties' financial capacity.

The resulting amended drafting is supported by Yancoal, New Hope, PN and Glencore. Aurizon Bulk agrees in principle, but is still to consider the drafting.

3.4 Form of Access Application

Queensland Rail proposed amendments to the requirements for submitting an access application, so that parties are not required to formalise an access application using the form provided in DAU2 (and AU1). The purpose of the amendments was to remove the rigidity to allow a more streamlined process where parties are (for example) seeking a renewal of existing access rights (where much of the information will automatically carryover), while still ensuring there is certainty of the date on which an access application is lodged.

In response to industry concerns about clarity in the original proposed DAU2 drafting, Queensland Rail proposed amendments to the definition and to further simplify the access application process.

The drafting set out in **Attachment 1** is supported by Yancoal, New Hope, Glencore, PN and Aurizon Coal. Aurizon Bulk agrees in principle, but is still to consider the drafting.

3.5 Preliminary Steps

Queensland Rail proposed amendments to confirm that discussions held in the preliminary stages of access negotiations are not binding on negotiating parties.

Yancoal noted that the QCA's Draft Decision recommended that Queensland Rail keep both Preliminary Information and Capacity Information current and accurate, which Queensland Rail accepted.

The resulting proposed amendments are supported by Yancoal, New Hope, Glencore, PN and Aurizon Coal. Aurizon Bulk agrees in principle, but is still to consider the drafting.

3.6 Operating Requirements Manual (ORM)

Queensland Rail proposed removing the ORM from the access undertaking, so that, subject to consultation, it can be amended without the administrative and regulatory burden of submitting a DAAU on each occasion. This was opposed by all stakeholders.

In an attempt to address those concerns, Queensland Rail proposed reinstating the ORM in DAU2, but providing provide a limited degree of flexibility for Queensland Rail to amend the ORM, overseen by the QCA, without requiring a DAAU in every instance.

In Queensland Rail's proposal, variations to the ORM would be permitted where the variation:

- is trivial or administrative in nature;
- has no material impacts on access seekers, access holders or rollingstock operators;
- has been requested by, or agreed with affected access seekers or access holders; and,
- where the QCA provides written confirmation that it is satisfied the variation falls within one of those categories.

Yancoal (supported by other stakeholders) was concerned that both Queensland Rail and the QCA may not have a proper appreciation of the extent to which amendments could have a material adverse impact on Yancoal, and that amendments of that nature may be made without stakeholders being aware of them.

Queensland Rail agreed to include an obligation to consult on the question of adverse impact to affected network users. These amendments are supported by Yancoal, New Hope, PN and Glencore. Aurizon Bulk agrees in principle, but is still to consider the drafting.

3.7 Safety Expert in Access Disputes

Queensland Rail consulted with access seekers in relation to the resolution of any aspects of an access dispute that relate to safety matters, and the treatment of those issues was not resolved.

Queensland Rail will amend DAU2 to delete clause 6.1.4(b).

The QCA has no power to resolve any dispute related to safety matters.

4. Operation and Productivity Improvements

4.1 Rail Freight's Operational Performance

Rail freight operational performance could be improved in many areas through better planning and service delivery, including below rail and above rail performance, interfaces with loading and unloading facilities and overall supply chain co-ordination.

Figure 1 shows the causes of train delays and percentage of trains entering the network on time over a 2-year period. It demonstrates that the major cause of train delays across the network i [redacted].

4.2 Rail Network User Groups

Queensland Rail believes that with better planning and service delivery, rail's whole of supply chain operational performance could be improved to make rail more attractive to freight users. One way to achieve this is to establish and support supply chain forums comprised of representatives of Queensland Rail, rail operators and end customers that measure, analyse and plan to improve operational rail service parameters. This would not only improve the rail service offering for customers but also postpone the need for infrastructure capacity enhancements, where capacity constraints exist.

During collaborative discussions with stakeholders, Queensland Rail offered to include in DAU2 an obligation to establish Rail Network User Groups for the West Moreton, North Coast Line and Mount Isa rail systems.[2] The proposal offered to stakeholders was as follows:

[1] Data exacted from Queensland Rail's Vizirail System.
[2] New Hope also sought the inclusion in DAU2 of operational improvement requirements, New Hope Submission in response to Queensland Competition Authority Draft Decision: Queensland Rail's 2020 Draft Access Undertaking, 11 July 2019, pp 19-20.

Productivity and Operational Improvements

a) Within two months of the Approval Date, Queensland Rail will convene a Regional Network User Group for each of the West Moreton System, North Coast Line System and Mt Isa Line System, subject to there being active and ongoing support for the group from the relevant nominated Rolling Stock Operators and Access Holders that operate in the respective system.

b) Queensland Rail will provide resources to:

- a. *develop and produce operational and system performance reports*
- b. *provide analysis of the root causes of ongoing or systemic issues being experienced*
- c. *identify resolutions to such issues and other productivity or efficiency initiatives*
- d. *provide evaluation and modelling of the outcomes of potential supply chain operational changes or investment decisions that the Regional Network User Group are supportive of investigating.*

c) Each Regional Network User Group will be a co-operative group with emphasis on analysis of data, open, impartial discussion and consensus discussion making to improve the operation of the supply chain.

d) Decisions made by the Regional Network User Group will not be binding on any organisation.

e) Queensland Rail and other group members may agree to invite other supply chain participants (including port operators and adjoining rail network owners) in specific advisory roles but do not participate in Regional Network User Group decision making processes.

f) The frequency, rules for the conduct of meetings, and purposes and objectives of each Regional Network User Group will be as agreed between Queensland Rail and group members and will be documented in a Terms of Reference.

***Regional Network User Group** means a separate group in relation to each Regional Network established to review, discuss and improve rail operational issues which can affect system or supply chain performance, comprised of each Access Holder, Rail Transport Operator and End User Access Seeker relevant to each Regional Network.*

Stakeholders generally agreed with the proposal to establish Rail Network User Groups, consistent with the purpose stated above. The two issues not unanimously agreed, were:

- whether Queensland Rail should chair the group or another party; and
- whether the terms of reference should also include consideration of supply chain investments.

New Hope, Yancoal and Glencore agreed with the above drafting but proposed it be amended to include a requirement for a rotating chair and for the scope to include consideration of supply chain investments.

Queensland Rail considers it is better placed to chair meetings of the Regional Network User Groups as it will be the party with the obligation to convene the group under the undertaking; has direct associations with all the participants using the rail network and avoids potential conflicts among other parties who may be competitors.

Queensland Rail also considers that the Regional Network User Groups should be focused on operational performance/improvements rather than supply chain investment decisions, as these are dealt with in other sections of DAU2 including development and funding of extensions and enhancements to the network. Learning from the SWUG, there needs to be a consistent and dedicated focus on operational performance to achieve whole of supply chain operational results.

The productivity and operational improvements provisions work in conjunction with **clause [1.3]** of the SAA (discussed earlier) which sets out the process for productivity improvements once identified to be incorporated into access agreements, where appropriate.

5. West Moreton System — Forecast Tonnes and Reference Tariffs

5.1 Context

Queensland Rail has developed reference tariffs for the West Moreton System based on the 'building blocks' approach.

Queensland Rail's West Moreton System provides rail infrastructure access to two coal mines on the West Moreton System—New Hope Coal's New Acland Stage 2 mine at Jondaryan and Yancoal's Cameby Downs mine that rails from Columboola. These two mines moved around [redacted] million tonnes of coal in 2018–19. New Hope Coal's New Acland Stage 2 mine is nearing the end of its life, with the likelihood that coal reserves at this mine may be exhausted by mid-2020.

DAU2 is being developed with considerable uncertainty about the potential future coal volumes that are likely to be moved on West Moreton coal system.

In particular, New Hope Coal is yet to receive approval to develop the NAS3 mine after commencing the approval process in 2006. For this reason, two tonnage scenarios were developed for Queensland Rail's original DAU2 submission:

- a **low tonnage 2.1 mtpa** scenario — assuming that only Yancoal's mine at Cameby Downs is producing coal and hauling on the West Moreton System—although this scenario was submitted for information with no reference tariff proposed.
- a **high tonnage 9.1 mtpa** scenario — assuming NAS3 is developed and produces 7 mtpa of coal for hauling from Jondaryan, in addition to the 2.1 mtpa from Cameby Downs. Reference tariffs were submitted for this scenario.

In July 2019, Queensland Rail noted that:

> "*At the time of lodgement of DAU2 Queensland Rail forecast a lower tonnage level of 2.1 mtpa, all being produced by Yancoal if New Acland Mine Stage 3 (NAS3) does not progress, and 9.1mtpa (7mtpa from New Hope) if NAS3 proceeds. Queensland Rail now has updated forecasts of a lower tonnage scenario of [redacted] and a high tonnage scenario of [redacted] if NAS3 is approved.*
>
> *Yancoal has recently received approval to expand production from 2.8 mtpa run-of-mine (ROM) to 3.5 mtpa ROM. This is expected to increase product tonnes available for railing and shipment to [redacted] and the mine is expected to be operating at this level at commencement of DAU2. Based on advice from New Hope, the forecast for NAS3 has [redacted] due to operating conditions associated with the approval of NAS3 and infrastructure limitations with train loading and the capacity of the coal preparation plant. At the date of this submission there remains no certainty that NAS3 will proceed. Queensland Rail has amended its capital and maintenance programs to reflect these tonnage levels."*[3]

New Hope and Yancoal also noted the continuing uncertainty about future tonnes. New Hope noted that:

> *"…this undertaking is being developed at a time of uncertainty regarding future volumes, due to the uncertainty regarding the approval of the New Acland Stage 3 Project. New Hope suggests that the question of volume forecasts should be reconsidered towards the end of 2019, so that the most up to date information can be taken into account in setting the final reference tariffs*."[4]

Yancoal's submission was positive about the prospect of the 'high-volume' scenario eventuating during the course of the DAU2 period. Yancoal noted that:

> *"In relation to whether the forecast should be lower, Yancoal notes that, since the Draft Decision, Yancoal has received approval for an environmental amendment to increase its ROM coal production to 3.5 mtpa (approximately 2.8 mtpa of product coal to be railed) and understands that*

[3] Queensland Rail Submission on DAU2 Draft Decision, July 2019 p2.
[4] New Hope Submission on DAU2 Draft Decision, July 2019, p14.

New Hope has received environmental approvals for its 7.5 mtpa New Acland Stage 3 Project. Those developments enhance the prospects of higher volumes than are currently being experienced eventuating during the 2020 DAU term.

The extent of the New Acland Stage 3 Project volume which exists at the commencement of the 2020 DAU term is highly likely to be dependent on whether the mining leases New Hope are seeking for that project are granted in the near term….. if it becomes evident at the time of the final decision that the actual tonnage during the term of the 2020 DAU is likely to be significantly lower, the tariff structure could either be amended to deal with that scenario (with Yancoal's submissions on the issue of 'low-volume' scenario tariffs set out in section 5 below) or the undertaking could include a process for consideration of a variation to the tariff if volume has not reached a certain level within a specified period of the 2020 DAU term commencing."

5.2 Continuing Tonnage Uncertainty

Queensland Rail had hoped that there would be clarity about the future of the NAS3 mine by this stage of the DAU2 process. However, since submissions were made on the DAU2 Draft Decision there have been two additional events that affect the future tonnage forecasts and timing:

- On 2 September 2019, New Hope announced it would be making 150 of its 300 workers redundant at the New Acland Stage 2 mine, having yet to receive any indication from the State Government about the future of the NAS3; and
- On 10 September 2019, the Queensland Court of Appeal ruled in favour of New Acland Coal Pty Ltd against an appeal by the Oakey Coal Action Alliance Inc. New Hope has advised the Australian Stock Exchange that it remains committed to delivering the NAS3 project in a timely manner,[5] Queensland Rail notes that New Hope continues to seek approvals as soon as possible, however the timeframe for resolution and the outcome of this process is unknown.

As at 27 September 2019, there is no greater certainty about the tonnes on the West Moreton System for the DAU2 period than there was in August 2018, except that it is unlikely coal tonnes will be 9.1 mtpa during the course of the DAU2 period. The likelihood of New Hope having its approvals in time to transition to NAS3 at the commencement of the DAU2 period is also increasingly uncertain.

5.3 Next Steps

Queensland Rail acknowledges the preference of both Yancoal and New Hope for DAU2 tariffs to be developed around a high tonnage scenario. [redacted] 2.1 mtpa from the Cameby Downs mine [redacted].

While there is the possibility that Yancoal could increase its tonnes to [redacted], to date Yancoal has made no indication to Queensland Rail that it anticipates contracting additional tonnes from the commencement of the DAU2 period.

In view of the above, Queensland Rail will provide revised cost estimates and a proposed reference tariff for the 2.1 mtpa scenario by mid-November 2019 along with a proposed loss capitalisation model for this scenario.

Queensland Rail notes that the QCA's consultant SYSTRA Scott Lister (**Systra**) gave some consideration to the 2.1 mtpa scenario, although it did so on the basis that 2.1 mtpa would become the medium to long term outlook for the West Moreton System. Queensland Rail still is of the view that the 2.1 mpta outlook is a transitional situation. That said, Queensland Rail will take the comments made by Systra into consideration, where relevant.

Queensland Rail proposes to provide future DAAUs subsequent to DAU2's approval as additional tonnes are added to the West Moreton System, and when the timing and volumes of these events are known.

[5] https://www.newhopegroup.com.au/files/files/1970721.pdf

6. Approaches to the WACC for Rail Networks

6.1 QCA's Willingness to Consider Other Approaches to WACC

In developing the West Moreton System reference tariff Queensland Rail sought to minimise debate with respect to allowed returns in DAU2 by accepting the WACC methodology adopted in the QCA's draft decision on Aurizon Network's 2017 draft undertaking (**UT5**) (which was consistent with the QCA's historical 'bottom up' approach to WACC), save to update the Asset Beta and associated Equity Beta. In doing so Queensland Rail reserved the right to revise its position if the QCA was to change its approach.

Since the lodgement of DAU2 the QCA has demonstrated a willingness to consider alternative approaches to calculating the WACC. In its UT5 Final Decision the QCA stated:

> *"The QCA recognises that mechanistically applying bottom-up assessment of individual WACC parameters will not necessarily ensure an appropriate overall WACC for Aurizon Network"*[6]

and reaffirmed this in its DAU2 Draft Decision:

> *"We had regard to both a bottom-up assessment of individual WACC parameters and the overall reasonableness and appropriateness of the resulting WACC. While a bottom-up assessment provides a means for assessing an appropriate rate of return for Queensland Rail, an ultimate consideration is whether the overall WACC is appropriate, having regard to all of the relevant factors in s. 138(2) of the QCA Act."*

Understanding the changes to the QCA's WACC methodology is of great significance to Queensland Rail given the role the WACC plays in determining the allowed revenues in infrastructure pricing decisions. The WACC is a central input variable into the 'building block' revenue model that is used to determine reference tariffs for coal carrying services on the West Moreton and Metropolitan Systems.

In altering its rate of return methodology in both the Aurizon final decision and Queensland Rail Draft Decision, the QCA had explicit regard to the alternative approaches to setting the rate of return adopted by other Australian regulators. However, the QCA's treatment of the methodologies adopted by other regulators focused on component elements of the WACC rather than the overall rate of return. Given the importance of the rate of return to Queensland Rail's reference tariff, Queensland Rail believes that a systematic examination of each other regulator's whole methodology is more appropriate.

HoustonKemp has undertaken 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 rail infrastructure (refer **Attachment 3**). By adopting such a broad assessment, the HoustonKemp report provides a sound basis for the QCA to assess the reasonableness of its proposed bottom-up WACC for Queensland Rail.

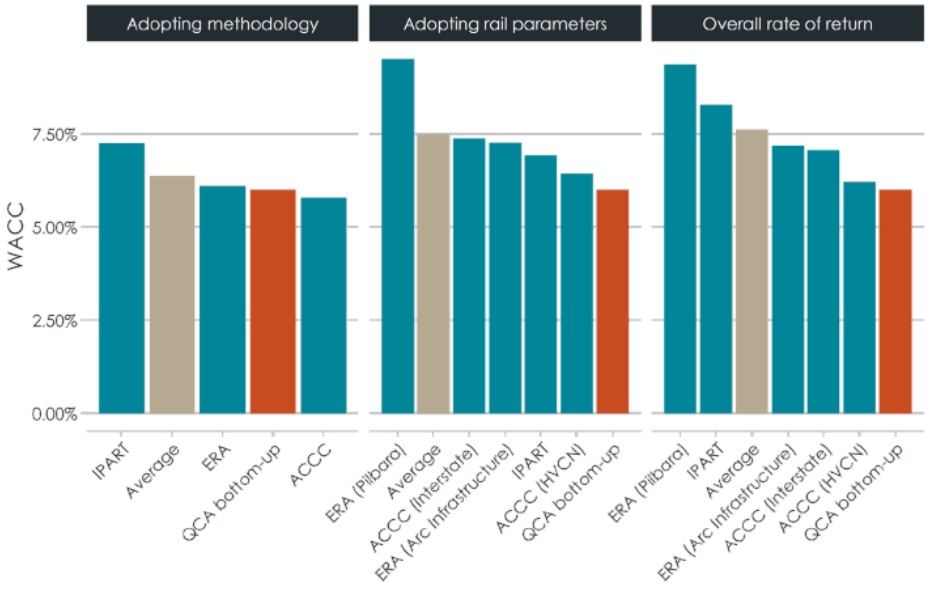
The analysis contained in the HoustonKemp report suggests that a review of alternative WACC methodologies in totality would reveal that the QCA's current methodology results in a lower rate of return. Figure 2 below demonstrates this result — that the QCA's bottom-up estimate lies at the bottom of the range for estimated WACC when drawing upon the rail parameters and totality of methodology adopted by other regulators. Further, Figure 2 highlights the choices made by the QCA which yield a systematically lower rate of return relative to other regulators, including:

- the application of a WACC methodology that delivers below average rate of return, with the QCA's methodology delivering a WACC of 6.02 per cent while the average of other methodologies would result in a WACC of 6.40 per cent;

[6] QCA Fact Sheet: Aurizon Network's 2017 Draft Access Undertaking: Weighted Average Cost of Capital (WACC), http://www.qca.org.au/Rail/Aurizon/Intro-to-Aurizon/UT5/Final-Report/2016-DAU

- the adoption of the lowest compensation for systematic risk, compared to that determined by other regulators for similar rail networks, with the QCA delivering 148 basis points less compensation for risk compared to the average of other regulators;[7] and
- the provision of the lowest overall rate of return and is 160 basis points less than the comparable average WACC allowed by other regulators for comparable rail networks.

Figure 2: Comparison of WACC Methodologies[8]



Source: HoustonKemp analysis. The average excludes the QCA bottom-up estimate

7. Reference Tariff WACC— Inflation

Queensland Rail has asked HoustonKemp to review the QCA's approach to inflation as it applies to WACC (refer **Attachment 4**).

This attached report presents the results of HoustonKemp's empirical analysis of the different approaches to inflation forecasting considered by the QCA i.e. the RBA inflation target method, the RBA forecasting method and the indexed bond method. Within the QCA's building block model, forecast inflation determines the amount removed from the annual revenue requirement via the indexation building block.

The report tests forecast inflation over both a five year and 10 year period. HoustonKemp concludes that the approach adopted by the QCA (the RBA forecasting method) does not produce superior inflation forecasts. Further, HoustonKemp finds no evidence that the indexed bond method produces biased estimates of inflation and recommends that the QCA use an average of the RBA forecasting method and indexed bond method.

8. Reference Tariff — Cost Allocation

Previously the QCA has determined that coal services on the West Moreton System should only pay the costs of the services that they able to contract. For example, the QCA's Final Decision on AU1 stated:

> "*We considered that coal traffics should only pay for efficient fixed common network costs that reflected the proportion of paths* ***available for*** *contracting by coal services.*"[9] (emphasis added)

[7] The average WACC using the QCA's methodology but the credit rating, gearing and beta determined by other regulators for similar rail networks is 7.50% compared to the QCA's draft decision for a WACC of 6.02%.
[8] HoustonKemp Economists, Approaches to the WACC for rail networks, 16 September 2019.
[9] Decision: Queensland Rail's Draft Access Undertaking June 2016, p.122.

However, the DAU2 Draft Decision appears to indicate that the QCA is considering changing its approach to cost allocation by allocating costs only to 'contracted' coal train paths (rather than those available for contracting), at least in relation to the lower tonnage scenario, which would leave Queensland Rail to fund most of the costs of the system, particularly in a low tonnage scenario. As set out in Queensland Rail's submission dated 11 July 2019, this would mean that Queensland Rail could not recover the efficient costs of providing its service (or an appropriate return).

HoustonKemp has undertaken an assessment of the approaches to the allocation of fixed costs in the West Moreton System and assessed their effect on economic efficiency (refer **Attachment 2**), being a key reference point in the applicable pricing principles set out in the QCA Act.

HoustonKemp found that Queensland Rail's approach is more aligned with the pricing principles contained in the QCA Act and economic principles of cost allocation when compared to the QCA's draft decision because:

- it means Queensland Rail is able to recover a higher proportion of its total efficient costs for the West Moreton System;
- it allocates a higher proportion of fixed costs to coal users, and so is consistent with recovering fixed costs in a least distortive manner;
- coal users are unlikely to be price responsive to changes in cost allocation, and so allocative efficiency in the coal market is not a concern; and
- it is more aligned with public interest, because it reduces the need for the Queensland Government to subsidise Queensland Rail.

HoustonKemp noted that under Queensland Rail's proposed approach, 86 per cent of costs are allocated to coal users and 14 per cent are allocated to non-coal users. This would not enable Queensland Rail to recover the fixed costs that are allocated to non-coal users given that these users have a lower ability to pay. HoustonKemp go on to state,

> "*It follows that there could be merit in allocating an even higher proportion of costs from coal users. Potential allocation options include allocation based on:*
>
> - *gross tonne kilometres, which would mean 95 per cent of fixed common costs are allocated to coal services; or*
> - *other measures of use, such as train kilometres travelled or net tonnes carried.*"[10]

HoustonKemp identified that the approach that allocates the highest proportion of fixed costs to coal users would also be the approach that best promotes the objectives of the QCA Act. This is because:

- Queensland Rail would not recover more than the efficient costs of providing services on the West Moreton System;
- it would align with economic principles of cost allocation, namely it would:
  - result in a revenue that is above avoidable costs but below standalone costs;
  - allocate fixed costs to coal users who are unlikely to be responsive to the change in cost allocation in the high tonnage scenario, and so is least distortive; and
  - provide Queensland Rail with the best chance of recovering its efficient costs, and so promote allocative efficiency;
- it is aligned with the public interest of Queensland, since it reduces the need for subsidy on the West Moreton system; and
- it is based on actual use of the network.

Based upon the HoustonKemp report, Queensland seeks that the QCA accept the cost allocation approach in DAU2 for fixed common network costs for the Western Moreton System reference tariff.

[10] HoustonKemp, DAU2 cost allocation for the West Moreton System 16 September 2019 p.19.

9. DAU2 Pricing Principles and Non-Coal Pricing

9.1 DAU2 Pricing Principles

Stakeholders provided comments about the application of the pricing principles in DAU2, expressing concerns about access charges and stakeholders' ability to compete with road transport and/or the cost impacts on end customers.

Queensland Rail is aware of the challenging environment for rail freight transport and the ability of customers to pay for rail. Queensland Rail is also aware of the commercial challenges for rail operators in the competitive environment and is strongly committed to the objective of attracting freight to rail.

Queensland Rail notes that almost all of its systems are supported via transport service payments under the Transport Services Contract (**TSC**) with the Queensland Government, and access revenue falls below the system floor costs for all systems except for the West Moreton System and Mount Isa Line.[11] Capital expenditure for all systems excluding the West Moreton System and Mount Isa Line is funded entirely by the Queensland Government, with no contribution by rail operators/end customers through access charges.

The significant gap between access revenue and the costs of providing the service reflects the fact that Queensland Rail is constrained in setting access charges to support utilisation of the rail network and the commercial reality is that if these rates are too high, freight will shift from rail to road.

Queensland Rail also notes rail operators are seeking improved rail infrastructure quality at the same time as pressing for decreased access charges. It is difficult to balance these two competing objectives without additional financial support.[12]

It also seems the pricing principle changes sought by some stakeholders extend beyond a pure regulatory role and into a broader policy realm. Queensland Rail does not consider that decisions about the balance between rail and road freight, additional subsidies to be applied in respect of access charges and investment in rail infrastructure not funded by access holders falls within the intent of Part 5 of the QCA Act.

Queensland Rail also does not consider that the floor and ceiling limits in DAU2 should be amended to achieve broader policy objectives that fall outside those of Part 5 of the QCA Act.

9.2 AU1 and DAU2 Pricing Limits in Practice

AU1/DAU2 includes the pricing limits that are typically applied to all regulated infrastructure services and which have been included in Queensland Rail access undertakings since 2001. Queensland Rail considers that continued inclusion of these price limits remains appropriate.

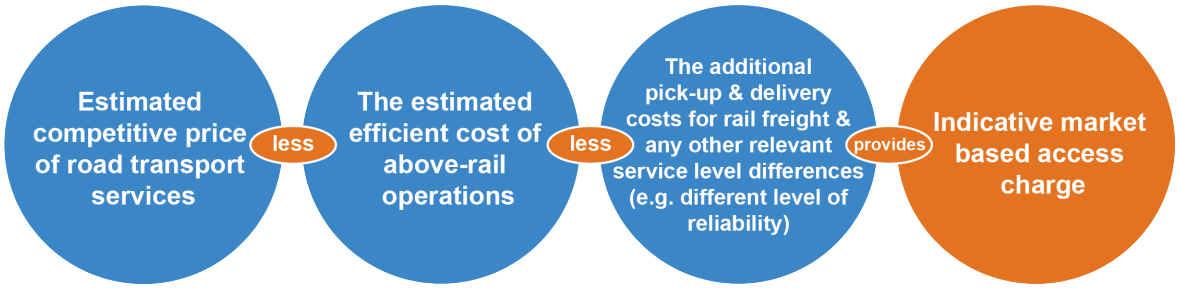
Outside of West Moreton, the Mount Isa Line is the only other system where cost recovery plays a more direct role in development of access charges — given that the Mount Isa Line is not supported through the TSC and Queensland Rail must have continuing regard to the ongoing financial viability of the service and support a reliable link in one of Queensland's most important export supply chains.

Many of Queensland Rail's regional rail services are exposed to direct competition from road transport. In these circumstances, access prices are estimated relative to the competitive 'market price' for freight services. The methodology for estimating a market-based freight access charge is set out in Figure 3.

[11] Declaration Review: Queensland Rail's Response to the QCA's Draft Recommendation (11 March 2019), p24

[12] Queensland Rail notes that the QCA Act requires that access seekers pay for the costs of extending facilities, not the access provider — section 119(2)(c) of the QCA Act which states the authority must not make an access determination that would require an access provider to pay some or all of the costs of extending the facility.

Figure 3: Estimating a market price for rail access



In negotiating with access seekers, Queensland Rail performs a desktop analysis of costs, being the only practical way of estimating what the market price might be, including making an assessment of the point at which a product may switch from rail transport to road transport.' Invariably, Queensland Rail must make estimates of road prices (which relies on market intelligence) and above rail costs.

The negotiation of access charges requires an estimate of the maximum amount rail freight can charge overall and be competitive with road transport.

Queensland Rail notes that price is not the only determinant of the choice between the use of road and rail. Differences in service quality, particularly timeliness and reliability play a critical role in the amount end customers will pay for rail transport.

Queensland Rail does not consider that amending the pricing limits to respond to market circumstances is an appropriate response. Instead, Queensland Rail considers that the pricing limits provide transparency about the level of subsidisation provided through the access charging arrangements.

9.3 Mount Isa Line Access Charges

Queensland Rail agrees that setting access charges at the ceiling revenue limit would make moving rail freight on the Mount Isa Line unaffordable. This is not in the interests of Queensland Rail, train operators, end customers or the broader market.

Queensland Rail does not receive TSC payments for operations on the Mount Isa Line, so access charges must be set to support the ongoing financial sustainability of providing the service. In setting access charges Queensland Rail considers a range of competing objectives including:

- the level of competition with road transport and the objective of maximising freight on rail;
- ensuring the ongoing financial viability of the system, which means at least covering system floor costs;
- having sufficient revenue to support investment in the rail network to support the overall competitiveness of rail e.g. upgrade from steel to concrete sleepers and heavier rail to support system reliability; and
- access prices already in place for like commodities on the Mount Isa Line to not contravene the price differentiation provisions of AU1.

Queensland Rail has previously indicated to the QCA that access revenue generated on the Mount Isa Line is only marginally above the floor price and falls well short of the ceiling price of providing the service.

Having regard to the concerns of Mount Isa Line customers and rail operators, Queensland Rail reduced its intermodal access charges by 5.3 per cent on 1 July 2019 taking into consideration the competition with road transport. Queensland Rail continues to negotiate with other customers to develop access charges and considers that a negotiation process for amending access charges, within the pricing limits included in AU1/DAU2, is preferable to amending pricing limits which reduces transparency about the true costs of providing services.

9.4 Proposed Modal Shift Pricing Rule

One submission has proposed amendments to DAU2 to take account of the positive externalities provided by rail freight transport and provide incentives for a modal shift from road to rail to grow upstream and downstream competition. The submission said these amendments should take precedence over revenue adequacy and network utilisation. Specifically, the submission has proposed:

- a 24 per cent reduction in all non-coal access charges — this reflects the difference between the proposed West Moreton coal reference tariff and the QCA's draft decision for the coal reference tariff; and
- no CPI escalation for the duration of DAU2.

While Queensland Rail notes that the issue of heavy vehicle charging at the national level is yet to be resolved, Queensland Rail does not consider that the proposed modal shift rule is appropriate for inclusion in DAU2.

There is no evidence that road freight competitors operating on brand new (and/or well-maintained) roads do so at little or no expense. The National Transport Commission (**NTC**) sets heavy vehicle registration and road user charges with the principle of full recovery of allocated infrastructure costs while minimising both the over and under recovery of any class of vehicle.[13]

In 2007, the Productivity Commission found that rail transport's market share is more likely to be influenced by factors other than the price differential between road and rail.[14] It also considered that improving service quality between rail and road is likely to play a more significant role in moving freight to rail.[15]

While DAU2 does not include explicit modal shift incentives, Queensland Rail notes that there are a range of initiatives that have been progressed outside of the access undertaking environment to support freight on rail.

On the North Coast Line

- access charges are supported through the Queensland Government's TSC payments, with intermodal rail access charges covering less than half of the maintenance costs of providing the service and estimated to represent only 8-10 per cent of the total door-to-door cost of rail freight costs[16];
- Queensland Rail 're-balanced' access charges on the NCL in 2017 which reduced access charges for the Brisbane-Rockhampton journey by around 36%. Queensland Rail notes that the movement of intermodal freight by rail on the NCL is already cheaper than road transport for destinations Mackay and north[17]; and
- investment is occurring to enable up to 950 metre trains at a cost of $100 million.

On the Mount Isa Line

- Queensland Rail intermodal access charges were reduced by 5.3 per cent effective from 1 July 2019; and
- $53 million was spent on 2019 flood repairs. Access charges have not been increased to recover these costs from users.

Separately, the Queensland Government has announced $80 million over four years to reduce access costs and encourage freight on rail.

[13] National Transport Commission, https://www.ntc.gov.au/heavy-vehicles/heavy-vehicle-charges/ accessed 6 August 2019.
[14] Productivity Commission's Road and Rail Freight Infrastructure Pricing Report (2006), pxxvi
[15] Productivity Commission's Road and Rail Freight Infrastructure Pricing Report (2006), pxxvi
[16] North Coast Line Capacity Improvement Study (2015), p 147.
[17] Examples provided to the ACCC indicate that for freight carried beyond this tipping point, from Brisbane to Townsville / Cairns, road has been quoted as significantly more expensive than rail, with examples ranging from 15% more expensive to 300% more expensive. *market inquiries have indicated that where goods can appropriately be hauled by rail, then, at least for routes beyond the 'tipping point', they tend to almost always be hauled by rail.*

Attachment 1 : Drafting changes

Proposed DAU2 amendments

Issue	Current Proposal
Access application (DAU 2.1.1, 7.1, Schedule B)	**2.1.1 Access Applications** (a) A request for Access Rights must be submitted to Queensland Rail in the form of an Access Application and, must be sent to the address nominated on Queensland Rail's website for Access Applications. (b) Queensland Rail will publish on its website the application forms for Access Applications. These may identify different requirements for different types of Train Services. However, the information requirements must be in accordance with this Undertaking. (c) An Access Seeker will, by submitting an Access Application, unconditionally and irrevocably be taken to agree to comply with the requirements, obligations and processes in this Undertaking relating to it or its Access Application. **Access Application** means a request for Access Rights by an Access Seeker that includes: (a) the information referred to under **schedule [B]** or so much of that information as Queensland Rail reasonably requires based on the nature of the request; and (b) all additional or clarified information required by Queensland Rail under **clause [2.3.1]**; **Schedule B – Access Application Information** (a) Without limiting the information requirements that an Access Application must satisfy in accordance with this Undertaking, an Access Application must satisfy the information requirements set out in this **schedule [B]** or so much of those requirements as Queensland Rail considers appropriate based on the nature of the relevant request for Access Rights.

Issue	Current Proposal
Preliminary steps (DAU2 2.1.2)	**2.1.2 Preliminary steps** (a) A prospective Access Seeker may request initial meetings with Queensland Rail, prior to submitting an Access Application, to discuss the proposed Access Application and to clarify any matters relating to the negotiation process including any application requirements under **schedule [B]**. (b) A prospective Access Seeker may give a written request to Queensland Rail for relevant Capacity Information and Queensland Rail will make available that Capacity Information within 10 Business Days after receiving that request. (c) Information (including Capacity Information) exchanged as between a prospective Access Seeker and Queensland Rail under **clauses [2.1.2(a)]** or **[(b)]** is non-binding and is only indicative or preliminary in nature. Despite this, the prospective Access Seeker and Queensland Rail must act reasonably in providing or requesting information under **clauses [2.1.2(a)]** or **[(b)]** taking into consideration the purpose for which it is being provided or requested. The provision of information under **[2.1.2(a)]** or **[(b)]** does not: (i) affect the operation of this Undertaking; (ii) restrict the prospective Access Seeker's right to lodge an Access Application or to seek the grant of Access Rights; (iii) oblige the prospective Access Seeker to accept the grant of Access on the basis of or in any way subject to that information; or (iv) oblige Queensland Rail to provide Access on the basis of or in any way subject to that information. (d) Queensland Rail will: (i) make the Preliminary Information available to Access Seekers on its website; and (ii) keep the Preliminary Information and Capacity Information to be made available to Access Seekers current and accurate.

Issue	Current Proposal
Operating Requirements Manual (DAU2 4.2, 4.3, 7.1)	4.2 Consultation for Through-Running Trains Queensland Rail will consult with other relevant Railway Managers, in relation to: (a) the coordination of maintenance activities; (b) the development of MTPs; and (c) proposed amendments (other than a Permitted ORM Variation) to the Operating Requirements Manual, and if any of Queensland Rail's proposed changes or activities might affect other Railway Managers, Queensland Rail will use reasonable endeavours to minimise adverse effects in relation to Through-Running Trains. 4.3 Operating Requirements Manual (a) The Operating Requirements Manual is initially as set out in **Schedule [G]**. (b) Queensland Rail must make available the Operating Requirements Manual to Access Seekers and Access Holders. Queensland Rail must consult with Access Holders and Nominated Rolling Stock Operators before making any amendments to the Operating Requirements Manual. (c) Queensland Rail may vary the Operating Requirements Manual from time to time: (i) where the variation: (A) is trivial or administrative in nature (for example, updating telephone numbers or correcting errors); (B) has no material adverse impacts on Access Seekers, Access Holders or Rolling Stock Operators provided Queensland Rail first consults with existing Access Seekers, Access Holders and Rolling Stock Operators; or

Issue	Current Proposal
	(C) has been requested by, or agreed with, all Access Seekers and Access Holders who will be affected by the variation, (**Permitted ORM Variation**); and (ii) Queensland Rail has obtained the QCA's prior written confirmation that the QCA is satisfied that the proposed variation is a Permitted ORM Variation. (d) Except to the extent of variations permitted in accordance with **clause [4.3(c)]**, Queensland Rail may only otherwise amend the Operating Requirements Manual in **schedule [G]** through a draft amending access undertaking in accordance with the QCA Act. (e) Where the Operating Requirements Manual is varied under **clause [4.3(c)]** or is amended in accordance with the QCA Act, Queensland Rail must publish a copy of the current Operating Requirements Manual on its website. **Operating Requirements Manual** means the document set out in **Schedule [G]** as varied or amended by Queensland Rail from time to time in accordance with **clause [4.3]**;
Productivity and Operational Improvements (New clause)	**Productivity and Operational Improvements** (a) Within two months of the Approval Date, Queensland Rail will convene a Regional Network User Group for each of the West Moreton System, North Coast Line System and Mt Isa Line System, subject to there being active and ongoing support for the group from the relevant nominated Rolling Stock Operators and Access Holders that operate in the respective system. (a) A Queensland Rail representative will chair each of the Regional Network User Groups. (b) Each Regional Network User Group will be a co-operative group with emphasis on analysis of data, open, impartial discussion and consensus discussion making to improve the operation of the supply chain.

Issue	Current Proposal
	(c) Queensland Rail will provide resources to: (i) develop and produce operational and system performance reports; (ii) provide analysis of the root causes of ongoing or systemic issues being experienced; (iii) identify resolutions to such issues and other productivity or efficiency initiatives; and (iv) provide evaluation and modelling of the outcomes of potential supply chain operational changes that the Regional Network User Group are supportive of investigating. (d) Decisions made by the Regional Network User Group will not be binding on any organisation. (e) Queensland Rail and other group members may agree to invite other supply chain participants (including port operators and adjoining rail network owners) in specific advisory roles but not to participate in Regional Network User Group decision making processes. (f) The frequency, rules for the conduct of meetings, and purposes and objectives of each Regional Network User Group will be as agreed between Queensland Rail and group members and will be documented in a Terms of Reference. **Regional Network User Group** means a separate group in relation to each Regional Network established to review, discuss and improve rail operational issues which can affect system or supply chain performance, comprised of each Access Holder, Rail Transport Operator and End User Access Seeker relevant to each Regional Network.

Proposed DAU2 SAA amendments

Issue	Current position
1.2, 1.3, 6.7(c), 8.8(b), 18.2(c) and Schedule 3 clauses 2.2 and 5.4(a).	QR agrees to revert to the current position – reinstate references to good faith without definition.
1.3 (productivity and efficiency variations)	**1.3 Productivity and efficiency variations** (a) Subject to the terms of this agreement and without prejudice to each Party's rights in respect of this agreement: (i) a party, during the term of this agreement, may notify the other Parties of a proposed variation to this agreement to promote, or accommodate, a demonstrable efficiency or productivity improvement (Productivity Proposal); and (ii) where a Party is notified of a Productivity Proposal, that Party must, in good faith: (A) consider that Productivity Proposal having regard to any relevant factors including the costs, benefits and impacts of the proposal on each of the Parties, on Train Services and on the operation and use of the Network, and whether the Productivity Proposal would result in a capacity increase for the Network, efficiency improvements in one or more elements of the supply chain; and (B) if requested by any Party, participate in discussions concerning the Productivity Proposal with a view to determining what (if any) amendments to this agreement the Parties are willing to agree. (b) If despite reasonable consideration a Party declines to pursue all or part of a Productivity Proposal after complying with **clause [1.3(a)]**, that Party must provide written confirmation to the other Parties of its reasons for doing so.

Issue	Current position
	(c) If the Parties in complying with **clause [1.3(a)]** agree to make amendments to this agreement, the Parties must do all things reasonably necessary to give effect to those amendments in accordance with this agreement including under **clause [27.4]**.
Security Amount (17.1, Schedule 1)	**17.1 Obligation to provide Security** (a) The Operator and the Access Holder (if the Access Holder is not also the Operator) must in appropriate cases and having regard to the Parties' financial capability: (i) on or before the Commitment Date, provide to Queensland Rail security in the form set out in clause [17.1(b)] for the relevant Security Amount respectively (except where the relevant Security Amount is zero); and (ii) thereafter maintain that security (including for any increased or decreased amount or any top up) in accordance with this clause [17], **Reference Schedule – Security Amount** *[insert a Security Amount for each of the Access Holder and the Operator which may be an amount in the range of zero to the sum of six months' Access Charges, to be determined by Queensland Rail acting reasonably (having regard to the Access Holder or Operator's financial capability).*]

Attachment 2: HoustonKemp report – DAU2 cost allocation for the West Moreton System

HOUSTONKEMP
Economists

DAU2 cost allocation for the West Moreton System

A report for Queensland Rail

22 September 2019

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Disclaimer

Contents

Executive Summary

Queensland Rail's current access undertaking (AU1) expires on 30 June 2020. Queensland Rail submitted a draft access undertaking, Draft Access Undertaking 2 (DAU2), to the Queensland Competition Authority (QCA) for approval.[1] If approved, this would replace AU1 from 1 July 2020.

In April 2019 the QCA issued a draft decision[2] that refused to approve Queensland Rail's DAU2 (the QCA draft decision). The QCA draft decision included several suggested changes to DAU2, including the approach used to allocate fixed common costs when calculating the West Moreton System reference tariff.

Queensland Rail has asked us to review different approaches to the allocation of fixed common costs in the West Moreton System and to assess their effects on economic efficiency.

Queensland Rail's proposed approach and the QCA draft decision

To calculate the West Moreton System reference tariff which applies only to coal users, fixed common costs need to be allocated between coal and non coal users.

Under AU1, fixed common costs allocated to coal users was based on an 80/113 ratio (or around 71%). The 80/113 ratio was set with reference to:

- the total amount of train paths available on West Moreton System, which the QCA considered to be 113; and
- the number of train paths West Moreton coal users could contract, which the QCA considered to be 80.

In DAU2, Queensland Rail stated that coal users could contract up to 97 train paths, and so proposed to allocate fixed common costs to coal users based on a 97/113 ratio (or around 86%). However, the QCA considered that only 87 paths would be available for coal users and proposed an 87/113 ratio instead (or around 77%).

Our assessment framework

Cost allocation can often be a contentious issue and there is no uniquely correct way to allocate fixed costs to different users. Nevertheless, there are well accepted economic principles that should be followed so that cost allocation is undertaken in a way to maximise the potential for economically efficient outcomes. These principles include that cost allocation should:[3]

1. lead to a level of revenue that falls between the standalone and incremental cost of providing the service;
2. minimise pricing distortions, including the making use of the potential for efficiency enhancing price discrimination where possible; and
3. allow a service provider to recover its total efficient costs of providing the service.

The three principles above are consistent with the QCA Act, which is the foundational reference point for decisions made by QCA.[4] A summary of our assessment of the QCA's proposed approach is shown in Table E-1 below.

[1] Queensland Rail, *Queensland Rail's Draft Access Undertaking 2,* 14 August 2018.

[2] QCA, *Draft Decision Queensland Rail's 2020 Draft Access Undertaking,* April 2019.

[3] For example, see QCA, *Statement of Regulatory Pricing Principles*, August 2013

[4] QCA Act, Division 11, Clause 168A.

In short, the QCA's approach:

- will satisfy principle 1: the revenue collected from coal users will likely fall between incremental and standalone costs;
- is inconsistent with principle 2: non-coal users are allocated a higher proportion of fixed common costs when compared with their usage but are likely to be more price responsive; and
- is inconsistent with principle 3: Queensland Rail is unlikely to recover its total efficient costs for the West Moreton System, even when utilisation is expected to be higher than 90 per cent during the DAU2 period.

Table E-1: assessment of the QCA's proposed approach against economic principles

Principle	Assessment
Revenue between incremental and standalone costs	The QCA's approach involves allocating variable costs based on gross tonne kilometres and fixed common costs on proportion of capacity available to coal users. This will likely result in revenue that falls between incremental and stand-alone costs.
Minimise price distortion	Economic principles suggest that users with a lower price responsiveness should be allocated a higher proportion of fixed costs. Coal users are very unlikely to be price responsive to changes in how fixed common costs are allocated. This is because 1) road is not a feasible alternative, and so coal users must use rail and 2) the change in cost allocation will have a limited effect on the costs of exporting coal, and so it is unlikely to reduce amount of coal exported. Coal users are expected to contract the entire capacity that is available to them in the high tonnage scenario. This means that non-coal users are allocated the residual fixed common costs, including any spare capacity on the West Moreton System. It follows that non-coal users, which are more likely to be price responsive, are implicitly allocated a higher proportion of fixed costs when compared with their usage.
Allow Queensland Rail to recover total costs	Service providers need to have the opportunity of recover their costs – otherwise there would be a disincentive to invest in the business. The QCA's proposed approach to cost allocation means non-coal users are allocated a higher proportion of fixed common costs when compared to their actual use of the network. It follows that Queensland Rail is unlikely to recover the costs that have been allocated to non-coal users because 1) to recover the costs would involve charging non-coal users a significantly higher price than current access prices; and 2) non-coal users have a lower ability to pay and can potentially switch to road.

Queensland Rail's proposed approach would allocate a higher proportion of fixed costs to coal users. In our opinion, this is more aligned with economic principles and the QCA Act because:

- a higher proportion of costs are allocated to coal users, which are very unlikely to be price responsive to a change in cost allocation which minimises pricing distortion; and
- improves Queensland Rail's ability to recover its efficient costs.

Assessment of alternative approaches to allocating fixed common costs

The need to allocate common fixed costs across several users is a common issue regulators face when regulating monopoly infrastructure. In general, regulators:

- allocate fixed common costs based on actual use of the service, rather than with reference to maximum capacity – any spare capacity available is implicitly shared by users based on use;
- the allocation approach considers the impact on all users, rather than a subset of users;

- all costs are allocated, thereby allowing the regulated business the opportunity to recover its total efficient costs; and
- there is no 'correct' approach to allocating fixed costs, and regulators sometimes give the regulated business the flexibility to propose their own approach, subject to it meeting certain high level objectives.

In our view, an alternative approach to allocating fixed costs would be with reference to actual use of the service between users, eg, gross tonne kilometres, train kilometres travelled, or net tonnes carried. In our opinion, the approach that allocates the highest proportion of fixed costs to coal users would also be the approach that best promotes the objectives of the QCA Act. This is because:

- Queensland Rail would not recover more than the efficient costs of providing the West Moreton System;
- it would align with economic principles of cost allocation, namely:
  - result in a revenue that is above avoidable costs but below standalone costs;
  - allocate fixed costs to coal users who are unlikely to be responsive to the change in cost allocation in the high tonnage scenario, and so is least distortive; and
  - it provides Queensland Rail with the best chance of recovering its efficient costs, and so promotes allocative efficiency;
- it is aligned with the public interest of Queensland, since it reduces the need for subsidy on the West Moreton System; and
- is based on actual use of the network.

1. Introduction

Queensland Rail's current access undertaking (AU1) expires on 30 June 2020. Queensland Rail has submitted a draft access undertaking, Draft Access Undertaking 2 (DAU2), to the Queensland Competition Authority (QCA) for approval.[5] If approved, this would replace AU1 from 1 July 2020.

DAU2 applies to Queensland Rail's entire network but includes provisions that apply to only parts of the network. One of these specific provisions is a reference tariff for coal services using the West Moreton System. The West Moreton System is shared between coal users and other users. In light of this sharing of system capacity, the derivation of a coal specific reference tariff requires an approach to common cost allocation.

In April 2019 the QCA issued a draft decision[6] that refused to approve Queensland Rail's DAU2 (the QCA draft decision). The QCA draft decision included suggested changes to Queensland Rail's approach to the allocation of common costs in calculating the West Moreton System reference tariff.[7]

Queensland Rail has asked us to assess the approaches to the allocation of fixed costs in the West Moreton System and to assess their effect on economic efficiency, being a key reference point in the applicable pricing principles set out in the *Queensland Competition Authority Act (1997)* (the QCA Act).[8]

The remainder of our report is structured as follows:

- section 2 describes the reference tariff for the West Moreton System and the QCA's draft decision; and
- section 3 discusses the economic principles governing cost allocation and our assessment of the QCA's draft decision.

[5] Queensland Rail, *Queensland Rail's Draft Access Undertaking 2,* 14 August 2018.

[6] QCA, *Draft Decision Queensland Rail's 2020 Draft Access Undertaking,* April 2019.

[7] QCA, *Draft Decision Queensland Rail's 2020 Draft Access Undertaking,* April 2019, p56.

[8] QCA Act, Division 11, Clause 168A.

2. QCA's draft decision

In this section we describe the basis for deriving the reference tariff on the West Moreton System and the QCA's draft decision in relation to that reference tariff.

2.1 Volume uncertainty on West Moreton

The West Moreton System is a shared rail network, transporting grain, livestock and coal. Coal is by far the largest commodity transported on the West Moreton system, and represents around 95 per cent of freight task measured in gross tonne kilometres. The West Moreton system also services two weekly passenger train services.

There are currently two mines that use the West Moreton system, being Cameby Downs, operated by Yancoal, and New Acland, operated by New Hope. Together, these two mines hauled around seven million tonnes of coal on the West Moreton system in 2016-17.[9]

There is considerable uncertainty about the future volume of coal that will be carried on the West Moreton system in the coming years. Queensland Rail's Access Undertaking 1's (DAU1) West Moreton system reference tariffs are based on approximately 6.2 million net tonnes of coal per year being transported on the system. [10] New Hope's New Acland Stage 2 mine has nominal production of around 4mtpa and Yancoal's Cameby Downs mine with production of around 2.1mtpa. A third mine, Peabody's Wilkie Creek mine, ceased operations in early 2013.[11]

New Acland Stage 2 is expected to cease producing coal by around 2020.[12] The long-term future of the New Acland mine is dependent on securing approval for a mine expansion New Acland Coal Stage 3. Queensland Rail expects that the amount of coal will be around two million tonnes per annum (mtpa) if the New Acland Stage 3 mine does not proceed and around nine mtpa if it does. The South West Producers (representing New Hope Group and Yancoal) consider that the likely volume of coal will be around 7.8 mtpa during the declaration period, which we take to be a reference to the next 10 or 15 years.[13]

Queensland Rail dealt with the significant uncertainty regarding future volume of coal volume in its DAU2 by calculating reference tariffs for two demand scenarios, namely:

- a high tonnage scenario, where annual coal haulage is around 9.1 mtpa; and
- a low tonnage scenario, where annual coal haulage is around 2.1 mtpa.

Queensland Rail proposed to charge the reference tariff if the high tonnage scenario eventuates, ie, New Acland Stage 3 proceeds. If the low tonnage scenario eventuates, Queensland Rail considered that the reference tariff would be above the ability to pay of the remaining mine, operated by Yancoal. In that event, Queensland Rail proposed to work with Yancoal to determine an amount that Yancoal can reasonably pay.

[9] QCA, *Draft recommendation, Part B: Queensland Rail declaration review*, December 2018, p 65.

[10] QCA, Decision, Part B: Queensland Rail Draft Access Undertaking, June 2016, p 186 and Queensland Rail, Explanatory Submission – Queensland Rail's Draft Access Undertaking 1 (2015) Volume 2, May 2015, p 17.

[11] Queensland Rail, *Queensland Rail's Draft Access Undertaking 2 (DAU2) Explanatory Document 14,* August 2018, p 10.

[12] QCA, *Queensland Rail's 2020 Draft Access Undertaking Draft Decision,* April 2018, p 8.

[13] South West Producers, QR Declaration review forum presentation slides, 9 April 2019, p 8, available at http://www.qca.org.au/getattachment/70365ccb-9056-49d8-a155-ee427bb8df5e/South-West-Producers-presentation-slides.aspx. Accessed 12/9/19.

The QCA's draft decision noted Queensland Rail's intention not to impose the reference tariff in the low tonnage scenario. Given this, the QCA focused on developing a reference tariff on the basis that the high tonnage scenario occurs.

2.2 Derivation of the West Moreton reference tariff

The West Moreton System and the Metropolitan System are the only two systems on Queensland Rail's network that have a reference tariff. The reference tariff applies only for coal users and is a two-part tariff, comprising: [14] [15]

- a per train path charge, currently at $3,072.1 per reference train service; and
- a gross tonne kilometres (GTK) based charge, currently at $8.61 per thousand GTK.

The reference tariff acts as a price cap[16] so that, in principle, coal users could pay an amount that is lower than the reference tariff. Nevertheless, we understand that coal users currently pay the reference tariff. Access charges for coal services are applied on a 100 per cent take or pay arrangement, meaning that coal users are required to pay for the capacity for which they have contacted, even if this amount is not used.[17] Coal users currently may purchase additional 'ad hoc services' from Queensland Rail at the reference tariff.[18]

In DAU2, Queensland Rail proposed to continue to apply:

- a two-part tariff;
- 100 per cent take or pay arrangements; and
- to charge for 'ad hoc services' at the reference tariff.

Th QCA's draft decision is to accept Queensland Rail's proposal to apply a two-part tariff and 100 per cent take or pay arrangements, but for 'ad hoc services' to be charged at a five per cent premium to the reference tariff.[19]

2.3 QCA draft decision on cost allocation

The West Moreton System is shared between coal users and non-coal users. This requires the allocation common costs (opening asset base, maintenance costs, operating costs and forecast capital expenditure) to coal users, to determine the amount of the total revenue requirement for coal users.

The costs allocated to coal users are then used to determine Queensland Rail's revenue requirement for coal services for the regulatory period, using a regulatory building block model. The reference tariff is then set so that Queensland Rail can recover the revenue requirement for coal services.

Arrangements under AU1

In AU1, the approach used to allocate common costs to coal services involved:[20]

- variable common costs being allocated based on a GTK basis – this resulted in around 95 per cent of costs being allocated to coal users; and

[14] Queensland Rail, West Moreton System Reference Tariffs (RE 1.0). 19 July 2018 to 30 June 2019.

[15] We note that there is also a QCA levy, which is charged on a net tonne basis. The QCA levy charge is $0.31825 per net tonne carried.

[16] QCA, *Draft Decision Queensland Rail's 2020 Draft Access Undertaking,* April 2019, p 42.

[17] QCA, *Draft Decision Queensland Rail's 2020 Draft Access Undertaking,* April 2019, p 16-17.

[18] QCA, *Draft Decision Queensland Rail's 2020 Draft Access Undertaking,* April 2019, p 14.

[19] QCA, *Draft Decision Queensland Rail's 2020 Draft Access Undertaking,* April 2019, p 15-16.

[20] QCA, *Decision Queensland Rail's Draft Access Undertaking,* June 2016, p 146.

- fixed common costs being allocated to coal users based on the number of train paths available to coal users (80 paths) and the total number of train paths available on the network (113) – this resulted in around 71 per cent of fixed common costs being allocated to coal users.

In its final decision for AU1, the QCA noted that allocation of fixed common costs was a contentious issue. The QCA's decision to allocate common fixed costs using an 80/113 ratio was set with reference to the following considerations: [21]

- that the maximum number of train paths available on the West Moreton System was 113 per week;
- the maximum number of paths available to coal services on the West Moreton System was 80 per week since:
  - capacity constraints on the Metropolitan System meant only 87 train paths were available for coal services; and
  - at the time, there were seven coal train services not operating within the Metropolitan System; and
- coal services were forecast to use 63 paths.

The QCA considered that allocating fixed common costs using a ratio of 80/113 meant that coal services would only be paying for the proportion of capacity that is potentially available to them.

The QCA acknowledged that Queensland Rail would be unlikely to recover its costs under its approach:[22]

> However, under our allocation approach (as well as under the approaches proposed by Queensland Rail and the miners), Queensland Rail may not be able to recover the efficient costs of providing access for all traffics on the West Moreton network (i.e. costs that reflect the overall capacity of the network to provide all those services). This is due to the risk that Queensland Rail may not be able to recover, from non-coal services, its efficient costs that are not allocated to coal services, and that is a commercial matter for Queensland Rail.

Despite this problem, the QCA considered the 80/113 allocation would be appropriate because it: [23]

> - will promote the economically efficient use of, operation of, and investment in the network (s. 138(2)(a))—as it signals to coal train users that they will pay for efficient fixed common network costs that reflect the share of capacity they are able to contract and efficient variable common network costs reflecting their share of usage (and no more), and provides for Queensland Rail to recover its efficient costs and investments relating to the spare capacity that is available for contracting by coal services;
>
> - is in the interests of access seekers and access holders of coal services and their customers (s. 138(2)(e) and (h))—as they are not required to pay for the fixed common network costs of network capacity that reflects the share of capacity they are unable to contract;
>
> - is in the public interest (s. 138(2)(d))—as it promotes the future development of the above rail market by signalling to customers that they will not have to pay for the fixed common network costs of network capacity that reflects the share of capacity they are unable to contract; and
>
> - will advance Queensland Rail's legitimate business interests, to the extent that the risk of recovering efficient fixed common network costs of spare capacity, reflecting the capacity available for contracting by coal services, is borne by coal traffics and not by Queensland Rail (s. 138(2)(b)).

[21] QCA, *Decision Queensland Rail's Draft Access Undertaking*, June 2016, p 146.

[22] QCA, *Decision Queensland Rail's Draft Access Undertaking*, June 2016, p 143-145.

[23] QCA, *Decision Queensland Rail's Draft Access Undertaking*, June 2016, p 144-145.

Queensland Rail's proposed approach

In DAU2, Queensland Rail proposed to allocate common fixed costs to coal services using a 97/113 ratio, or 86 per cent of costs. Queensland Rail's rationale for the change is that:[24]

- the 87 train path constraint on the Metropolitan System no longer applies – we understand that this has been confirmed by the Department of Transport and Main Roads;
- the high tonnage scenario of 9.1 mtpa would require 92.5 train paths; and
- that 97 train paths are available for coal services on the West Moreton System, given that:
  - total capacity is 113 train paths per week; and
  - there are 16 preserved train paths for non-coal trains, including 14 train paths for non-coal freight and two for passenger trains.

QCA's draft decision

The QCA's draft decision was to reject Queensland Rail's proposed approach to allocating fixed common costs as it considered there was no evidence that the 87 train path constraint no longer applied. Given this constraint, the QCA proposed that fixed costs be allocated to coal services on an 87/113 basis. Consistent with this, the QCA has assumed that 8.5 mtpa of coal would be transported, and so coal services would be using the entire capacity that is available to them.[25] The coal producers support the QCA's approach.[26, 27]

The QCA's analysis indicates that allocating fixed costs on an 87/113 basis rather than a 97/113 basis would reduce the amount paid by coal services from $22.39 per thousand GTK to $21.44 per thousand GTK. This represents a reduction of $0.95 per thousand GTK, or around four per cent. [28]

The QCA noted that its position may change if Queensland Rail was able to provide:[29]

- firmer volume numbers or;
- compelling evidence that the 87 path constraint no longer applies and so it is appropriate to reconsider how fixed costs are allocated.

[24] Queensland Rail, *Queensland Rail's Draft Access Undertaking 2 (DAU2) Explanatory Document*, 14 August 2018, p15.
[25] QCA, *Decision Queensland Rail's Draft Access Undertaking*, June 2016, p 45-46.
[26] New Hope Group, *Queensland Rail's 2020 Draft Access Undertaking: Initial Submission – Volume 1 Overview and Reference Tariffs* 17 October 2018, p10.
[27] Yancoal, *Initial Submission on QR 2020 Draft Access Undertaking*, 17 October 2018, p 14.
[28] QCA, *Draft Decision Queensland Rail's 2020 Draft Access Undertaking,* April 2019, p 58.
[29] QCA, *Draft Decision Queensland Rail's 2020 Draft Access Undertaking,* April 2019, p12.

3. Economic assessment of cost allocation

In this section we discuss the economic principles governing cost allocation and our assessment of the QCA's draft decision.

3.1 The pricing principles within the QCA Act

The QCA Act is the foundational reference point for decisions made by Queensland Competition Authority.

The QCA must make decisions in a manner that is consistent with the QCA Act, including the pricing principles. The pricing principles suggest that the prices should:[30]

> (a) generate expected revenue for the service that is at least enough to meet the efficient costs of providing access to the service and include a return on investment commensurate with the regulatory and commercial risks involved
>
> (b) allow for multi-part pricing and price discrimination where it aids efficiency
>
> (c) not allow a related access provider to set terms and conditions that discriminate in favour of the downstream operations of the access provider or a related body corporate of access provider or a related body corporate of the access provider, except to the extent the cost of providing access to other operators is higher; and
>
> (d) provide incentives to reduce costs or otherwise improve productivity

Efficiency is a key concept underpinning the QCA's assessment criteria and the pricing principles. 'Efficiency' is widely accepted by economists as having three distinct dimensions, being: [31]

- **productive efficiency**, ie, production using a least-cost combination of inputs;
- **allocative efficiency**, ie, production of an optimal set of goods and services, which is allocated to provide the maximum benefit to society; and
- **dynamic efficiency**, ie achieving productive and allocative efficiency over time, in the face of changes in technology and consumer preferences.

Each of these dimensions of efficiency is reflected in the QCA Act's pricing principles. By way of explanation:

- generating expected revenue to meet efficient costs is related to ensuring that the service provider has a financial incentive and ability to provide the service: this is crucial to ensuring that
  - optimal service is provided to access seekers, and so allocative efficiency; and
  - the service provider has the incentive to invest in the future, and so dynamic efficiency.
- multi-part pricing and price discrimination is relevant to the efficient allocation of fixed common costs – this allows the service provider to recover its costs from users in a least distortive manner, and so promotes allocative efficiency;
- not discriminating in favour of downstream operators is to ensure that pricing does not affect competition in a related market – that is, pricing should not distort outcomes in a related market, which could lead to productive and allocative inefficiencies if it results in different products being produced and sold; and

[30] Queensland Competition Authority Act (1997), Division 11 Clause 168A.

[31] For further discussion of the dimensions of efficiency and their relation to public policy see Productivity Commission, *On efficiency and effectiveness – some definitions*, May 2013.

- incentives to reduce costs or improve productivity is related to promoting cost efficiencies, and so productive efficiency.

3.2 Our assessment of the QCA's draft decision

Cost allocation can often by a contentious issue and there is no uniquely correct way to allocate fixed costs to different users. Cost allocation is not a precise science for which there is a unique and single answer.

Nevertheless, there are well accepted economic principles that should be followed so that cost allocation is undertaken to maximise the potential for economically efficient outcomes. These include that cost allocation should:[32]

- lead to a level of revenue that falls between the standalone and incremental cost of providing the service;
- minimise pricing distortions, including the making use of the potential for efficiency enhancing price discrimination where possible; and
- allow a service provider to recover its total efficient costs of providing the service.

We explain these concepts in further detail below.

3.2.1 Revenue between stand-alone costs and incremental costs

Economic principles

Economic principles establish that, in the presence of shared costs, the quantum of costs to be allocated to a service should be:

- no more than the standalone cost of each relevant service; and
- no less than the avoidable cost of each relevant service.

The standalone cost of a service is the costs of providing that service alone. This principle forms the upper bound because, once the price for any service exceeds its standalone cost, the user is being asked to pay more than the cost of delivering the service by another means. Prices set above this threshold are inefficient because, in principle, the user could procure the service by some other means, for a lower price.

The avoidable cost of a service is the cost that would be avoided if that service was not provided, given all other circumstances (including the provision of other services). Prices set below this threshold will be allocatively inefficient and the service provider would be making a loss through continuing to serve the customers.

Our assessment of the QCA's draft decision

The QCA's approach to allocating costs to coal services involves allocating:

- variable common costs based on use, measured on a GTK basis; and
- allocating fixed common costs based on proportion of capacity available to coal services, measured on a train path basis.

An accurate assessment of whether costs allocated to coal services and non-coal services are within standalone costs and incremental costs would require significant technical work and is outside of the scope of this report. However, we expect that the QCA's approach to cost allocation would likely result in a revenue that falls between standalone and avoidable costs for coal users and non-coal users.

[32] For example, see QCA, *Statement of Regulatory Pricing Principles*, August 2013.

3.2.2 Minimise distortion of the recovery of fixed costs

Economic principles

It is a well accepted economic principle that pricing based on the marginal cost of providing the service promotes economic efficiency.[33] In particular, setting prices equal to marginal costs sends users an accurate price signal as to how much it costs to provide a certain service. Users may then decide to use the service if the benefits they receive are higher than the costs, and not use the service if the benefits received are lower than the costs of it being provided.

However, setting prices based on marginal costs will not recover costs for an infrastructure business where a large proportion of the costs are fixed, giving rise to the need to impose a fixed charge or mark-up on the usage charge. As noted above, there is not a uniquely 'right' answer as to how fixed costs should be recovered.

Nevertheless, economic principles suggest that fixed costs should be allocated in a manner that creates the least distortion. Economic theory suggests that this would involve allocating fixed costs to users who are least responsive to price changes.[34]

The Ramsey price approach – sometimes referred to as the inverse elasticity rule – is an example of such an approach to allocating fixed common costs. It involves setting prices at a level of mark-up above marginal costs that varies according to price responsiveness of different customers (or groups of customers), thereby minimising the extent of distortion to consumer behaviour (as compared with prices that are set at marginal cost).

The concept of recovering fixed costs in a manner that minimises distortion is also consistent with the pricing principles within the QCA Act, where price discrimination is allowed when it improves efficiency.

Our assessment of QCA's draft decision

As noted above, economic principles suggest that users with a lower price responsiveness should be allocated a higher proportion of fixed costs. In our opinion, coal users are very unlikely to be price responsive to changes in how fixed common costs are allocated in the high tonnage scenario since:

- coal haulage by road is not a feasible substitute service, and so coal users only potential response is to reduce production; and
- the allocation of the contemplated higher proportion of fixed costs will have a limited effect on the total costs of exporting coal.

We explain why this is the case below.

Existing government policies prohibit the transport of coal from the West Moreton region to the Port of Brisbane via road.[35] This means that the only possible response for coal users from an increase in price is to reduce the amount of coal exported. Given the profitability of coal exports, we believe it is highly unlikely that coal producers would reduce output in response to a revised cost allocation especially given the limited effect this would have on rail haulage costs.

Table 3-1 and Table 3-2 shows the estimated free on board costs of coal for the two existing mines in the West Moreton region on a per tonne basis from 2011 to 2018. This shows that below rail costs are a fraction of the total costs, ranging from:

- [redacted]

[33] For example, see QCA, *Statement of Regulatory Pricing Principles*, August 2013, p 8-9.

[34] For example, see QCA, *Statement of Regulatory Pricing Principles*, August 2013, p 11.

[35] QCA, *Draft recommendation, Part B: Queensland Rail declaration review*, December 2018, p 66.

[redacted]

Table 3-1: Estimated cost of Cameby Downs coal mine ($AUD per tonne)[36]

Category	2011	2012	2013	2014	2015	2016	2017	2018	Average
[redacted]									

Table 3-2: Estimated cost of New Acland coal mine ($AUD per tonne)[37]

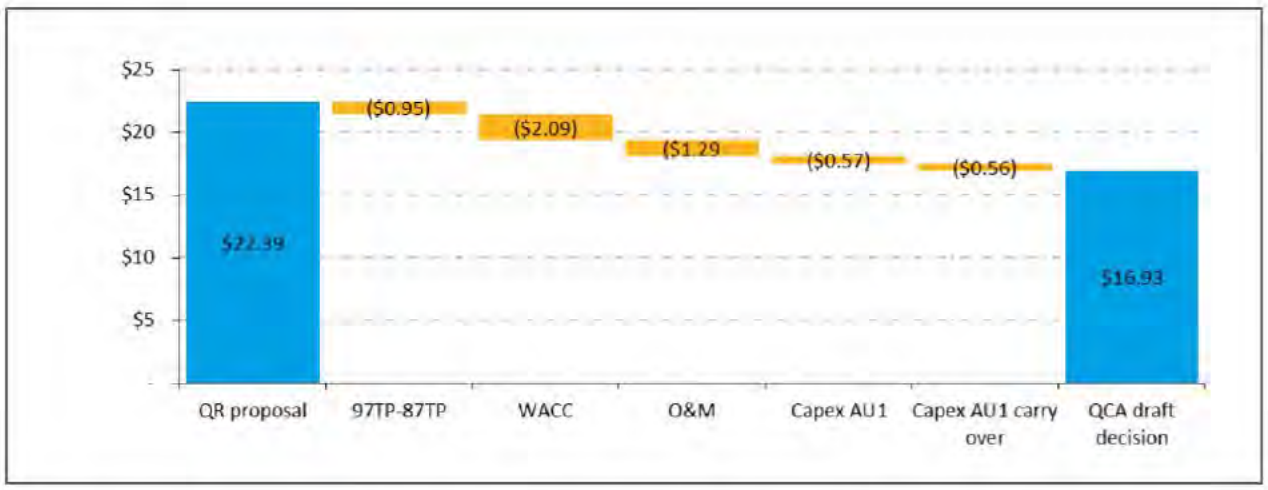
Category	2011	2012	2013	2014	2015	2016	2017	2018	Average
[redacted]									

Further, the QCA's draft decision suggests that moving from Queensland Rail's proposed approach (allocating fixed costs on a 97/113 ratio) to the QCA's preferred approach (allocating fixed costs on an 87/113 ratio) is likely to have a small effect on the reference tariff. The QCA's analysis suggests that adopting Queensland Rail's approach over the QCA's approach would increase reference tariff from $21.44 per thousand gtk to $22.39 per thousand GTK – Figure 1. This represents an increase of around 4 per cent.

[36] AME Advisory, *Mine Datasheet Report for HoustonKemp*, April 2018.

[37] AME Advisory, *Mine Datasheet Report for HoustonKemp*, April 2018.

Figure 1:West Moreton tariff proposed by Queensland Rail's and the QCA's draft decision ($ per thousand GTK) [38]



The discussion above suggests that a change in cost allocation approach would have a small effect of the total free on board costs for the two existing mines. By way of worked example, assuming that below rail costs only account for [redacted] then a 4 per cent increase in below rail costs (calculated by the QCA as the difference reference prices between QR and the QCA's cost allocation approach) would increase total costs by under [redacted]

In summary:

- below rail costs represent a small proportion [redacted] of the overall costs of exporting coal;
- a change in cost allocation would likely have small effect on below rail costs – the QCA's draft decision suggests that moving from 97/113 ratio to 87/113 ratio would only reduce the reference tariff by four per cent; and therefore
- adopting Queensland Rail's approach over the QCA's approach would increase total costs of exporting coal by around [redacted]

In contrast, non-coal users, which include passenger, grain and livestock are likely to be much more responsive to changes in prices because they could potentially switch to road and are likely to have a lower ability to pay when compared to coal users due to the economics of their supply chains.

The QCA's draft decision is:

- to allocate 77 per cent of common fixed costs to coal users, reflecting the 87 paths that are available to them and expected to use; and
- for the remaining 23 per cent of common fixed costs to be allocated to non-coal users, reflecting the 16 paths preserved for non-coal users and 10 unused train paths.

We understand that on an actual use basis, coal users represent:

- 84 per cent of train paths used; and
- 95 per cent of GTK.

[38] QCA, *Draft Decision Queensland Rail's 2020 Draft Access Undertaking*, April 2019, p58.

In our opinion, the QCA's approach is inconsistent with economic principles where users that are less price responsive should be allocated a higher proportion of fixed costs to minimise distortion. Coal users are allocated a lower amount of costs when compared to their actual use of the network. Our analysis indicates that coal users are unlikely to respond to changes in how fixed costs are allocated and so, as a matter of economic principle, should be allocated a higher proportion of costs. In contrast, non-coal users are likely to be more responsive since they can switch to road.

3.2.3 Allow service provider to recover efficient costs

Economic principle

A key consideration when setting prices is to ensure that the service provider can recover its efficient costs. Recovery of efficient costs also includes a reasonable return on capital that is appropriate given the associated risks of the infrastructure. If the service provider recovers a revenue that is below its efficient costs of providing the service, then the service provider would not have an incentive to provide the service.

Infrastructure investment is often fixed and lumpy in nature. This can sometimes create cost recovery challenges, particularly after expansion, when there is excess capacity but insufficient demand to recover efficient costs. However, excess capacity does not mean the service provider has acted imprudently and should not be allowed to recover its total efficient costs. As pointed out by Professor King:[39]

> If there is currently excess capacity on the network, but this excess capacity is 'efficient' in the sense that there is likely to be increasing demand for rail services on the network in the future, then it may be economically efficient not to fully recover the common costs in the short term. Rather, it would be recognised that these costs were in part an investment today in the future use of the network and should be allocated over time as well as over current users. Put simply, in a situation of current excess capacity, allocation of common costs can be considered in a dynamic sense, not merely in a static sense.

Professor King further notes that Queensland Rail's inability to: [40]

> … 'fully recover' its efficient forward looking costs in the short term under a specific allocation method does not, as a matter of economics, mean that either:
>
> a. The allocation method is inconsistent with economic efficiency; or
>
> b. An allocation method that does 'fully recover' efficient forward looking costs in the short term is preferable.

The above discussion suggests, although cost recovery does not need to ensure full recovery of common costs in the short run, Queensland Rail does need to be able to recover its efficient costs associated with providing the service in the long run. Otherwise, Queensland Rail will have a financial disincentive to continue to provide the capacity.

Our assessment of the QCA's draft decision

We note that the West Moreton System is expected to be highly utilised over the DAU2 period in the high demand scenario, ie:

- Queensland Rail's forecast suggests that around 96 per cent of train paths would be allocated (93 paths would be used by coal services and 16 paths preserved from non-coal freight and passenger services); and
- the QCA's draft decision suggests that 91 per cent of train paths would be allocated (87 paths would be used by coal services and 16 paths preserved from non-coal freight and passenger services)

[39] Professor Stephen P. King, *An independent review of reports by Professor Menezes*, May 19, 2016, p11.
[40] Professor Stephen P. King, *An independent review of reports by Professor Menezes*, May 19, 2016, p11.

Many network businesses operate with a degree of spare capacity (ie, do not operate at 100 per cent capacity) both on account of the intrinsic scale economies of much network infrastructure and the benefits to users of being able to minimise capacity-related disruptions to services. We are not aware of any evidence suggesting that the extent of spare capacity on West Moreton is 'inefficient', and that the under-recovery of costs of providing the full extent of existing capacity would lead to efficient outcomes.

The QCA's approach to allocating common costs is with reference to maximum capacity that could be contracted. The remaining capacity, including capacity used by other services and any spare capacity on the system is allocated to non-coal users. In our opinion, Queensland Rail would not be able to recover its efficient fixed costs, even when utilisation of the West Moreton line is expected to be higher than 90 per cent during the DAU2 period.

To illustrate Queensland Rail's inability to recover its costs, we have considered the following simplified and hypothetical rail network as an example. We have made the following assumptions:

- there are $11.3 million of fixed costs per year to be allocated across coal users and non-coal users;
- there are 113 total train paths, in which:
  - 87 are used by coal services;
  - 16 used by non-coal; and
  - 10 are unused; and
- the QCA's cost allocation approach is adopted, ie:
  - coal users are allocated $8.7 million per year (using an 87/113 allocation ratio), which equates to $0.1 million of fixed costs per train path; and
  - residual fixed costs of $2.6 million per year to be recovered from non-coal users, which equates to $0.26 million of fixed costs per train path.

Under this hypothetical example, non-coal users are implicitly paying for the spare capacity available on the West Moreton system. Given that non-coal users represent a fraction of actual use, Queensland Rail would need to charge a significantly higher charge on non-coal users for it to be possible to recover its total fixed costs.

The example above show that Queensland Rail is unlikely ever to recover its total costs because:

- it is unlikely that Queensland Rail would ever be able to contract out all its train paths to coal users; and
- it is unlikely that Queensland Rail could recover the fixed costs that are allocated to non-coal users since:
  - it would involve charging non-coal users a significantly higher charge than current access charges; and
  - they are likely to have less ability to pay and more likely to be price responsive.

Put another way, Queensland Rail will likely only be able to receive a revenue that is equal to its efficient costs if it is operating at or close to 100 per cent capacity.

Furthermore, we are unaware of any business that allocate costs with reference to maximum capacity, such that this would likely give rise to a shortfall in the recovery of its total costs. We discuss approaches used by other regulated businesses in further detail below.

In summary, our assessment is that Queensland Rail would be very unlikely to recover its efficient costs on the West Moreton System, even if a high tonnage scenario occurs and utilisation rate on the system is very high. In our opinion, under-recovery of efficient costs would lead to:

- allocative inefficiency, as Queensland Rail has a disincentive to invest in the network, even if demand is high;

- reference tariffs that do not reflect the full economic costs of providing the service, and so coal users receive an implicit subsidy; and
- the Queensland Government either subsidising the West Moreton System or accepting a lower rate of return, which is inconsistent with public interest.

3.3 Alternative approaches to allocating common fixed costs

We discuss below approaches adopted in other regulatory regimes and alternative approaches that would better promote the pricing principles in the QCA Act below.

3.3.1 Approaches adopted in other regulatory regimes

We have reviewed approaches used in relation to other regulated businesses to allocate fixed costs, including:

- those used by the QCA for Aurizon Network and Dalrymple Bay Coal Terminal (DBCT);
- the AER's guidance on cost allocation for electricity network businesses; and
- the approach used by Australian Rail Track Corporation (ARTC) for its interstate network and Hunter Valley coal network, which are both regulated by the Australian Competition and Consumer Commission (ACCC).

A summary of our findings is presented in the Table 4-1 below.

We make the following observations:

- fixed costs are allocated on actual use of the service, rather than with reference to maximum capacity – any spare capacity available is implicitly shared by users based on use;
- the allocation approach considers the impact on all users, rather than a subset of users;
- all costs are allocated, thereby allowing the regulated business the opportunity to recover its total efficient costs; and
- there is no 'correct' approach to allocating fixed costs, and regulators sometimes give the regulated business the flexibility to propose their own approach, subject to it meeting certain high level objectives.

Table 3-3: approaches to allocating fixed costs used by other regulated businesses

Regulated asset owner/operator	Cost allocation methodology
QCA – Aurizon	For coal users, a reference tariff is used which includes:[41] • the incremental maintenance tariff, levied on a gross tonne kilometre (gtk) basis; • the incremental capacity tariff, levied on a reference train path (rtp) basis; • the electric access tariff, levied on an electric gross tonne kilometre (egtk) basis; • allocative tariffs and other components, levied on ntk, egtk or nt basis.
QCA – DBCT	Cost allocation manuals are used to determine how costs are to be allocated, these are determined either by the QCA, DBCT and relevant operators. The cost types to consider include:[42] • identifiable costs, ie, costs that are uniquely identified or directly incurred in relation to a particular component of capacity, should be assigned to that component; • attributable costs, ie, costs that are not explicitly identified, but there is reasonable causal relation between the cost and capacity component, should be allocated based on an appropriated allocation factor; and • neither identifiable nor attributable costs should be allocated on a reasonable basis, eg, through tonnage of coal transport.
ACCC – ARTC's Interstate	The ACCC has allowed ARTC to allocate costs such that:[43] • Operating and maintenance costs are separated into those attributable to individual rail segments (direct costs) and those attributable to the entire network (indirect costs). • Indirect costs are then defined by their division, for example finance and procurement and tagged with either a gross tonne kilometre (GTK) or a train kilometre allocation method, depending on the division to which they are allocated. • Costs are then allocated to different parts of the network.
ACCC – ARTC's Hunter Valley	The cost allocation that the ACCC has accepted stipulates that as actual usage is what drives network costs rather than contracted usage, actual usage is the appropriate allocator for incremental capital costs.[44] In addition, the tariff allowed dictates that:[45] • incremental capital costs are allocated on the basis of either Contracted Coal GTK or Contracted Coal Km; and • Variable Maintenance Costs are allocated based on either GTK (weighted for axle load) or Train Km.
AER – TNSPs and DNSPs	TNSPs and DNSPs must submit cost allocation methods to the AER for approval. Allocation must align with the AER's cost allocation guidelines and principles which state that allocation to a particular category of services is such that:[46] • costs directly attributable to the provision of those services are included; • costs which are not directly attributable to the provision of those services but are incurred in the provision of those services are included and must be allocated using an appropriate allocator where practically possible An example of a method approved by the AER is AusGrid's cost allocation to users based on their share of system peak demand, eg 10 per cent of system peak demand sees the user face 10 per cent of the costs. This reflects the notion that the contribution of a tariff to annual system peak is a suitable proxy for its efficient cost share.

[41] QCA, *Aurizon Network's 2017 draft access undertaking*, Decision, December 2018, p 247.

[42] QCA, *DBCT Management's 2015 draft access* undertaking, Final decision, November 2016, p 246; QCA, *DBCT Management Differential Pricing Draft Amending Access Undertaking*, Draft Decision, May 2015, p 24.

[43] ACCC, *Access Undertaking – Interstate Rail Network*, Final decision, July 2008, p 171.

[44] ACCC, ARTC's application to vary the 2011 Hunter Valley Access Undertaking, Decision, November 2018, p 4.

[45] ACCC, ARTC's application to vary the 2011 Hunter Valley Access Undertaking, Decision, November 2018, pp 4-5.

[46] National Electricity Rules 122, rules 6.15.2 and 6A.19.2.

3.3.2 Overall assessment

As highlighted in our discussions above and practices used in other regulatory regimes, there is no single 'correct' approach to allocating common fixed costs. Nevertheless, in our opinion, Queensland Rail's proposed approach would be more aligned with the QCA Act's pricing principles and economic principles of cost allocation when compared to the QCA's draft decision because:

- it means Queensland Rail is able to recover a higher proportion of its total efficient costs for the West Moreton System;
- it allocates a higher proportion of fixed costs to coal users, and so is consistent with recovering fixed costs in a least distortive manner;
- coal users are unlikely to be price responsive to changes in cost allocation, and so allocative efficiency in the coal market is not a concern; and
- it is more aligned with public interest, because it reduces the need for Queensland Government to subsidise Queensland Rail.

We note that under Queensland Rail's proposed approach, 86 per cent of costs are allocated to coal users and 14 per cent are allocated to non-coal users. However, it is still unclear if Queensland Rail would be able to recover the fixed costs that are allocated to non-coal users given that these users likely have a lower ability to pay. It follows that there could be merit in allocating an even higher proportion of costs from coal users. Potential allocation options include allocation based on:

- gross tonne kilometres, which would mean 95 per cent of fixed common costs are allocated to coal services; or
- other measures of use, such as train kilometres travelled, or net tonnes carried.

In our opinion, the approach that allocates the highest proportion of fixed costs to coal users would also be the approach that best promotes the objectives of the QCA Act. This is because:

- Queensland Rail would not recover more than the efficient costs of providing the West Moreton System;
- it would align with economic principles of cost allocation, namely:
  - result in a revenue that is above avoidable costs but below standalone costs;
  - allocate fixed costs to coal users who are unlikely to be responsive to the change in cost allocation in the high tonnage scenario, and so is least distortive; and
  - it provides Queensland Rail with the best chance of recovering its efficient costs, and so promotes allocative efficiency;
- it is aligned with the public interest of Queensland, since it reduces the need for subsidy on the West Moreton system; and
- it is based on actual use of the network.

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Attachment 3: HoustonKemp report – Approaches to the WACC for rail networks

HOUSTONKEMP
Economists

Approaches to the WACC for rail networks

A report for Queensland Rail

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1. Introduction

This report sets out in detail information to support a submission to the Queensland Competition Authority (QCA) that updates the weighted average cost of capital (WACC) proposed to be applied in Queensland Rail's revised draft access undertaking (DAU) for the 2020-2024 period, ie, from 1 July 2020.

We note that in its propose DAU Queensland Rail adopted the QCA's approach to the WACC as set out in the Aurizon draft decision. However, Queensland Rail indicated it may seek to revise this position were the QCA to change its approach.[1] The catalyst for this report is the changes to the QCA's methodology for estimating the WACC as part of the Aurizon final decision in 2018,[2] as well as the subsequent changes in the made in the QCA's April 2019 draft decision in relation Queensland Rail's DAU.[3]

Understanding the changes to the QCA's WACC methodology is of great significance to Queensland Rail given the role the WACC plays in determining the allowed rate of return in infrastructure pricing decisions. The WACC is a central input variable into the 'building block' revenue model that is used to determine reference tariffs for coal carrying services on the West Moreton and Metropolitan systems.

The recent changes to the QCA's WACC methodology, coupled with the various methodologies employed by other regulators, highlights the extent of discretion that arises in the estimation of the allowed rate of return. Industry participants have long been cognisant of this inherit uncertainty and associated regulatory discretion, as well as the effect it has on the allowed rate of return. For instance, in Aurizon's submission to the QCA's draft decision for the latest undertaking, it remarked in relation to a change in the market risk premium methodology:[4]

> Aurizon network considers that this is another example where the QCA has used its judgement to produce a lower return on equity estimate than would be the case acting reasonably, including if it had maintained its long-standing approach to using survey results in estimating the MRP. This is an unreasonable and inappropriate use of its discretion.

Queensland Rail has posited a similar view regarding the changes to the QCA's regulatory approach:[5]

> […] the marked change in regulatory approach to setting of the reference tariff and the setting of the asset base value proposed by the QCA has and will create significant uncertainty […] there is no certainty in the current regulatory process as to what the price will ultimately be.

In altering its rate of return methodology in both the Aurizon final decision and Queensland Rail draft decision, the QCA had explicit regard to the alternative approaches to setting the rate of return adopted by other Australian regulators. This consideration of alternative approaches indicates a willingness on behalf of the QCA to consider alternative approaches to calculating the WACC. However, the QCA's treatment of other regulators' methodologies focused on component elements of the WACC rather than the overall rate of return. Given the importance of the rate of return to Queensland Rail, a systematic examination of each regulator's whole methodology is appropriate.

This report provides 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 rail infrastructure. By

[1] Queensland Rail, *Draft access undertaking 2 (DAU2) explanatory document,* 14 August 2018, p 17.

[2] QCA, *Aurizon Network's 2017 draft access undertaking | Final decision,* December 2018.

[3] QCA, *Queensland Rail's 2020 draft access undertaking | Draft decision,* April 2019.

[4] Aurizon, *2017 draft access undertaking response to the Queensland Competition Authority's draft decision,* 12 March 2018, p 103.

[5] Queensland Rail, *Response to Queensland Competition Authority's draft decision to refuse to approve draft access undertaking,* December 2015, p 15.

adopting such a broad assessment, our report provides a sound basis for the QCA to assess the reasonableness of its proposed bottom-up WACC for Queensland Rail.

Our report is structured as follows:

- section 2 provides an overview of the QCA's draft decision for Queensland Rail's 2020 DAU, detailing:
  - the rate of return methodology employed by the QCA; and
  - the parameters estimated and the framework utilised by the QCA;
- section 3 considers the approaches adopted by other Australian regulators, detailing:
  - a description of the rate of return methodology employed by the Independent Pricing and Regulatory Tribunal (IPART), the Australian Competition and Consumer Commission (ACCC) and the Economic Regulation Authority of Western Australia (ERA);
  - for those regulators that regulate rail infrastructure services, an explanation of the methods for deriving the various WACC parameters (and their values) over the assessment period adopted by the QCA for Queensland Rail; and
  - for those regulators that regulate rail infrastructure services, an analysis of the range of potential WACCs for Queensland Rail using either the parameters estimated, and the framework utilised by the relevant regulator or the framework of the relevant regulator without implementing the estimated rate of return; and
- section 4 provides concluding remarks.

2. Queensland Rail draft decision

In April 2019 the QCA released its draft decision on Queensland Rail's 2020 DAU proposed maximum allowed revenues over the 2020 DAU pricing period.

The 2020 DAU sets the maximum prices for Queensland Rail's rail network services that facilitate the transport of both thermal and metallurgical coal in Queensland for export.

In its draft decision for Queensland Rail's 2020 DAU, the QCA returned to its reliance on its traditional bottom-up approach to determining the rate of return. This approach comprises calculating the WACC by reference to an individual assessment of each of its components. Such reliance on a fully bottom-up approach was made despite the concerns noted by the QCA in relation to the Aurizon final decision, namely that:[6]

> […] simply applying a mechanistic approach to a bottom-up WACC estimate will not necessarily ensure an appropriate overall WACC for the provision of access to the CQCN [Central Queensland Coal Network].

A similar sentiment regarding solely relying on the bottom-up assessment of the WACC is echoed in the Queensland Rail draft decision:[7]

> While a bottom-up assessment provides a means for assessing an appropriate rate of return for Queensland Rail, an ultimate consideration is whether the overall WACC is appropriate

However, in its draft decision, the QCA determined that the WACC generated through its bottom-up assessment was a rate of return that was commensurate with the regulatory and commercial risks involved. In particular, the QCA determined a WACC of 6.02 per cent, comprising:[8]

- a return on equity of 6.92 per cent;
- a return on debt of 4.67 per cent;
- a capital 40 per cent debt and 60 per cent equity; and
- a gamma value of 0.484.

In developing its approach to estimating the individual WACC parameters and assessing the reasonableness of the overall WACC, the QCA had explicit regard to the approaches of other Australian regulators. The QCA's explicit consideration of alternative approaches to those it has employed previously illustrates that it recognises the inherit uncertainty associated with estimating the WACC.

In our opinion, the QCA's decision to consider alternative methods, including the approaches of other regulators, is a constructive development.

2.1 QCA's methodology for estimating the WACC

The QCA adopts a nominal vanilla WACC as its estimate of the rate of return. A nominal vanilla WACC is a weighted average of the cost of the return required by a benchmark efficient entity's debt and equity costs. The weighting of debt and equity is determined by the QCA's gearing estimate, which is based on its benchmark efficient entity definition. Gearing is discussed in more detail in section 2.2.

[6] QCA, *Aurizon Network's 2017 draft access undertaking | Final decision,* December 2018, p 74.

[7] QCA, *Queensland Rail's 2020 draft access undertaking | Draft decision,* April 2019, p 25.

[8] QCA, *Queensland Rail's 2020 draft access undertaking | Draft decision,* April 2019, p 24.

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

2.1.1 Cost of equity

The QCA relies solely on the Sharpe-Lintner capital asset pricing model (SL CAPM) to estimate the cost of equity. The SL CAPM comprises three elements, ie:

- the risk-free rate;
- the market risk premium (MRP); and
- the equity beta.

The following sections detail the QCA's methodology for estimating each of these elements.

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 bonds using the 20[9] business days preceding the start of the new access undertaking (a place holder period is used in the draft decision).

The use of a ten-year Commonwealth bond 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.

Market risk premium

The QCA's approach to estimating the MRP involves a variety of estimation techniques, in which it weights the evidence of each base on their relative strengths and weaknesses. In particular, the QCA has regard to five methods:[10]

- the Ibbotson method, which emphasises historical excess returns;
- the Siegal method, which emphasis 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
- 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:[11]

- 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 indicates that the QCA primarily has a regard to a combination of historical excess returns and forward-looking approaches.

[9] The QCA notes that it is open to extending the averaging period to 40 days, see: QCA, *Queensland Rail's 2020 draft access undertaking | Draft decision,* April 2019, p 33.

[10] QCA, *Queensland Rail's 2020 draft access undertaking | Draft decision,* April 2019, p 38.

[11] QCA, *Queensland Rail's 2020 draft access undertaking | Draft decision,* April 2019, p 39 (footnote 82).

Equity beta

The QCA estimates the equity beta through the use of a comparator set of publicly listed companies. Using this comparator set, the QCA estimates the asset beta for each firm with reference to both weekly and monthly data over a ten-year period. This process generates a range of asset betas which are subsequently re-levered using the benchmark gearing and Conine formula. The equity beta is then selected from this range of estimates.

2.1.2 Cost of debt

The QCA has regard to three factors when estimating the cost of debt:

- the risk-free rate;
- the debt risk premium; and
- debt transaction costs.

The following sections detail the QCA's methodology for estimating each of these components.

Risk-free rate

To estimate the risk-free rate in the context of the cost of debt, the QCA adopts an identical methodology to that employed in the context of the cost of equity. Specifically, the QCA estimates the prevailing risk-free rate using the 'on-the-day' approach using Commonwealth government bonds with a ten-year tenor.

Debt risk premium

The QCA has traditionally estimated the debt risk premium through an econometric approach. One of the key choices affecting the econometric approach is the averaging period, since this decision determines the bond sample. Given the need for consultation on this issue, the averaging period is typically announced in advance of the draft decision. However, Queensland Rail had not nominated an averaging period to the draft decision. It follows that the QCA could not undertake consultation with stakeholders regarding the bond sample and econometric specification, meaning an alternative approach to estimating the debt risk premium was required.

In lieu of an econometric approach, the QCA considered that a viable alternative was to use third-party data from the Reserve Bank of Australia (RBA) and Bloomberg to estimate the debt risk premium.[12] In particular, the QCA used an 'on-the-day' approach to calculate the debt risk premium in each dataset and determine its final estimate by averaging the two.

Debt transaction costs

To ensure consistency with its estimate of the debt risk premium, the QCA solely considers the Australian corporate bond market when assessing the benchmark debt-financing transaction costs.

2.1.3 Discretion in the QCA's WACC methodology

The above discussion of the QCA's WACC methodology illustrates that it necessarily exercises considerable discretion in its determination of a bottom-up WACC for Queensland Rail. The key areas where the QCA has exercised discretion are:

- its sole reliance on the SL CAPM;

[12] QCA, *Queensland Rail's 2020 draft access undertaking | Draft decision,* April 2019, p 34.

- the significant weight placed on historical returns when calculating the MRP, potentially leading to low beta bias; and
- the adoption of a prevailing debt risk premium that, in order for Queensland Rail to match, would require exposing Queensland Rail to an unacceptable level of refinancing risk, where a trailing average debt risk premium would more closely align to a debt strategies of benchmark efficient entity that seeks to minimise refinancing risk.[13]

The following sections provide more detail on each of these key areas of discretion.

Reliance on the SL CAPM

The QCA employs SL CAPM as its sole methodology for calculating the cost of equity, with other approaches such as the Fama-French three factor model ignored. A potential issue with this reliance is that over the past 50 years it has become well known that empirical versions of the SL CAPM tend to underestimate the returns to low-beta assets and overestimate the returns to high-beta assets.[14] This empirical regularity suggests that the SL CAPM will tend to underestimate the cost of equity for a low-beta asset such as regulated rail operators.

Despite these shortcomings, the QCA recently reiterated its preference to use the SL CAPM when estimating the return on equity:[15]

> […] the QCA is not of the view that the SL [Sharpe-Lintner] CAPM model is deficient – and that another model is better – at this time.

Emphasis on historical returns in calculating the MRP

The QCA's methodology for estimating the MRP places a significant weight on the Ibbotson method, which relies upon historical excess returns to estimate the MRP. However, regulated firms have expressed the view that emphasising historical returns does not reflect the fact that the MRP varies over time. For instance, APA has argued that a reliance on historical returns results in MRP estimates that vary slowly over time, given they stem from changes to historical returns and the risk-free rate.[16] It follows that relying on historical excess returns may not be reflective of prevailing market conditions and, as such, yield an estimate of the MRP that leads to a rate of return that does not sufficiently compensate an efficient benchmark entity.

Debt risk premium

The QCA adopts the on-the-day approach as part of its determination of the debt risk premium. However, implicit in the on-the-day approach is that the benchmark efficient entity would issue all of its debt at the beginning of the regulatory period. Such a debt management strategy would expose a firm to a high degree of refinancing risk.

This characteristic of the on-the-day approach was one of the primary reasons that the AER transitioned to a trailing average approach as part of its 2013 rate of return guideline.[17] In particular, the AER cited the following benefits of the trailing average approach:[18]

[13] We note that the QCA expressed that it is open to considering alternative regulatory debt management strategy benchmarks, see: QCA, *Queensland Rail's 2020 draft access undertaking | Draft decision,* April 2019, p 36.

[14] 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.

[15] QCA, *Aurizon Network's 2017 draft access andertaking | Final Decision*, December 2018, appendix F, p 123.

[16] APA, *Victorian transmission system access arrangement submission,* 3 January 2017, p 146.

[17] AER, *Explanatory Statement | Rate of Return Guideline,* December 2013.

[18] AER, *Explanatory Statement | Rate of Return Guideline,* December 2013, pp 108-110.

- it enables the benchmark efficient entity to manage interest rate risk arising from the potential mismatch between the regulatory return on debt allowance and the expected return on debt of a service provider without exposing itself to substantial refinancing risk;
- it smooths changes in the return on debt over time, potentially leading to lower price volatility;
- it minimises the consequences of a single measurement error; and
- it may be more reflective of the actual debt management practices of non-regulated entities and, as such, better represent efficient financing practice.

2.2 QCA's WACC parameters for Queensland Rail

The QCA adopts the following business specific WACC parameters for Queensland Rail:[19]

- gearing of 40 per cent debt and 60 per cent equity;
- an asset beta of 0.50, which when re-levered using the Conine formula and benchmark gearing yields an equity beta of 0.71; and
- a BBB credit rating.

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

2.2.1 Gearing

The QCA determined the 40 per cent benchmark debt gearing ratio drawing upon an assessment of comparator companies. In particular, the QCA's consultant Incenta viewed regulated energy and water businesses, as well as toll roads were likely the best comparators for Queensland Rail's West Moreton coal system.[20] Based on this assessment, Incenta calculated the average and median gearing of the sample of comparators and deemed that a gearing of 40 per cent was appropriate. The QCA accepted Incenta's analysis and noted its consistency with the QCA's own first principles analysis.[21]

2.2.2 Asset and equity beta

For the 2020 DAU draft decision, the QCA determined that the most appropriate comparator set for Queensland Rail was regulated energy and water businesses. In developing the comparator set, the QCA had regard to a variety of determinants of systematic risk including:[22]

- market power and the regulatory framework;
- income elasticity of demand and the nature of the customer;
- asset stranding risk;
- contracting;
- operating leverage;
- growth options; and
- pricing structure.

Using this comparator set, the QCA estimates the asset beta for each firm with reference to both weekly and monthly data over a ten-year period. This process generates a range of asset betas which are subsequently

[19] QCA, *Queensland Rail's 2020 draft access undertaking | Draft decision,* April 2019, p 27.
[20] QCA, *Queensland Rail's 2020 draft access undertaking | Draft decision,* April 2019, p 30.
[21] QCA, *Queensland Rail's 2020 draft access undertaking | Draft decision,* April 2019, p 30.
[22] QCA, *Queensland Rail's 2020 draft access undertaking | Draft decision,* April 2019, p 134.

re-levered using the benchmark gearing and Conine formula. The equity beta is then selected from this range of estimates. To further very the suitability of the determined asset beta, the QCA also compared its determination to other Australian regulators.

2.2.3 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 Queensland Rail. To do so, Incenta took the determined benchmark gearing level and applied the Standard and Poor's credit rating methodology. However, since Standard and Poor's has not assessed Queensland Rail, Incenta determined the credit rating through a comparator analysis. Based on this analysis, the QCA determined a benchmark credit rating of BBB.

3. Approaches by other regulators

In this section we review the approaches adopted to the determination of the allowed rate of return by other Australian regulators, including the Independent Pricing and Regulatory Tribunal (IPART), the Australian Competition and Consumer Commission (ACCC) and the Economic Regulation Authority of Western Australia (ERA).

Our review includes an explanation of the methods for deriving the various WACC parameters (and their values) over the assessment period adopted by the QCA for Queensland Rail. We also include an analysis of the range of potential WACCs for Queensland Rail using either the parameters estimated and/or the framework utilised by the relevant regulator.

3.1 Independent Pricing and Regulatory Tribunal (IPART)

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

3.1.1 WACC methodology

IPART's WACC methodology has been continually evolving and has been the subject to two reviews – one in 2013 and another in 2017. The latest review has maintained the core elements of IPART's methodology, however, there has been a refinement of the approach.

IPART's WACC methodology centres around its definition of the benchmark efficient entity, ie, 'a firm operating in a competitive market and facing similar risks to the regulated business'.[23] This definition of the efficient benchmark entity is distinct to those employed by other regulators such as the AER and the QCA.

Other components of IPART's WACC methodology are also unique. In particular, IPART's approach gives rise to a WACC range bounded by an estimate based on current market data estimated over a 40-day period, and a separate estimate developed for 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 retains the discretion to move away from the mid-point when market conditions are not normal.[24]

Cost of equity

Similar to the QCA, IPART uses the SL CAPM to calculate the cost of equity.[25] However, a unique feature of IPART's methodology is that it involves estimating 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 selection of proxy companies.

[23] IPART, *Review of our WACC method,* February 2018, p 19.

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

[25] 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.

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.[26]

Risk-free rate

IPART uses data on coupon-paying Commonwealth government bonds to calculate the risk-free rate, with varying averaging approaches to determining 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.

In terms of 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 the historical MRP is to use a range of values that have a midpoint of six per cent. The rationale of this methodology is that over lengthy periods the average MRP has been steady at six per cent.[27]

The calculation of the prevailing MRP encompasses extensive analysis. Specifically, IPART determines a single point estimate of the MRP based on the following six methods:[28]

- 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.

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 in calculating 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.

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:[29]

- 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

[26] IPART, *Review of our WACC method,* February 2018, p 47.

[27] IPART, *Review of our WACC method,* February 2018, p 51.

[28] IPART, *Review of our WACC method,* February 2018, p 52.

[29] IPART, *Review of our WACC method,* February 2018, p 52.

- give stakeholders the opportunity to propose additional comparable industries that meet the criteria, but not individual stocks.

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.

Cost of debt

IPART calculates the cost of debt as the sum of the risk-free rate and the debt risk premium, as well as an allowance for 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 corporate rated bond yields and the ten-year Commonwealth government bonds.

Analogously to the cost of equity, 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.[30]

Until recently, the cost of debt determined at the beginning of the regulatory period would apply for its duration. However, as part of the 2017 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 preceding five years. The cost of each tranche of debt (ie, each year's debt) will be calculated by averaging a 40-day period determined by IPART.[31]

Gearing

IPART re-estimates the gearing of the benchmark entity at each price review to inform its assessment of whether the current parameters remain appropriate. However, the review of the gearing does not necessarily imply that the estimate will be altered, rather, it will only be altered where there is sufficient evidence to support such a change.

3.1.2 Impact of IPART's methodology

Table 3.1 provides an indication of how the IPART WACC methodology would affect Queensland Rail's rate of return. In particular, each of the market parameters have been estimated according to IPART's methodology. However, the business specific parameters (ie, equity beta, gearing and the relevant credit rating) have been maintained from the Queensland Rail draft decision.

Table 3.1 illustrates that the IPART methodology leads to a WACC of 7.28 per cent – 1.26 percentage points above Queensland Rail's WACC in the draft decision. The key features of IPART's methodology that generate this increase are:

- the adoption of a long term average WACC encapsulates past higher risk-free rates and cost of debt, together with a higher MRP;

[30] 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.

[31] IPART, *Review of our WACC method,* February 2018, p 32.

- the current WACC uses a forward looking estimate of the MRP, with the latest estimate being 8.6 per cent;[32] and
- the adoption of a gamma value of 0.25.

Table 3.1: Adopting IPART's methodology with the QCA's business specific parameters

WACC component	QR draft decision	IPART methodology, QCA parameters
Cost of debt		
Risk-free rate	2.28%	3.15%
Debt risk premium	2.28%	2.50%
Debt refinancing costs	0.108%	-[a]
Return on debt	4.67%	5.65%[b]
Cost of equity		
Risk-free rate	2.28%	3.15%
Market risk premium	6.50%	7.30%
Equity beta	0.71	0.71
Return on equity	6.92%	8.36%
Gearing		
Debt proportion	40%	40%
Equity proportion	60%	60%
WACC	**6.02%**	**7.28%**

Source/notes: The QCA's bottom-up approach parameters are drawn from the Queensland Rail draft decision, see: QCA, Queensland Rail's 2020 Draft Access Undertaking | Draft decision, April 2019. The IPART parameters are taken from its February 2017 WACC parameter update, see: IPART, WACC biannual update, February 2018.
[a] IPART allows debt refinancing costs of 12.5 basis points. However, its illustrative calculation of the WACC suggests it is incorporated into the debt risk premiums, ie, it does not have its own line item in the calculation.
[b] Noting that IPART would update the cost of debt annually throughout the regulatory period

3.1.3 IPART assessment of rail risk characteristics

One of the roles of IPART is to enforce 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).

[32] IPART, *WACC biannual update,* February 2019, p 32.

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 transportation and other freight.

Only RailCorp is covered by the IPART review, with the Australian Competition and Consumer Commission (ACCC) responsible for the ARTC network in the Hunter Valley. IPART's review is required to be undertaken every five years, with the draft decision to its latest review published in April 2019.

2019 draft decision

As discussed in section 3.1.1, 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 draft determination for RailCorp's Hunter Valley rail network, IPART determined:[33]

- a gearing structure of 45 per cent debt and 55 per cent equity;
- an equity beta of one; and
- a credit rating of BBB rated bonds.

The arguments underpinning each of these draft determinations are detailed below.

Gearing and equity beta

IPART determined RailCorp's gearing and equity beta using the following process:[34]

- compiling a list of comparable transport companies;
- de-levering each company's equity beta – generating an asset beta to re-lever with the benchmark entity's gearing and corporate tax rate;
- calculating the median, re-levered equity beta and gearing level for the sample; and
- comparing the results to the equity betas of other industries as well as those determined by other regulators.

Credit rating

IPART has conventionally viewed BBB rated bonds to be the most appropriate credit rating for the benchmark efficient entity and reaffirmed this view in its 2018 WACC review.[35] IPART's preference for using BBB rated bonds stems from its view that the rating will, on average, provide an efficient estimate of the WACC.

Adopting the 2019 draft decision parameters

Table 3.2 demonstrates the effect that adopting IPART's assessment of rail risk characteristics would have on Queensland Rail's WACC, relative to the QCA bottom-up approach in the draft decision. Two alternative estimates have been calculated:

- Queensland Rail's potential WACC maintaining the QCA's methodology while adopting IPART's rail parameters; and
- Queensland Rail's potential WACC when adopting IPART's overall rate of return methodology (ie, adopting IPART's calculation of market-based parameters as well as the business specific parameters).

[33] For the gearing level and equity beta, see: IPART, *NSW Rail Access Undertaking – review of the rate of return and remaining mine life | Draft report,* April 2019, p 8. For the credit rating, see: IPART, *Review of our WACC method,* February 2018, p 45.

[34] IPART, *NSW Rail Access Undertaking – review of the rate of return and remaining mine life | Draft report,* April 2019, pp 9-10.

[35] IPART, *Review of our WACC method,* February 2018, p 45.

Both alternative approaches to calculating the WACC result in a higher rate of return relative to the QCA bottom-up estimate, with a greater difference when adopting the IPART rate of return framework in full. These differences are driven by higher cost of debt (owing to a greater risk-free rate and debt risk premium), as well as the greater cost of equity stemming from a higher equity beta and MRP.

Table 3.2 illustrates that adopting IPART's assessment of the risk characteristics of rail businesses would lead to a 93 basis point increase in the WACC. However, in totality, adopting IPART's rate of return framework increases the WACC by 2.29 percentage points relative to the QCA bottom-up estimate.

Table 3.2: Impact of adopting IPART's rail parameters and overall rate of return methodology on Queensland Rail's WACC

WACC component	QR draft decision	QCA methodology, IPART parameters	Overall rate of return
Cost of debt			
Risk-free rate	2.28%	2.28%	3.15%
Debt risk premium	2.28%	2.28%	2.50%
Debt refinancing costs	0.108%	0.108%	-[a]
Return on debt	4.67%	4.67%	5.65%[b]
Cost of equity			
Risk-free rate	2.28%	2.28%	3.15%
Market risk premium	6.50%	6.50%	7.30%
Equity beta	0.71	1.00	1.00
Return on equity	6.92%	8.78%	10.45%
Gearing			
Debt proportion	40%	45%	45%
Equity proportion	60%	55%	55%
WACC	**6.02%**	**6.93%**	**8.29%**

Source/notes: The QCA's bottom-up approach parameters are drawn from the Queensland Rail draft decision, see: QCA, Queensland Rail's 2020 Draft Access Undertaking | Draft decision, April 2019. The IPART parameters are taken from its February 2017 WACC parameter update, see: IPART, WACC biannual update, February 2018.
[a] IPART allows debt refinancing costs of 12.5 basis points. However, its illustrative calculation of the WACC suggests it is incorporated into the debt risk premiums, ie, it does not have its own line item in the calculation.
[b] Noting that IPART would update the cost of debt annually throughout the regulatory period

3.2 Australian Competition and Consumer Commission

The ACCC is responsible for assessing undertakings made under the National Access Regime in Part IIIA of the *Competition and Consumer Act 2010*. This includes assessing undertakings from the Australian Rail Track Corporation (ARTC) for its:

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

The ARTC's HVCN is similar to that of Queensland Rail since it transports a mixture of thermal and metallurgical coal, though thermal coal accounts for the majority of the export volume.[36]

3.2.1 WACC methodology

Cost of equity

The ACCC calculates the cost of equity using the SL CAPM. The sections below set out the ACCC's methodology for estimating each component of the Sharpe-Lintner CAPM.

Risk-free rate

The ACCC calculates the risk-free rate as the 20-day average of ten-year Commonwealth government bond yields using Reserve Bank of Australia (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:[37]

- 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 the midpoint of six per cent.

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.

[36] ACCC, *Australian Rail Track Corporation's 2017 Hunter Valley access undertaking | Draft decision,* 20 April 2017, p 6.

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

Equity 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.

Cost of debt

The ACCC calculates the cost of debt as the sum of the:

- risk-free rate;
- debt risk premium; and
- debt issuance costs.

The following sections set out each of these components of the cost of debt are calculated.

Risk-free rate

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

Debt risk premium

The ACCC calculates the debt risk premium as the difference between the bond yield and the risk-free rate. To calculate the bond yield, the ACCC:

- uses both RBA (containing yields for A and BBB rated bonds over various tenors) and Bloomberg (estimates of BBB rated Australian corporate bonds) 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.

Market value of debt and equity

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.

3.2.2 Impact of the ACCC's methodology

Table 3.3 provides an indication of how the ACCC's WACC methodology would affect Queensland Rail's rate of return. Note that the QCA in its draft decision for Queensland Rail has adopted an identical methodology to the ACCC in estimating the risk-free rate and debt risk premium. As such, we have adopted the QCA's estimates of these parameters when examining the impact of the ACCC's methodology. Further, the business specific parameters (ie, equity beta, gearing and the relevant credit rating) have been maintained from the QCA's draft decision.

Table 3.3 illustrates that adopting the ACCC's approach to estimating the market parameters would decrease the WACC by 21 basis points. The decrease is owing to the close alignment of the ACCC's methodology with that of the QCA in the Queensland Rail draft decision. The key differences are that the ACCC provides a lesser allowance for debt refinancing costs, while also estimating a lower MRP. These differences generate a lower cost of debt and equity respectively – generating the reduction in Queensland Rail's WACC.

Table 3.3: Adopting the ACCC's methodology with the QCA's Queensland Rail business specific parameters

WACC component	QR draft decision	ACCC methodology, QCA parameters
Cost of debt		
Risk-free rate	2.28%	2.28%
Debt risk premium	2.28%	2.28%
Debt refinancing costs	0.108%	0.095%
Return on debt	4.67%	4.66%
Cost of equity		
Risk-free rate	2.28%	2.28%
Market risk premium	6.50%	6.00%
Equity beta	0.71	0.71
Return on equity	6.92%	6.56%
Gearing		
Debt proportion	40%	40%
Equity proportion	60%	60%
WACC	**6.02%**	**5.80%**

Source/notes: The QCA's bottom-up approach parameters are drawn from the Queensland Rail draft decision, see: QCA, Queensland Rail's 2020 Draft Access Undertaking | Draft decision, April 2019.

3.2.3 ACCC assessment of rail risk characteristics

This section provides an overview of the ACCC's most recent determinations for the ARTC's HVCN and interstate networks. Note that the discussion below pertains to the draft decisions, since the application for each access undertaking has been withdrawn. This section also details how the rail parameters determined by the ACCC would affect Queensland Rail's WACC under both the QCA's methodology and adopting the ACCC's methodology in totality.

Hunter Valley draft decision

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 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 firm. In reaching this conclusion, the ACCC had regard to:[38]

- the ACCC's position paper regarding the 2010 Hunter Valley access undertaking;
- the 2014 Aurizon DAU; and
- the agreement between the 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 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.

These considerations, coupled with the fact that the ARTC and HRATF had agreed upon the gearing of 52.5 per cent, led the ACCC to deem such a capital structure appropriate.

Equity beta

In determining an appropriate asset beta (and therefore equity beta) for the ARTC, the ACCC considered:[39]

- 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 business 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 subject to less cyclicality, 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 the ARTC, relative to the 2010 position paper. Ultimately, it was deemed that there had not been a substantial change in the risk profile of the 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 the ARTC, the ACCC considered the QCA's 2014 determination. The ACCC formed the view that the 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.

[38] ACCC, *Australian Rail Track Corporation's 2017 Hunter Valley access undertaking | Draft decision,* 20 April 2017, p 164.

[39] ACCC, *Australian Rail Track Corporation's 2017 Hunter Valley access undertaking | Draft decision,* 20 April 2017, p 154.

Credit rating

The ACCC determined the credit rating of the benchmark efficient entity with reference to:[40]

- 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.

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.

Adopting the ACCC's HVCN parameters

Table 3.4 illustrates the effect of adopting the ACCC's methodology for calculating market-based parameters, as well as adopting their overall rate of return methodology. The table contains a comparison of:

- the QCA's bottom-up approach for Queensland Rail;
- maintaining the QCA's WACC methodology but adopting the ACCC's business specific parameters; and
- adopting both the ACCC's methodology and business specific parameters (ie, the overall rate of return).

In the first instance, adopting the QCA's methodology with the ACCC's business specific parameters leads to an increase in the WACC of 44 basis points (relative to the Queensland Rail draft decision). This increase is driven by the increase in the return on equity as a result of the higher equity beta.

Turning to adopting the ACCC's overall rate of return framework, Queensland Rail's WACC increases by 21 basis points. As noted above, the ACCC and QCA have adopted identical methods for estimating the risk-free rate and debt risk premium. It follows that the increase in the WACC is again driven by the higher equity beta. However, the increase is more muted than solely adopting the ACCC's business specific parameters, since the ACCC provides a lower allowance for debt refinancing costs, while also estimating a lower MRP.

[40] ACCC, *Australian Rail Track Corporation's 2017 Hunter Valley access undertaking | Draft decision,* 20 April 2017, p 140.

Table 3.4: Impact of adopting the ACCC's rail parameters and overall rate of return methodology on Queensland Rail's WACC – HVCN draft decision

WACC component	QR draft decision	QCA methodology, ACCC parameters	Overall rate of return
Cost of debt			
Risk-free rate	2.28%	2.28%	2.28%
Debt risk premium	2.28%	2.28%	2.28%
Debt refinancing costs	0.108%	0.108%	0.095%
Return on debt	4.67%	4.67%	4.66%
Cost of equity			
Risk-free rate	2.28%	2.28%	2.28%
Market risk premium	6.50%	6.50%	6.00%
Equity beta	0.71	0.94	0.94
Return on equity	6.92%	8.39%	7.92%
Gearing			
Debt proportion	40%	52.5%	52.5%
Equity proportion	60%	47.5%	47.5%
WACC	**6.02%**	**6.44%**	**6.21%**

Source/notes: The QCA's bottom-up approach parameters are drawn from the Queensland Rail draft decision, see: QCA, Queensland Rail's 2020 Draft Access Undertaking | Draft decision, April 2019. The ACCC's business specific parameters are taken from its draft decision regarding its ARTC HVCN draft decision, see: ACCC, Australian Rail Track Corporation's 2017 Hunter Valley access undertaking | Draft decision, 20 April 2017

Interstate draft decision

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 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 views at the time of the 2008 access undertaking.[41] 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 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.

Equity beta

In determining an appropriate asset beta (and therefore equity beta) of ARTC's interstate network, the ACCC had regard to:[42]

- 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.

Adopting the ACCC's interstate parameters

Table 3.5 illustrates the effect of adopting the ACCC's methodology for calculating market-based parameters, as well as adopting their overall rate of return methodology. The table contains a comparison of:

- the QCA's bottom-up approach for Queensland Rail;
- maintaining the QCA's WACC methodology but adopting the ACCC's business specific parameters; and
- adopting both the ACCC's methodology and business specific parameters (ie, the overall rate of return).

In the first instance, adopting the QCA's methodology with the ACCC's business specific parameters leads to an increase in the WACC of 137 basis points, or 1.37 percentage points, relative to the Queensland Rail draft decision. This increase is driven by the increase in the return on equity as a result of the higher equity beta.

Turning to adopting the ACCC's overall rate of return framework, the WACC increases by 107 basis points, or 1.07 percentage points, relative to the Queensland Rail draft decision. As noted above, the ACCC and QCA have adopted identical methods for estimating the risk-free rate and debt risk premium. It follows that the increase in the WACC is again driven by the higher equity beta. However, the increase is more muted than solely adopting the ACCC's business specific parameters, since the ACCC provides a lower allowance for debt refinancing costs, while also estimating a lower MRP.

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

[42] ACCC, *Australian Rail Track Corporation's 2018 Interstate Access Undertaking | Draft decision*, 20 December 2018, p 136.

Table 3.5: Impact of adopting the ACCC's rail parameters and overall rate of return methodology on Queensland Rail's WACC – interstate draft decision

WACC component	QR draft decision	QCA methodology, ACCC parameters	Overall rate of return
Cost of debt			
Risk-free rate	2.28%	2.28%	2.28%
Debt risk premium	2.28%	2.28%	2.28%
Debt refinancing costs	0.108%	0.108%	0.095%
Return on debt	4.67%	4.67%	4.66%
Cost of equity			
Risk-free rate	2.28%	2.28%	2.28%
Market risk premium	6.50%	6.50%	6.00%
Equity beta	0.71	1.2	1.2
Return on equity	6.92%	10.08%	9.48%
Gearing			
Debt proportion	40%	50%	50%
Equity proportion	60%	50%	50%
WACC	**6.02%**	**7.37%**	**7.07%**

Source/notes: The QCA's bottom-up approach parameters are drawn from the Queensland Rail draft decision, see: QCA, Queensland Rail's 2020 Draft Access Undertaking | Draft decision, April 2019. The ACCC's business specific parameters are taken from its draft decision regarding its ARTC interstate draft decision, see: ACCC, Australian Rail Track Corporation's 2018 Interstate Access Undertaking | Draft decision, 20 December 2018

3.3 Economic Regulation Authority of Western Australia

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. The ERA's current purview extends to 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).[43] The ERA makes a determination for each of these rail networks. However, for the purposes of our analysis we have not considered the determination for the Public Transport Authority. The basis for this exclusion is the fact that the public transport network is unlikely comparable to Queensland Rail's West Moreton system. This is

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

consistent with the QCA's view that the risks on Queensland Rail's coal network are likely to be substantially different than those in other parts of its network (such as the public transport component).[44]

Given the ERA's role as a rail regulator, the following sections first set out its approach to estimating common market parameters (ie, the risk-free rate and market risk premium) and then sets out in detail the ERA's consideration of rail operator specific parameters. Throughout our analysis we focus on the freight and iron ore transportation networks regulated by the ERA.

Common market parameters

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 choice of the ten-year tenor is motivated by the ERA's view that it is consistent with a long term estimate of the WACC.[45]

The risk-free rate is re-estimated for each annual determination of the WACC. The ERA adopts the 'on-the-day' approach to calculating the risk-free rate, owing to the fact that Commonwealth bond data does not tend to exhibit a trend that returns to a long run average.[46]

Market risk premium

In its past determinations, the ERA had relied on a combination of three models to determine its estimate of the MRP, ie:[47]

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

However, recent criticisms regarding the ERA's analysis of the MRP using the Wright method have caused the ERA to abandon its use in determining the MRP.[48] It follows that the ERA is now proposing to calculate the MRP from a range that is bounded between the Ibbotson approach and the DGM. However, weaknesses associated with the DGM approach throughout the consultation process have led the ERA to place greater weight on the historical estimate (ie, the Ibbotson approach) as opposed to the forward-looking approach of the DGM.[49]

Table 3.6 illustrates the effect of adopting the ERA's market parameter estimates while preserving the QCA's draft determination of business specific parameters. Note that since the ERA determines different credit ratings for each regulated railway, market driven parameters such as the debt risk premium differ across each regulated rail operator. To generate a single estimate, we have calculated the debt risk premium as equal to the average of that for Arc Infrastructure and Pilbara Railways. This calculation is done to approximate a BBB rating, since these railways have credit ratings of BBB+ and BBB- respectively.

[44] QCA, *Queensland Rail's 2020 draft access undertaking | Draft decision,* April 2019, p 26.

[45] ERA, *Method for determining the weighted average cost of capital for railway networks,* May 2018, para 53, p 10.

[46] ERA, *2017 weighted average cost of capital for the freight and urban rail networks and for Pilbara railways,* 6 October 2017, p 10.

[47] 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.

[48] ERA, *Method for determining the weighted average cost of capital for railway networks,* May 2018, para 93, p 16; and 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, para 234, p 51.

[49] 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, para 247, p 54.

Table 3.6: Adopting the ERA's methodology with the QCA's business specific parameters

WACC component	QR draft decision	ERA methodology, QCA parameters
Cost of debt		
Risk-free rate	2.28%	2.76%
Debt risk premium	2.28%	1.97%
Debt refinancing costs	0.108%	0.10%
Return on debt	4.67%	4.83%
Cost of equity		
Risk-free rate	2.28%	2.76%
Market risk premium	6.50%	5.90%
Equity beta	0.71	0.71
Return on equity	6.92%	6.97%
Gearing		
Debt proportion	40%	40%
Equity proportion	60%	60%
WACC	**6.02%**	**6.12%**

Source/notes: The QCA's bottom-up approach parameters are drawn from the Queensland Rail draft decision, see: QCA, Queensland Rail's 2020 Draft Access Undertaking | Draft decision, April 2019. The ERA's market parameters for each regulated railway have been drawn from its latest draft determination, see: 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. The debt risk premium has been calculated as the average of Arc Infrastructure and Pilbara Railways to approximate the BBB rating (these rail operators have credit ratings of BBB+ and BBB- respectively)

The effect of adopting the ERA's methodology is to increase Queensland Rail's WACC by eight basis points. This increase is driven by marginally higher returns on both debt and equity, relative to the QCA's bottom-up approach.

Rail specific characteristics

Cost of equity

Consistent with other Australian regulators, the ERA calculates the cost of equity using the Sharpe-Lintner CAPM. However, the ERA has previously noted that it reserves the right to consider and utilise alternative models to inform its cost of equity decision.[50] For instance, in its 2015 rail decision, the ERA accepted that

[50] ERA, *Method for determining the weighted average cost of capital for railway networks,* May 2018, para 76, p 14.

the DGM and the Black CAPM may be used to determine the cost of equity.[51] However, the ERA reaffirmed in the 2019 draft decision that it would place full weight on the SL CAPM in determining the cost of equity.[52]

The following sections set out the ERA's methodology for estimating each rail operator specific component of the SL CAPM.

Equity beta

The ERA is of the view that empirical evidence is required to inform its judgement of the appropriate estimate of the equity beta. This view reflects the ERA's position that there is no *a priori* expectation for neither the equity beta of a regulated railway network, nor its efficient benchmark counterpart.[53]

Consequently, the equity beta is required to be estimated using historical data in order to inform the appropriate range of a benchmark efficient entity's equity beta. In developing the benchmark sample, the ERA endeavours to develop a sample that reflects the regulated rail networks along two dimensions:[54]

- estimates of the asset beta should provide some relevance to the economy in which the benchmark efficient entity operates (ie, Australia); and
- estimates should provide some relevance to the industry/sector in which the benchmark efficient entity is operating (ie, the rail industry).

Given the lack of comparable rail businesses operating in Australia compromises an empirical approach, the ERA develops a benchmark sample that also includes rail operators in Europe and the US.

Drawing upon the sample of benchmark firms, the ERA estimates a regression of the observed raw returns to asset *i* in year *t*, with a constant specific to asset *i* and individual time residuals. To arrive at an estimate of each firm's asset beta the estimated equity beta is de-levered using the Brealey-Myers formula. This adjustment is undertaken for each benchmark firm. The required equity beta is then calculated using the assumed benchmark gearing level to re-lever the asset beta to the assumed level of gearing in the Brealey-Myers formula.

Applying this process to each of the rail operators regulated by the ERA resulted in the following equity and asset betas:[55]

- Arc Infrastructure – an asset beta of 0.70 and an equity beta of 0.90; and
- Pilbara railways – an asset beta of 1.00 and an equity beta of 1.30.

Cost of debt

The ERA calculates the cost of debt as the sum of the:

- risk-free rate;
- debt risk premium; and
- debt issuance costs.

[51] ERA, *Method for determining the weighted average cost of capital for railway networks,* May 2018, para 77, p 14.

[52] 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, para 181, p 39.

[53] 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, para 262, p 57.

[54] 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, para 263, p 57.

[55] 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, para 311, p 67.

The following sections set out the ERA's methodology for estimating each component of the cost of debt, with the exception of the risk-free rate which is discussed above.

Debt risk premium

The ERA estimates the debt risk premium to be consistent with a ten-year term, since the ERA considers this tenor as consistent with the long term nature of rail assets, while also being the longest term for which reliable data exists.[56]

The ERA uses its own methodology that it has developed estimate the debt risk premium. Referred to as the revised bond yield approach, the method involves deriving the debt risk premium from the observed yields of corporate bonds (with the data drawn from Bloomberg) that qualify for inclusion in the benchmark sample. In particular, the ERA calculates the debt risk premium by:[57]

- determining the benchmark sample, ie, identifying a sample of relevant corporate bonds that reflect the credit rating of the efficient benchmark entity;
- collecting data and converting yields to Australia dollar equivalents (inclusive of Australian swap rates);
- averaging yields over the averaging period;
- estimating curves applying the Gaussian Kernel, Nelson-Siegel and Nelson-Siegel-Svensson techniques;
- estimating the cost of debt; and
- calculating the debt risk premium.

For the 2019 draft determination, the ERA used the following samples of benchmark credit ratings, reflecting the fact that it assessed each railway to have a different benchmark efficient credit rating:[58]

- 46 bonds for the Arc Infrastructure BBB+ rated sample; and
- 21 bonds for the Pilbara railways BBB- rated sample.

Owing to the low sample sizes for each of the bonds, the ERA performed the following augmentations:[59]

- extending the Arc Infrastructure sample to BBB+ and BBB – increasing the sample to 85 bonds; and
- extending the Pilbara railways sample to include BBB – increasing the sample to 60 bonds.

A consequence of introducing bonds with a credit rating distinct from the benchmark efficient entity is that the resulting debt risk premium is biased. This bias may be upward bias in the case where lower rated bonds are added, whereas the debt risk premium would be biased downwards as higher rated bonds are added. If the augmented sample estimate is biased downward, the ERA adopts the highest estimate from this sample and averages it with the highest estimate from the benchmarked sample.

Applying this methodology, the ERA estimated debt risk premiums of:[60]

- 1.692 per cent for Arc Infrastructure; and

[56] 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 118-119, p 27.

[57] 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, para 133, p 30.

[58] 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, para 137, p 31.

[59] 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, para 138, p 31.

[60] 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, para 145, p 33.

- 2.244 per cent for Pilbara railways.

Debt issuance costs

The ERA provides an allowance of 0.1 per cent for debt raising costs, with a firm view that this allowance only applies to the direct costs of debt raising. The categories of debt raising which attracts the ERA's allowance include:[61]

- gross underwriting fees;
- legal and roadshow fees;
- company credit rating fees;
- issue credit rating fees;
- registry fees; and
- paying fees.

Applying the cost of debt methodology as a whole (ie, summing the risk-free rate, debt risk premium and debt issuance costs for each regulated railway), the ERA determined a cost of debt of:[62]

- 4.55 per cent for Arc Infrastructure; and
- 5.10 per cent for Pilbara railways.

Gearing

The ERA determines an appropriate gearing level by reference to a set of comparator companies for each of the regulated railways. The set of comparators is drawn from both domestic and international companies, with the final estimate being drawn from the range of gearing across the comparison sample. Undertaking this assessment for each regulated railway, the ERA determined in its 2019 draft decision a level of gearing of:[63]

- 25 per cent debt and 75 per cent equity for Arc Infrastructure; and
- 20 per cent debt and 80 per cent equity for Pilbara railways.

Adopting the ERA's rail methodology and parameters

The following tables illustrate the effect of adopting the ERA's methodology for calculating market-based parameters, as well as their rail specific business parameters. While each rail network regulated by the ERA is considered, we view the Pilbara network as the most comparable to Queensland Rail. The basis of this view is that the sole function of the Pilbara rail network is to transport iron ore to the ports for export. This is analogous to Queensland Rail's primary role of transporting coal for export. Further, both of these goods are inputs into the production of steel.

The tables show that the largest increase in Queensland Rail's WACC occurs when maintaining the QCA's methodology for market-based parameters while adopting the ERA's rail business specific parameters for Pilbara Railways (see Table 3.7). In particular, this approach leads to an increase of Queensland Rail's WACC of 3.50 percentage points, relative to the QCA's bottom-up estimate in the draft decision. This increase is driven by the larger equity beta and the reduced level of gearing. While there is also a large

[61] 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, para 147, p 34.

[62] 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, p 86.

[63] 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, para 73, p 20.

increase in Queensland Rail's WACC adopting the ERA's overall rate of return methodology, the increase is more muted due to the lower MRP and therefore cost of equity.

Adopting the ERA's rail and market-based parameters for Arc Infrastructure also yields an increase in Queensland Rail's WACC (see Table 3.8). For instance, maintaining the QCA's methodology for market-based parameters while adopting the business parameters determined for Arc Infrastructure increases Queensland Rail's WACC by 1.24 percentage points, relative to the QCA's bottom-up estimate in the draft decision. This decreases slightly in the bottom-up WACC is 1.17 percentage points when adopting the ERA's overall rate of return methodology. The drivers of these increases are analogous to those discussed in relation to Pilbara railways. However, the increase is more muted given that Arc Infrastructure has a lower equity beta and a higher degree of gearing.

Table 3.7: Impact of adopting the ERA's rail parameters and overall rate of return methodology on Queensland Rail's WACC – 2018 Pilbara draft decision

WACC component	QR draft decision	QCA methodology, ERA parameters	Overall rate of return
Cost of debt			
Risk-free rate	2.28%	2.28%	2.76%
Debt risk premium	2.28%	2.28%	2.24%
Debt refinancing costs	0.108%	0.108%	0.100%
Return on debt	4.67%	4.67%	5.10%
Cost of equity			
Risk-free rate	2.28%	2.28%	2.76%
Market risk premium	6.50%	6.50%	5.90%
Equity beta	0.71	1.3	1.3
Return on equity	6.92%	10.73%	10.43%
Gearing			
Debt proportion	40%	20%	20%
Equity proportion	60%	80%	80%
WACC	**6.02%**	**9.52%**	**9.36%**

Source/notes: The QCA's bottom-up approach parameters are drawn from the Queensland Rail draft decision, see: QCA, Queensland Rail's 2020 Draft Access Undertaking | Draft decision, April 2019. The ERA's business and market parameters have been drawn from its latest rail draft determination, see: 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

Table 3.8: Impact of adopting the ERA's rail parameters and overall rate of return methodology on Queensland Rail's WACC – 2018 Arc Infrastructure draft decision

WACC component	QR draft decision	QCA methodology, ERA parameters	Overall rate of return
Cost of debt			
Risk-free rate	2.28%	2.28%	2.76%
Debt risk premium	2.28%	2.28%	1.69%
Debt refinancing costs	0.108%	0.108%	0.100%
Return on debt	4.67%	4.67%	4.55%
Cost of equity			
Risk-free rate	2.28%	2.28%	2.76%
Market risk premium	6.50%	6.50%	5.90%
Equity beta	0.71	0.9	0.9
Return on equity	6.92%	8.13%	8.07%
Gearing			
Debt proportion	40%	25%	25%
Equity proportion	60%	75%	75%
WACC	**6.02%**	**7.26%**	**7.19%**

Source/notes: The QCA's bottom-up approach parameters are drawn from the Queensland Rail draft decision, see: QCA, Queensland Rail's 2020 Draft Access Undertaking | Draft decision, April 2019. The ERA's business and market parameters have been drawn from its latest rail draft determination, see: 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.

4. Conclusion

The distinct and diverse approaches adopted by the 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 efficient benchmark entity to the methodology for determining an appropriate cost of debt and equity as well as the estimation of the constituent parameters.

A consequence of the varying approaches is that regulated entities with similar risk but under different regulatory regimes will have vastly different rates of return. It follows that the apparent evolution of the QCA's approach (ie, considering the approaches of other regulators) will have a potentially material effect on Queensland Rail's rate of return for the 2020 DAU and bring it into line with the returns provided by other regulators. As such, we support and seek to develop further the QCA's new approach to determining the rate of return. In particular, the QCA should consider the totality of the WACC methodologies applied by other regulators to rail businesses, rather than an ad hoc approach of examining particular components.

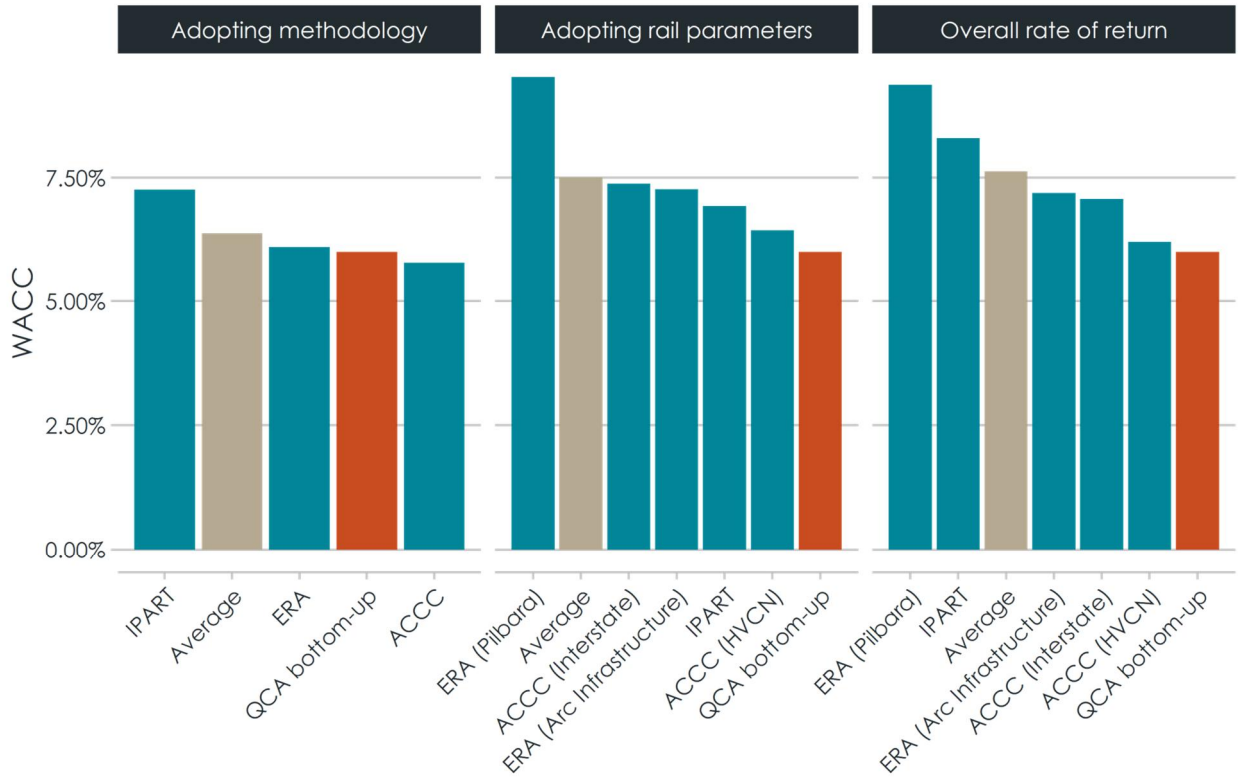
The analysis contained in this report suggests that a review of alternative WACC methodologies in totality would reveal that the QCA's current methodology results in a lower rate of return. Figure 4.1 demonstrates this result – the QCA's bottom-up estimate lies at the bottom of the range of WACCs estimated when drawing upon other regulators' rail parameters and their methodology in totality. Further, Figure 4.1 highlights the choices made by the QCA's including:

- the application of a WACC methodology that delivers below average rate of return, with the QCA's methodology delivering a WACC of 6.02 per cent while the average of other methodologies would result in a WACC of 6.40 per cent;
- the adoption of the lowest compensation for systematic risk, compared to that determined by other regulators for similar rail networks, with the QCA delivering 148 basis points less compensation for risk compared to the average of other regulators;[64] and
- the provision of the lowest overall rate of return and is 160 basis points less than the comparable average WACC allowed by other regulators for comparable rail networks.

The QCA's position in the distribution of these WACCs indicates that its methodology yields a systematically lower rate of return relative to other regulators.

[64] The average WACC using the QCA's methodology but the credit rating, gearing and beta determined by other regulators for similar rail networks is 7.50% compared to the QCA's draft decision for a WACC of 6.02%.

Figure 4.1: Comparison of WACC methodologies



Source: HoustonKemp analysis. The average excludes the QCA bottom-up estimate

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Attachment 4: HoustonKemp report – Evaluation of inflation forecasting methods

HOUSTONKEMP
Economists

Evaluation of inflation forecasting methods

A report for Queensland Rail

16 September 2019

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1. Introduction

Regulators require a forecast of consumer price inflation over the regulatory control period to convert costs and revenues expressed in constant price (or real) terms to current price (or nominal) values and to calculate the real revenue and price paths for regulated industries. Forecast inflation is also an important parameter in the determination of the timing of revenues that regulated businesses receive as a result of investing in necessary capital.

Under the Queensland Competition Authority's (QCA's) regulatory framework, forecast inflation determines the proportion of the return on assets that a regulated business expects to receive as revenues during the period and the proportion that is expected to be received in the form of a higher regulatory asset base (RAB), and so future revenues. Specifically, within the QCA's building block model, forecast inflation determines the amount deducted from the annual revenue requirement via the indexation building block. The deduction of revenue via the indexation building block is necessary to avoid a regulated business from being compensated for inflation twice, ie, through the use of a nominal rate of return and the indexation of the RAB for outturn inflation.

Consequently, when a forecast of inflation is accurate, the indexation building block (ie, the amount removed from the annual revenue requirement) matches the expected increase in the RAB and the regulated business has a reasonable expectation to earn a return on assets (through a combination of current revenues and a higher RAB) equal to the determined nominal weighted average cost of capital (WACC). In contrast, the adoption of an inaccurate inflation forecast results in the regulated business having an expected return on assets that is either above or below the determined WACC. In other words, where:

- the adopted inflation forecast overstates expected inflation, then the amount removed from revenues via the indexation building block is greater than the expected consumer price index (CPI) increase in the RAB and the expected return on assets would be below the determined WACC; and
- where the adopted inflation forecast understates forecast inflation, then the amount removed via the indexation building block is less than the expected CPI increase in the RAB and the expected return on assets would be above the determined WACC.

Queensland Rail has asked us to examine whether there is a statistical basis for preferring one or more of the methods considered by the QCA for estimating inflation.

Our report is structured as follows:

- section two outlines the QCA's previous assessment of different inflation forecasting methods;
- section three assesses each of the inflation forecasting methods previously considered by the QCA for evidence of bias and accuracy; and
- section four presents our conclusions about the best methodology for forecasting inflation over the access undertaking period.

2. Background

In earlier regulatory decisions, the QCA has considered three approaches to forecasting inflation, ie:[1]

- the RBA inflation target method – to adopt the midpoint (2.5 per cent) of the Reserve Bank of Australia's (RBA's) inflation target band of two to three per cent, on average, over time;
- the RBA forecasting method – the geometric mean of the RBA short-term forecasts set out in its quarterly Statement on Monetary Policy (SoMP), coupled with the RBA inflation target midpoint for the remainder of the forecasting period; and
- the indexed bond method – the implied inflation forecast derived from nominal and indexed bond yields using the Fisher relationship.[2]

These methods were assessed by the QCA with:[3]

> … the objective of determining the best method for obtaining an unbiased estimate of the expected inflation rate over the forecasting period.

The QCA has adopted the "RBA forecasting method" based on a combination of stated concerns with the indexed bond method and its analysis of the RBA forecasting method.[4]

The QCA's primary concern is the theoretical possibility that the indexed bond method could be biased because:[5]

- nominal bonds impose additional inflation risk on investors relative to indexed bonds, which results in the indexed bond method:
  - overestimating inflation expectations where these are inflationary; and
  - underestimating forecast deflation where these are deflationary; and
- indexed bonds are relatively less liquid than nominal bonds, which establishes a relatively higher liquidity premium incorporated into the indexed bond yields, resulting in the indexed bond method underestimating forecast inflation.

The QCA concludes that:[6]

> [in] the absence of being able to quantify these effects, the break-even method is an unreliable estimator of forecast inflation.

The QCA's assessment of the RBA forecasting method cites a report by Tulip and Wallace.[7] Tulip and Wallace assessed the RBA's one-year and two-year-ahead inflation forecast. Tulip and Wallace's analysis found that the RBA's:

[1] QCA, *Aurizon Network's 2017 draft access undertaking | Draft decision*, December 2017 (the "Aurizon draft decision"), p 51 and QCA, *DBCT Management's 2015 draft access undertaking | Final decision*, November 2016 (the "DBCT (2015) decision"), p 167.

[2] We note that in the Aurizon draft decision this approach was referred as the "break-even method".

[3] QCA, DBCT (2015) decision, p 167.

[4] QCA, Aurizon draft decision, p 57.

[5] QCA, Aurizon draft decision, p 52.

[6] QCA, Aurizon draft decision, p 53.

[7] QCA, Aurizon draft decision, p 56.

- one-year-ahead inflation forecast has substantial explanatory power for both the level and change in inflation;[8]
- two-year-ahead inflation forecast is marginally superior than the use of the inflation target, but is not significantly better (statistically);[9] and
- inflation forecasts are slightly more accurate than those of private sector forecasters provided by Consensus Economics.[10]

The data relied on by Tulip and Wallace included forecasts made during the period March 1996 to February 2012.[11]

Further, the QCA relies on the advice of Dr Lally that:[12]

> … on the basis that one should use the inflation target in the absence of compelling contrary evidence, the best forecast over the next four years would be the RBA's forecast for the first year coupled with the inflation target for the remaining three years. So, the QCA's approach is close to optimal.

We note that, in previous decisions, the QCA has not directly assessed the empirical proficiency of either the RBA forecasting method or the indexed bond method to forecast inflation.

2.1 QR's 2020 Draft Access Undertaking

In its draft decision for QR's 2020 Draft Access Undertaking (DAU), the QCA did not describe its approach for forecasting inflation. In the same decision, the QCA determined that the adoption of a 10-year term for the risk free rate (ie, a risk free rate estimated using bonds with 10-year terms) was appropriate.[13] This represented a departure from previous QCA decisions, which matched the term of the risk free rate to the length of the regulatory period.[14]

Bearing in mind this development, there to be two possible time horizons for which the QCA estimates inflation in QR's 2020 DAU, ie, five or 10 years.

Previous QCA decision have used a five-year inflation estimate. A five-year inflation estimate would be consistent with the length of QR's regulatory period and reflect compensation required for increases in its opex and capex cost drivers.

A 10-year inflation forecast would be consistent with the term of the risk free rate which, as a nominal estimate, implicitly includes a inflation forecast and reflects the compensation required by equity holders. This would be consistent with the approach of the AER, which forecasts inflation over a ten year period, to match the term for its return on capital estimate.[15]

In the following section, we directly assess each of the inflation forecasting methods outturn inflation over five-year and 10-year periods.

[8] Peter Tulip and Stephanie Wallace, *Estimates of Uncertainty around the RBA's Forecasts | Research Discussion Paper | RPD 2012-07*, November 2012, p 2.

[9] *Op Cit*, p 11.

[10] *Op Cit*, p 16.

[11] See *Forecast date by event date.xls* which was the underlying supporting data for the Peter Tulip and Stephanie Wallace research paper and published by the RBA. RBA inflation forecasts sourced from: Joint Economic Forecasting Group; Statement on Monetary Policy; and Policy Discussion Group.

[12] Dr Martin Lally, *Review of WACC Submissions on Aurizon's Regulatory Review*, 25 May 2017, p 32.

[13] Queensland Competition Authority, *Queensland Rail's 2020 Draft Access Undertaking | Draft decision*, April 2019, p 24.

[14] QCA, Aurizon draft decision, p 68; QCA, DBCT (2015) decision, pp 58-59.

[15] Australian Energy Regulator, *Regulatory treatment of inflation | Final position*, December 2017, p 22.

Evaluation of inflation forecasting methods

3. Evaluation of inflation forecasting methods

In this section we present evidence on the performance of the inflation forecasting methods previously considered by the QCA to predict inflation over five-year and 10-year horizon. Our analysis tests:

- whether any of the QCA's forecasting methods produce biased estimates of inflation; and
- the relative performance of each of the methods to forecasting inflation.

We have assessed four potential approaches to forecasting inflation over both five-year and 10-year periods, ie:

- the RBA inflation target method;
- the RBA forecasting method;
- the indexed bond method; and
- an average of the RBA forecasting and indexed bond methods.

In assessing these four inflation forecasting methods we have relied on the following data sets:

- the introduction in early 1993 of the RBA inflation target of between two and three per cent over the medium term;
- the indexed bond method, using RBA statistical table F16, for the 20 days prior to the start of each five-year period from 1 October 1994, noting that daily estimates of indexed bond yields started in August 1994;[16]
- the introduction in early 1993 of the RBA inflation target of between two and three per cent over the medium term;
- the RBA one and two-year-ahead inflation forecasts published in the SoMP, which started in February 2007;[17] and
- the Consumer Price Index (CPI) All Groups Australia (640101) published by the Australian Bureau of Statistics (ABS), published in July 2019.

3.1 Evidence of bias

The QCA dismisses the indexed bond method as an unreliable basis for forecasting inflation due to the potential for bias. The QCA also concludes that the RBA inflation target and RBA forecasting methods are unbiased estimators of inflation.

In this section we assess the performance of each of these forecasting methods, by reference to the difference between the five-year and 10-year forecasts of inflation and outturn inflation. For each quarter up to and including June 2014, we have calculated outturn inflation over the following five-year period.[18] For

[16] For example, the indexed bond method that forecasts inflation over the 1 October 1994 to 31 September 1999 period uses bond yields observed between 11 and 30 September 1994.

[17] Note that for the February and August SoPM inflation forecasts we have averaged the December and June CPI forecasts to calculate the one and two year ahead inflation forecasts.

[18] Five-year outturn inflation for the March 2014 quarter is calculated to be 1.60 per cent, ie:

$$Inf_{Mar14}^{5yr} = \left(\frac{CPI_{Mar19}}{CPI_{Mar14}}\right)^{0.2} - 1$$

$$1.60\% = \left(\frac{114.1}{105.4}\right)^{0.2} - 1$$

Evaluation of inflation forecasting methods

each quarter up to and including June 2009, we have calculated outturn inflation over the following 10-year period.[19]

Table 1 sets out the findings of our analysis for five-year outturn inflation.

Table 1: Average difference between forecast and outturn five-year inflation

Data from	RBA inflation target	Indexed bond	RBA forecasting	Average (Indexed bond & RBA forecasting)
March 1993	-0.05%	n/a	n/a	n/a
September 1994	-0.08%	0.09%	n/a	n/a
March 2007	0.29%	0.36%	0.37%	0.36%
June 2009	0.46%	0.43%	0.52%	0.47%

Table 2 sets out the findings of our analysis for ten-year outturn inflation. The results from March 2007 should be interpreted with caution due to a small sample size, since 10-year outturn inflation series can only be calculated up to June 2009, leaving a series of ten observations.

Table 2: Average difference between forecast and outturn ten-year inflation

Data from	RBA inflation target	Indexed bond	RBA forecasting	Average (Indexed bond & RBA forecasting)
March 1993	-0.18%	n/a	n/a	n/a
September 1994	-0.18%	0.10%	n/a	n/a
March 2007	0.27%	0.80%	0.33%	0.56%

3.1.1 Performance of the RBA target

Figure 1 reveals that since the RBA introduced its inflation target in early 1993 outturn inflation has departed substantially from the RBA target inflation band. Further, annual inflation has been below the floor of the RBA inflation target mid-point for the last 20 quarterly observations, ie, since the September quarter 2014.

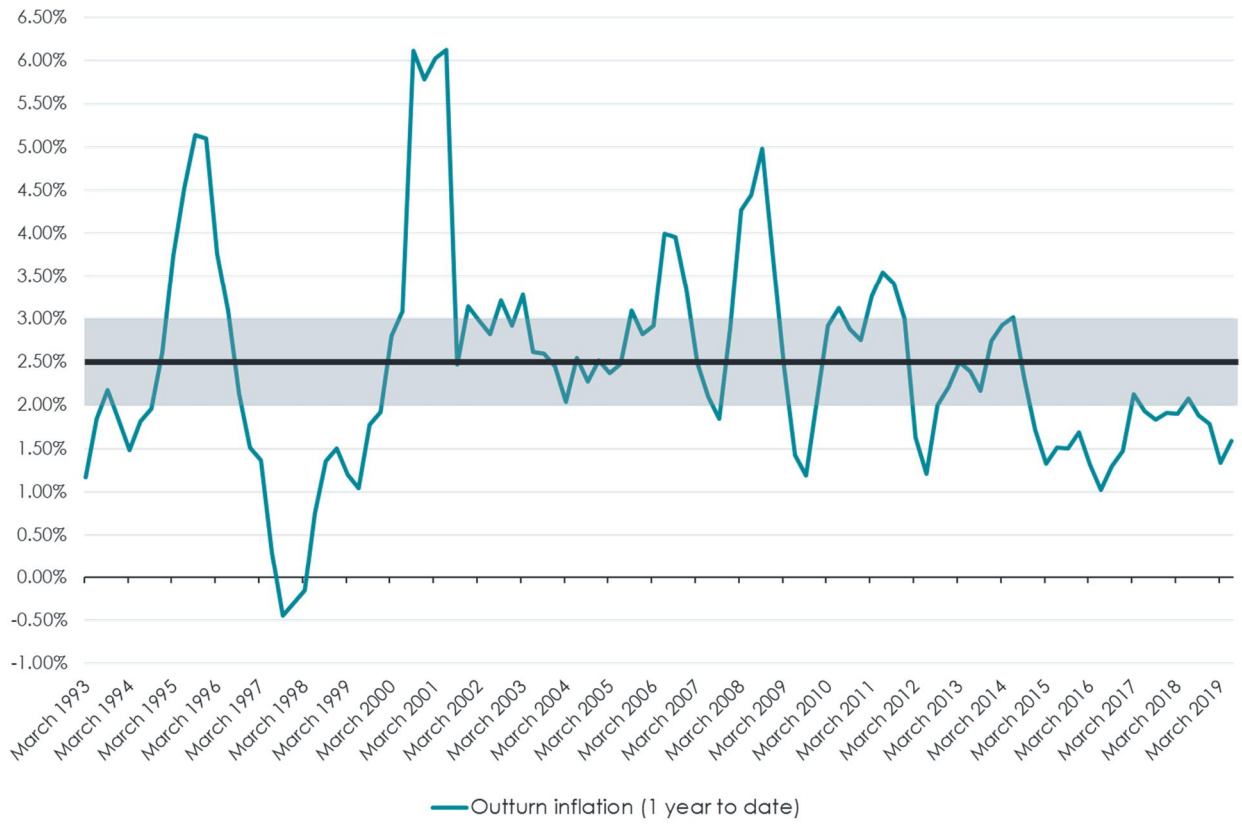
[19] Ten-year outturn inflation for the March 2009 quarter is calculated to be 2.12%, ie:

$$Inf_{Mar09}^{5yr} = \left(\frac{CPI_{Mar19}}{CPI_{Mar09}}\right)^{0.2} - 1$$

$$2.12\% = \left(\frac{114.1}{92.5}\right)^{0.2} - 1$$

Evaluation of inflation forecasting methods

Figure 1: Outturn inflation since 1993



However, for the period since the RBA adopted its inflation target, the five-year outturn inflation has averaged 2.55 per cent per annum and the ten-year outturn inflation has averaged 2.68 per cent per annum.

Figure 2 plots the five-year outturn inflation (per annum) from the start of each quarter – for example, inflation over the five-year period from the September 1993 quarter averaged 2.01 per cent. Figure 2 shows that while annual inflation regularly fluctuates outside the RBA's target inflation band, average inflation over a five-year period generally falls within the RBA's target band. However, for the most recent 19 available five-year periods (ie, since the December quarter 2009), five-year outturn inflation has been below RBA's inflation target mid-point.

Evaluation of inflation forecasting methods

Figure 2: Five-year outturn inflation (per annum)

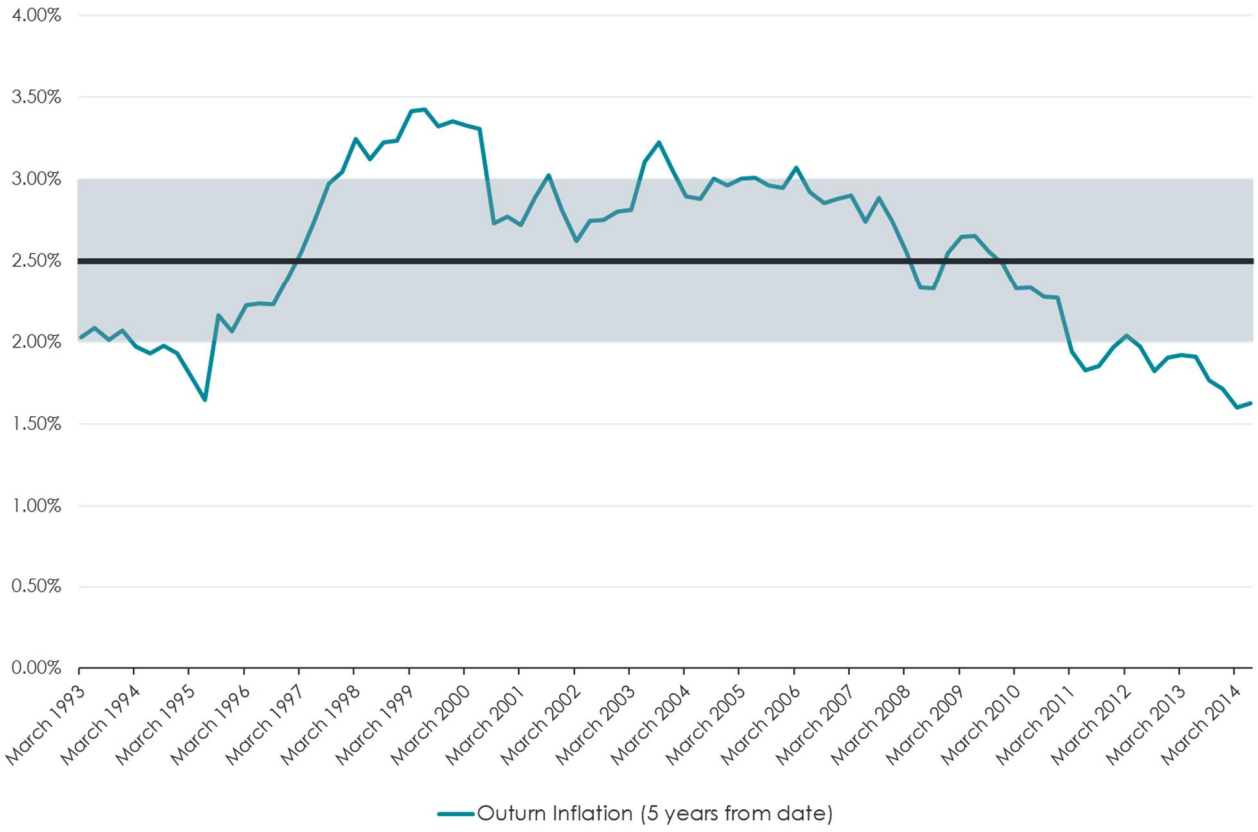
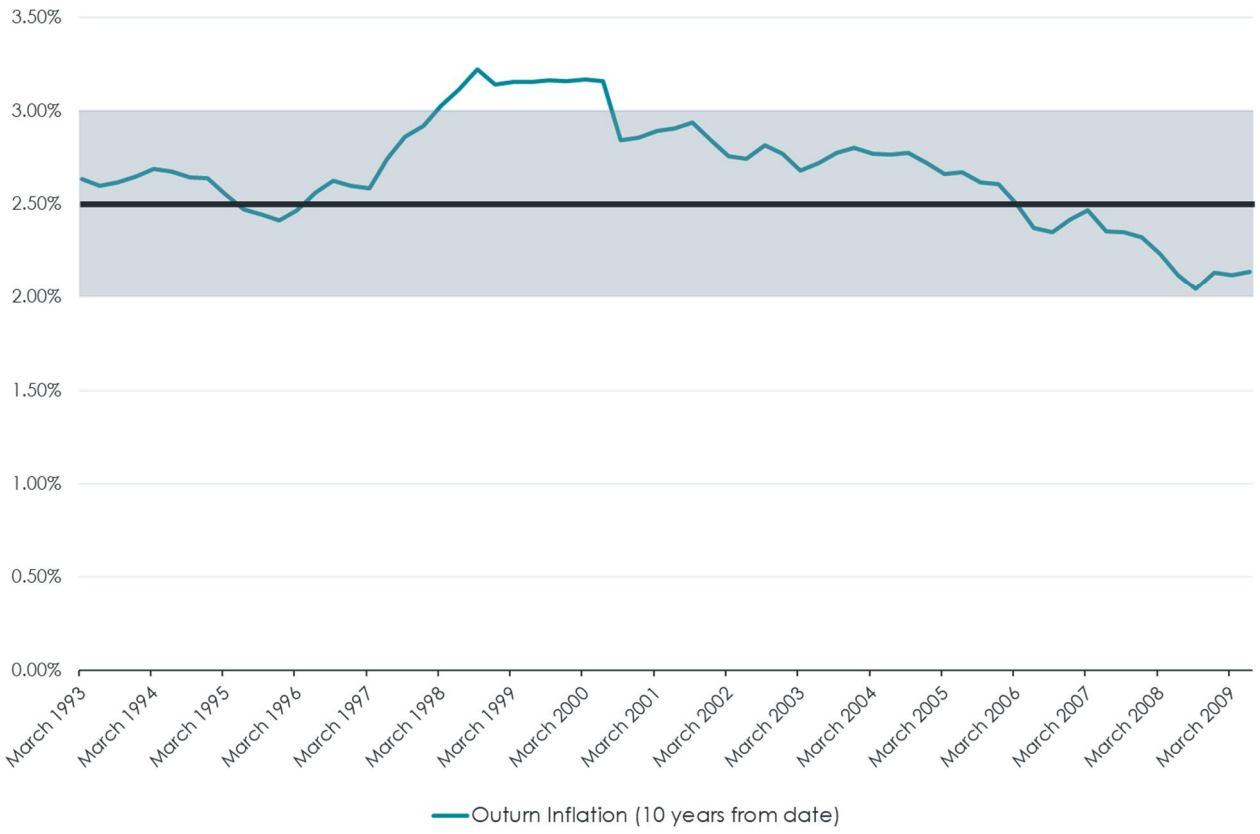


Figure 3 plots the ten-year outturn inflation (per annum) from the start of each quarter, ie, inflation over the ten-year period from the September 1993 averaged 2.62 per cent.

Similarly, figure 3 shows that while annual inflation regularly fluctuates outside the RBA's target inflation band, average inflation over a ten-year period generally falls within the RBA's target band. However, for the most recent 13 available ten-year periods (ie, since the June quarter 2006), ten-year outturn inflation has again been below RBA's inflation target mid-point.

Evaluation of inflation forecasting methods

Figure 3: 10-year outturn inflation (per annum)



The RBA inflation target method over this period has underestimated five-year outturn inflation by an average of five basis points and underestimated 10-year outturn inflation by an average of 18 basis points.[20]

We tested this forecasting result for evidence of bias by regressing the forecast error (the difference between outturn inflation and inflation forecasts) on a constant term, ie:[21]

$$Y_t - F_t = \gamma + \upsilon_t$$

Where:

Y_t is outturn inflation in period *t*

F_t is forecast inflation in period *t*

υ_t is an error term

The RBA target inflation method would be an unbiased estimator of inflation if the above regression shows that the estimated constant term, ie, γ, is zero. To test this, we use a t-test for the null hypothesis that γ=0, ie, that the forecast is unbiased. If the regression produces a t- statistic with an absolute value less than a critical value taken from student's t-distribution, we are unable to reject the null hypothesis that γ=0, which be consistent with the finding that the inflation forecasting method is free of bias.[22]

[20] This is consistent with the QCA findings set out in the Aurizon draft decision (page 55), which found that the inflation target was marginally higher than the mid-point of the RBA inflation target range.

[21] See, Holden, K, and Peel, D, *On testing for unbiasedness and efficiency of forecasts*, The Manchester School Vol LVII No. 2, June 1990.

[22] We note that, although this test can provide statistical evidence of bias, it is incapable of concluding that the estimator is unbiased.

Evaluation of inflation forecasting methods

We have assessed five-year outturn inflation over the period from the March quarter 1993 to the June quarter 2014, and find that the above regression for five-year inflation forecasts produces a t-statistic of 0.82, which is less than the five per cent critical value with 85 degrees of freedom from the student's t-distribution of 1.99.[23] For this period, we find no statistical evidence that adopting the RBA inflation target mid-point would result in a biased estimate of inflation for a five-year period.

We have assessed 10-year outturn inflation over the period from March quarter 1993 to June quarter 2009, and find that the above regression for ten-year inflation forecasts produces a t-statistic of 5.01, which is greater than the five per cent critical value with 65 degrees of freedom from the student's t-distribution of 2.00.[24] Consequently, for this period we find statistical evidence that adopting the RBA inflation target mid-point would result in a biased estimate of inflation for a ten-year period.

The analysis suggests that over the period since the RBA has stated an inflation target of between two to three per cent, there is no evidence that adopting the mid-point of the target (2.5 per cent) would be a biased estimator of five-year inflation. However, there is evidence that the RBA inflation target is a biased estimator of 10-year inflation. There is some evidence that adopting the RBA inflation target may underestimate inflation and so may slightly overcompensate regulated businesses for outturn inflation.

3.1.2 Performance of the indexed bond method

The RBA commenced publishing daily indexed and nominal bond yields on 24 August 1994. Prior to this date, indexed bond yields were published weekly. In the 80 quarterly estimates since the September 1994 quarter, the indexed bond method has on average overestimated five-year inflation by nine basis points and overestimated 10-year inflation by 10 basis points.

We have assessed five-year outturn inflation over period from September quarter 1994 to June quarter 2014, and find that our test of unbiasedness for five-year inflation forecasts using the indexed bond method produces a t-statistic of -0.82, which has an absolute value less than the five per cent critical value with 79 degrees of freedom taken from Student's t-distribution of 1.99.[25] Therefore, we find no statistical evidence that that five-year inflation forecasts estimated using the indexed bond method at the beginning of each five year period would result in a biased estimate of inflation for a five-year period.[26]

Over the over the period from September quarter 1994 to June quarter 2009, our test of unbiasedness for ten-year inflation forecasts using the indexed bond method produces a t-statistic of -0.86, which has an absolute value less than the five per cent critical value with 59 degrees of freedom taken from Student's t-distribution of 2.00.[27] Therefore, we find no statistical evidence that that 10-year inflation forecasts estimated using the indexed bond method would result in a biased estimate of inflation for a ten-year period.[28]

In other words, our analysis shows that there is no evidence that the indexed bond method results in biased estimates of forecast inflation due to either a liquidity premium for indexed bonds (and so underestimates forecast inflation) or the existence of an inflation risk premium (that could either over- or under-estimate forecast inflation). To the extent that either of these biases exist, their impact on the five-year and 10-year inflation forecasts appears to be immaterial.

Over the same period from September quarter 1994 to June quarter 2014, the RBA inflation target method would have underestimated inflation by an average of eight basis points for five-year inflation. Our test of unbiasedness produces a t-statistic of 1.49, which has an absolute value less than the five per cent critical

[23] The regression has 86 observations and one coefficient, therefore 85 degrees of freedom.

[24] The regression has 66 observations and one coefficient, therefore 65 degrees of freedom.

[25] The regression has 80 observations and one coefficient, therefore 79 degrees of freedom.

[26] In other words, available historical data cannot reject the null hypothesis that the indexed bond method is unbiased.

[27] The regression has 60 observations and one coefficient, therefore 59 degrees of freedom.

[28] In other words, available historical data cannot reject the null hypothesis that the indexed bond method is unbiased.

Evaluation of inflation forecasting methods

value of 1.99.[29] Therefore, we find no statistical evidence that the five-year inflation forecasts estimated using the RBA inflation target method at the beginning of each five-year period would result in a biased estimate of inflation.

Over the over the period from September quarter 1994 to June quarter 2009, the RBA inflation target method would have underestimated inflation by an average of 18 basis point for 10-year inflation. Our test of unbiasedness produces a t-statistic of 4.65, which has an absolute value greater than the five per cent critical value of 2.00.[30] Consequently, we find evidence that adopting the RBA inflation target mid-point would result in a biased estimate of inflation for a ten-year period.

3.1.3 Performance of the RBA inflation forecast method

The RBA first published a RBA inflation forecast in its SoMP in February 2007. Previous SoMPs only included surveys of market economists and union officials, and general comments on the RBA's short-term expectations of inflation. Over the 30 quarterly estimates from March 2007 to June 2014 the RBA forecast method has overestimated five-year forecast inflation by an average of 37 basis points and so, on average, would undercompensate regulated businesses for outturn inflation.[31] However, we note that over the same period, both the RBA inflation target method and the indexed bond method would have overestimated inflation by 29 and 36 basis points, respectively. Our test for potential bias would find that the all the forecasting methods produce biased estimates of five-year inflation at all conventional levels of confidence.

3.2 Additional considerations for the indexed bond method

We note that there was a period in which the indexed bond method should not be relied upon due to illiquidity in the indexed bond market. In a letter to the AER, the RBA noted:[32]

> The issue of insufficient supply is relevant, however, for the indexed bond market. In contrast to the regular issuance of nominal bonds that underpins the futures market contracts, there have been no indexed bonds issued since February 2003. Outstandings are now limited to just three issues, just one of which has maturity in excess of 10 years. Moreover, demand for these bonds has increased as supply has fallen. Turnover in the bonds is low and the market is fairly illiquid.

The liquidity issues in the indexed bond market was accepted by the AER, which stated:[33]

> However, since late 2006 a downward bias in the indexed CGS has become evident due to the limited supply of these securities. Consequently, using this method potentially results in an overestimate of expected inflation.

We note that this period of illiquidity in the indexed bond market recovered in 2009/10.[34] From the June 2009 quarter, each of the inflation forecasting methods overestimates outturn inflation, with the RBA forecasting method having the highest bias of 52 basis points. The RBA inflation target method and indexed bond method both overestimate five-year outturn inflation, by 46 and 43 basis points, respectively. Note that our test for bias would again find that the all the forecasting methods produce biased estimates of five-year inflation at all conventional levels of confidence.

[29] The critical value is the same as the test for bias of the indexed bond method forecasting five-year inflation over the period from September quarter 1994 to June quarter 2014 described above,

[30] The critical value is the same as the test for bias of the indexed bond method forecasting 10-year inflation over the period from September quarter 1994 to June quarter 2009 described above,

[31] There have been only nine quarterly estimates up to March 2014, ie, the period over which 10-year inflation can be estimated. We do not present results for 10-year inflation in this section due to the small sample size, results appear in table 2.

[32] Guy Debelle (Assistant Governor of the RBA), Letter to Joe Dimasi, 9 August 2007, p 3. Found as an attachment to the AER's, Draft determination for SP AusNet transmission determination 2008-14, 31 August 2007.

[33] AER, *Draft decision | TransGrid transmission determination 2009-10 to 2013-14*, 31 October 2008, p. 95.

[34] See QCA, DBCT (2015) decision, Figure 7, p. 165.

Evaluation of inflation forecasting methods

The illiquidity in the indexed bond market up to the June 2009 presents a problem for assessing the biasedness of 10-year inflation estimates using the indexed method. As at September 2019, 10-year outturn inflation can only be calculated up to June 2009. It follows that there is only one observation unaffected by indexed bond illiquidity that can be compared to 10-year outturn inflation.

However, when evaluating different forecasting methods, it is typical to have regard to both bias and variance.[35] One such technique is to calculate the root mean square errors (RMSE) for each forecasting method. The following section evaluates each of the identified forecasting methods by reference to their RMSE.

3.3 Assessment of each of the inflation forecasting methods

Figure 4 illustrates outturn annual average inflation over a five-year period stating in the date, together with the five-year inflation forecasts of:

- RBA inflation target method;
- RBA forecasting method;
- indexed bond method; and
- an average of the RBA forecast and indexed bond methods.

Figure 4: Five-year inflation forecasts and five-year outturn inflation

Figure 4 highlights that, since 2007, none of the inflation forecasting methods have been an accurate predictor of outturn inflation, and underscores the results set out in table 1 that, on average, each of the methods has overestimated outturn inflation since 2007. Figure 4 also supports the AER's decision to

[35] See QCA, DBCT (2015) decision, p 168.

Evaluation of inflation forecasting methods

discontinue using the index bond method in 2007, since the indexed bond method produced forecasts that diverged substantially from outturn inflation in the period up to 2009/10.

Table 3 tabulates the RMSE for each of the inflation forecasting methods for five-year inflation.

Table 3: RMSE of five-year inflation forecasting methods to June 2014

From	RBA inflation target	Indexed bond	RBA forecasting	Average (Indexed bond & RBA forecasting)
March 2007	0.48%	0.67%	0.55%	0.57%
June 2009	0.55%	0.57%	0.63%	0.60%

Table 3 shows that over the March 2007 to June 2014 period, the RBA inflation target and RBA forecasting methods produce better estimates of outturn inflation compared with the indexed bond approach. Excluding the period when the indexed bond market was illiquid (ie, using only the 20 quarters since June 2009), each of the forecasting methods records similar RMSE outcomes, with the indexed bond method performing marginally better than the RBA forecasting method.

Table 4 tabulates the RMSE for each of the inflation forecasting methods for ten-year inflation.

Table 4: RMSE of 10-year inflation forecasting methods

From	To	RBA inflation target	Indexed bond	RBA forecasting	Average (Indexed bond & RBA forecasting)
September 1994	March 2003	0.41%	0.97%	n/a	n/a
September 1994	June 2009	0.35%	0.89%	n/a	n/a
March 2007	June 2009	0.30%	1.05%	0.37%	0.67%

We note in section 3.2 that there are no data that allow 10-year inflation forecasts to be tested after the period of illiquidity ended, ie, since the June 2009 quarter.

Table 4 shows RMSE estimates for the period up to March 2003, after which time no indexed bonds were issued for several years.[36] Over this period, RBA inflation target produces a better estimate of 10-year outturn inflation than the indexed bond approach. When the period of illiquidity is included, the RBA inflation target, and RBA forecasting method produce better estimates of 10-year outturn inflation than the indexed bond approach.

[36] Guy Debelle (Assistant Governor of the RBA), Letter to Joe Dimasi, 9 August 2007, p 3. Found as an attachment to the AER's, Draft determination for SP AusNet transmission determination 2008-14, 31 August 2007.

4. Conclusion

An analysis of five and 10-year outturn inflation does not reveal that either the RBA target or indexed bond methods produce consistently superior inflation forecasts.

When all data is considered:

- using five-year inflation forecasts, there is no evidence the either RBA target or the indexed bond method produced biased estimates; and
- using 10-year inflation forecasts, there is evidence the RBA target produces biased estimates, but no evidence that the indexed bond method is biased.

Over the period since the March 2007 quarter (ie, after the inclusion of one and two-year ahead inflation estimates in the SoMP), all forecasting methods show evidence of bias and, on average, overestimate inflation.

Further, each of the inflation forecasting methods produces similar root mean square errors on the available five-year inflation data when the recognised period of market illiquidity is removed. Using the available data for 10-year inflation estimates suggests that the RBA target method and the RBA forecasting method are superior to the indexed bond method.

We therefore conclude no one of the inflation forecasting methods considered by the QCA is an unambiguously better estimator for five-year inflation or 10-year inflation.

However, we note the findings of Tulip and Wallace that the short-term forecasts of the RBA were statistically superior to adopting the mid-point of the RBA inflation target. On this basis we propose the adoption of an average of the RBA forecasting and indexed bond methods. The reasons for adopting an average of these two methods is consistent with the reasons provided by the Australian Competition Tribunal in its 2010 decision for ActewAGL Distribution, which found that when it was not possible to distinguish between two estimation methods it was appropriate to take an average.[37]

Adopting an average of these two methods results in a prevailing five-year inflation forecast of:

- 1.05 per cent using the indexed bond method, calculated over the 20 business days ending 30 August 2019;
- 2.23 per cent using the RBA forecasting method, using the August 2019 SoMP RBA forecasts of inflation and the mid-point of the RBA inflation target of 2 to 3 per cent; [38] and
- **1.64 per cent** using an average of the indexed bond and RBA forecasting methods.

Similarly, an average of these two methods results in a prevailing 10-year inflation forecast of:

- 1.16 per cent using the indexed bond method, calculated over the 20 business days ending 30 August 2019;
- 2.39 per cent using the RBA forecasting method, using the August 2019 SoMP RBA forecasts of inflation and the mid-point of the RBA inflation target of 2 to 3 per cent; [39] and

[37] Australian Competition Tribunal, Application by ActewAGL Distribution [2010] ACompT 4, para 78.

[38] Year one inflation calculated as the average of CPI inflation in the years-ended June 2020 and December 2020. Year two inflation calculated as the average of CPI inflation in the years-ended June 20201 and December 2021. Years three to five inflation are equal to the mid-point of the RBA inflation target.

[39] Year one inflation calculated as the average of CPI inflation in the years-ended June 2020 and December 2020. Year two inflation calculated as the average of CPI inflation in the years-ended June 20201 and December 2021. Years three to ten inflation are equal to the mid-point of the RBA inflation target.

- **1.78 per cent** using an average of the indexed bond and RBA forecasting methods.

We observe that the indexed bond and RBA forecasting methods currently produce disparate forecasts of inflation, which would individually produce materially different levels of allowed revenue for Queensland Rail. In the absence of evidence that one of these forecasting methods is superior, it would be inappropriate to disregard either of these inflation forecasts methods, given the materiality of this parameter for Queensland Rail's allowed revenue.

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