Economic Regulation Authority

2023 Draft Determination

For the Freight and Urban Networks, and the Pilbara Railways

30 May 2023

D261423

Economic Regulation Authority

Level 4, Albert Facey House

469 Wellington Street, Perth WA 6000

Telephone 08 6557 7900

Email info@erawa.com.au

Website www.erawa.com.au

This document can also be made available in alternative formats on request.

National Relay Service TTY: 13 36 77

Invitation to make submissions

Submissions are due by 4:00 pm WST, 28 June 2023

The ERA invites comment on this paper and encourages all interested parties to provide comment on the matters discussed in this paper and any other issues or concerns not already raised in this paper.

We would prefer to receive your comments via our online submission form https://www.erawa.com.au/consultation

You can also send comments through:

Email: publicsubmissions@erawa.com.au
Post: Level 4, Albert Facey House, 469 Wellington Street, Perth WA 6000

Please note that submissions provided electronically do not need to be provided separately in hard copy.

All submissions will be made available on our website unless arrangements are made in advance between the author and the ERA. This is because it is preferable that all submissions be publicly available to facilitate an informed and transparent consultative process. Parties wishing to submit confidential information are requested to contact us at info@erawa.com.au.

For further information please contact

General Enquiries

Jason Dignard
Ph: 08 6557 7900
info@erawa.com.au

Media Enquiries

Danielle Asarpota
Ph: +61 428 859 826
media@erawa.com.au

Contents

List of appendices

About this draft determination

The Railways (Access) Code 2000 requires the Economic Regulation Authority to determine each year a long-term Weighted Average Cost of Capital (WACC) to be applied in the establishment of capital costs for regulated railways in that year.

Regulated railways are those listed in schedule 1 to the Code, currently the Public Transport Authority network, the Arc Infrastructure network, and The Pilbara Infrastructure and Roy Hill Infrastructure railways (the Pilbara Railways).

Clause 3 of Schedule 4 of the Code further requires the ERA to, in every fifth year subsequent to 2003, invite interested parties to make written submissions and have regard to them prior to determining the WACC values for that year.

The ERA has undertaken a review of the rail WACC and reviewed available information.

The ERA is seeking feedback on the draft determination of the 2023 rail WACC.

After considering stakeholder feedback the ERA will then publish a final determination for the 2023 rail WACC, based on the period to 30 June 2023.

1. The structure of this draft determination

1. This draft determination discusses the WACC and its individual parameters as they apply to Western Australian railways under the Western Australian rail access regime.

2. For each WACC parameter, this paper details:

    - background, providing a brief description of each parameter
    - draft determination, detailing the ERA's considerations and its draft position.

3. The WACC, and the individual parameters as they apply to each of the railways, is provided at the end of this draft determination in Section 12.

2. The *Railways (Access) Code 2000*

4. The Code describes the WACC as the "interest rate" to be used in an "equivalent annual cost or annuity" calculation of capital costs:[1]

> (3) Capital costs (other than capital costs under subclause (5)) are to be determined as the equivalent annual cost or annuity for the provision of the railway infrastructure in accordance with subclause (4).
>
> (4) The calculation is to be made by applying –
>
> (a) the Gross Replacement Value (GRV) of the railway infrastructure as the principal;
>
> (b) the Weighted Average Cost of Capital (WACC) as the interest rate; and
>
> (c) the economic life which is consistent with the basis for the GRV of the railway infrastructure (expressed in years) as the number of periods

5. Consistent with schedule 4, clause 3(1) of the Code, the annual calculation of the WACC is for the period as at 30 June to apply for the 12 months following.

6. The Code does not prescribe a method for determining the WACC.

7. The Code is subsidiary legislation under the *Railways (Access) Act 1998*. The object of the Act is to:

> …establish a rail access regime that encourages the efficient use of, and investment in, railway facilities by facilitating a contestable market for rail operations.[2]

8. The ERA has estimated the rail WACC consistent with the efficient financing costs of efficient entities with a similar degree of risk to the provision of the rail services. This approach is taken on the basis that efficient firms with efficient financing provide a benchmark for each regulatory decision. Basing regulatory decisions on efficient input costs and output prices will enable contestability in the provision of railway services.

1 *Railways (Access) Code 2000*, Schedule 4, Clause 2.

2 *Railways (Access) Act 1998*, section 2A.

3. The WACC framework

3.1 Background

9. The rate of return, based on a WACC, provides a service provider with a return on the capital it has invested in its business.

10. The WACC is calculated considering the relative weights of each component of the capital structure. The Code does not prescribe the components of capital costs to be assessed, or the means of weighting the components.

3.2 2018 rail approach

11. In the 2018 rail approach the ERA employed WACC framework, which provided for:

- The cost of equity.
- The cost of debt.
- The shares of equity and debt in a benchmark financing portfolio as the weightings of these components.

12. For rail, the ERA calculated the WACC on a pre-tax basis.[3]

3.3 Draft determination

13. The ERA will continue using the nominal pre-tax WACC approach from 2018.

14. The pre-tax approach is preferred as the estimation of future tax liabilities may not be consistent with the light-handed nature of the Code and the determination of the asset base on a gross replacement valuation basis.

15. In nominal terms, the WACC equation is expressed as:

$$WACC_{nom} = R^{e}_{pre} * \frac{E}{V} + R^{d}_{pre} * \frac{D}{V} \qquad \text{(equation 1)}$$

where

$WACC_{nom}$	is the nominal pre-tax weighted average cost of capital
R^{e}_{pre}	is the pre-tax rate of return on equity, or the cost of equity
R^{d}_{pre}	is the pre-tax rate of return on debt, or the cost of debt

[3] See 2015 Decision paragraphs 39-45. Unlike gas pipelines, railways are not required to have the WACC calculated on a post-tax basis. In its 2015 decision, the ERA considered that a post-tax approach would require the development of a tax asset base calculated for a standalone entity, which would add considerable complexity to the estimation process. Further, the Code requires the estimation of total costs through an annuity that provides for the return on and of the cost of building a new railway, rather than through a building block approach that is based on a written down asset. For these reasons, the ERA considers it reasonable to retain a pre-tax approach to estimate the rail WACC.

$\frac{E}{V}$ is the proportion of equity in the total financing (comprising equity and debt)

$\frac{D}{V}$ is the proportion of debt in the total financing.

16. The pre-tax rate of return on equity is not readily available. The return on equity is derived through observing data that is then used to calculate a return on equity. Therefore, a post-tax rate of return on equity is used.

17. It is then necessary to adjust the post-tax rate of return on equity for taxation effects, including recognition of the value of imputation credits (commonly known as gamma).

18. The imputation tax system prevents corporate profits from being taxed twice. The gamma parameter accounts for the reduction in the effective corporate taxation that is generated by the distribution of franking credits to investors. Generally, investors who are able to use franking credits will accept a lower required rate of return, before personal tax, on an investment that has franking credits, compared with an investment that has similar risk and no franking credits.

19. This provides a framework for the calculation of a nominal pre-tax WACC, as follows:

$$WACC_{nom} = R^{e}_{post} * \frac{1}{(1-T*(1-\gamma))} * \frac{E}{V} + R^{d}_{pre} * \frac{D}{V} \quad \text{(equation 2)}$$

where:

$WACC_{nom}$ is the nominal pre-tax weighted average cost of capital

R^{e}_{post} is the post-tax rate of return on equity, or cost of equity

R^{d}_{pre} is the pre-tax rate of return on debt, or the cost of debt

T is the corporate tax rate

γ is the value of imputation credits (gamma)

$\frac{E}{V}$ is the proportion of equity in the total financing (comprising equity and debt)

$\frac{D}{V}$ is the proportion of debt in the total financing.

20. To provide additional information for stakeholders a real WACC is provided. The real WACC is obtained from the nominal WACC by removing expected inflation (π) from the nominal pre-tax WACC, as follows:

$$WACC_{real} = \frac{(1+WACC_{nom})}{1+\pi} - 1 \quad \text{(equation 3)}$$

21. The resulting WACC for a benchmark efficient entity represents efficient financing costs for the provision of assets.

4. The term of the WACC

4.1 Background

22. The Code describes the WACC as the "target long-term weighted average cost of capital appropriate to the railway infrastructure".[4]

23. A WACC with a term consistent with the long economic lives of the assets will best meet the Code's requirements.[5] This is because the capital cost determinations required by the Code are constructed to apply in perpetuity from a fixed point in time, and not over a defined (shorter) term of an access agreement.[6]

4.2 2018 rail approach

24. Under the 2018 rail approach the ERA applied a long-term approach to the determination of the WACC.

25. For the return on equity and debt, a term of 10 years was used to estimate returns.

4.3 Draft determination

26. The ERA will continue using a long-term approach in the determination of the WACC.

27. For the return on equity and debt, a term of 10 years is used to estimate returns. Although terms longer than 10 years are available for the risk free rate, a risk free rate with a 10-year term allows components of models to be estimated consistently. The ERA also does not consider that longer term Commonwealth Government Securities have sufficient liquidity and trading to provide reliable estimates of the risk free rate.

28. The ERA considers that this approach meets the requirements under the Code.

4 *Railways (Access) Code 1998*, Schedule 4, Clause 2.

5 The weighted average economic life of a typical heavy haul rail route may be as high as 50 years.

6 The capital cost determined is a Gross Replacement Value annuity, calculated as payable over the economic life of the asset.

5. The benchmark efficient entity and risk

5.1 Background

29. Regulators use a benchmark efficient entity to inform the WACC parameters set for a regulated entity. This ensures that a regulator does not compensate a regulated service provider for its actual costs, but compensates it as if it were operating efficiently.

30. When determining a benchmark efficient entity, a regulator needs to account for the risks of providing the regulated services.

5.2 2018 rail approach

31. Under the 2018 rail approach the ERA defined a benchmark efficient entity as:

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

32. The ERA recognised the differing risk profiles of the Western Australian railways and developed separate benchmarks for gearing, credit rating and equity beta specific to each of the regulated rail networks' infrastructure and operations.

5.3 Draft determination

33. For the draft determination, the ERA continues its approach for the benchmark efficient entity as applied in 2018.

34. The ERA uses a benchmark entity for rail service providers that are judged to be similar.

35. The ERA continues to define the benchmark efficient entity consistent with paragraph 31.

36. The ERA considers the components of this definition as follows:

- A pure-play business focuses exclusively on rail services. This solely reflects the risk in providing rail services and does not reflect the provision of any other business activities that may have a different risk profile.
- "Regulated rail facility" is intended to account for the specific types of business activity being dealt with.
- "Operating within Australia" is intended to account for country-specific factors such as currency, the level of economic growth and laws affecting business. This is consistent with the ERA's intention to base the rate of return on data from domestic financial markets.
- "Without parental ownership" is intended to recognise that some risks associated with providing reference services cannot be eliminated, and thus must be compensated. In this event, without parental ownership allows for explicit recognition of those risks, to ensure that these are not simply transferred to the parent, in a way that is not transparent and accountable.

- "With a similar degree of risk as that which applies to the service provider in respect of the provision of the rail services" is intended to recognise the difference in the risk profile of the rail services.

37. Estimates of WACC components are based on domestic financial markets. This meets the guiding principle that the risk for the asset in question should stem from the economy in which the benchmark efficient entity is situated.[7]

    - Market risk and systematic risk are the relevant risk considerations for equity markets. The market risk premium quantifies the risk premium for investing in a given economy as if a diversified portfolio of all listed firms in that economy were held. The risk premium is that part of the return that is in excess of the return on a risk free asset in that economy. Systematic risk is commonly quantified for a given economy through observing the co-variation between returns on listed equity in firms and the returns on a representative equity market index for the country in which that firm operates.

    - To evaluate the cost of equity, Australian regulators have implemented this practice through the application of a domestic Capital Asset Pricing Model (CAPM) framework. The ERA considered that the regulatory costs of basing its analysis on international markets and the adoption of an international CAPM would be significant and may not improve accuracy.

    - Using the domestic CAPM, Australian regulators have recognised the influence of foreign investors, where they invest domestically and thus contribute to market outcomes within Australia.

    - The domestic debt market reflects the influence of international lenders supplying debt finance to Australian firms. Australian markets for debt are linked to international markets. Covered interest rate parity asserts that, once the differential between spot and forward exchange rates used for hedging is taken into account, no interest rate arbitrage opportunities (to make profit) exist between two currencies. Therefore, borrowing and lending in different currencies cost the same.

38. To supplement small domestic data sets, the ERA uses international comparators where underlying risk factors are similar.

39. Rail services differ in their operations and network infrastructure. The WACC benchmark should account for these differences, as they give rise to different risk profiles for different operators. Given the differences in the services provided by the four regulated Western Australian rail networks, a single benchmark rail entity will not adequately capture the different risks faced by each network.

[7] The country of risk is determined by Bloomberg's methodology. This consists of four factors listed in order of importance: management location, country of primary listing, country of revenue and reporting currency of the issuer. Management location is defined by country of domicile unless location of such key players as CEO, CFO, COO and/or General Counsel is proven to be otherwise.

40. Urban and freight rail infrastructure have been distinguished on the following bases:[8]

- The location of the urban passenger service lessens ownership risk due to a low likelihood of asset stranding, obsolescence, regulatory changes, declining demand or volatility in demand forecasting.
- Freight services do not receive community service obligation payments.
- Freight services are not regulated and are open to competition from road transport.

41. Relevant classification frameworks exist for railway systems on the basis of their operations and infrastructure. In the United States of America, the Surface Transportation Board classifies rail networks by their operating revenues and whether they perform switching services and/or terminal operations. This classification system refers to Class I, Class II and Class III railways.[9]

42. On this basis, dedicated iron-ore railways in the Pilbara are different from the general freight networks in the following ways:

- The class II/III type railroad industry is a better approximation to Pilbara railways than large trans-national railroad networks, which share characteristics with the general freight networks.
- The expectation that there would be some increased risk for stand alone ore carrying railways, given their reliance on a single industry with a particular exposure to economic fluctuations, creates an expectation that the asset beta would be higher than that of general freight.

43. Consequently, the ERA develops separate benchmarks for gearing, credit rating and equity beta specific to each of the regulated rail networks' infrastructure and operations. Using the same benchmark for all rail networks would not adequately capture their different risks, and therefore the efficient financing costs of each of the rail entities.

---

8 Macquarie Bank, *Western Australia Rail Access Regime: Independent Assessment of Maximum Rate of Return on Rail Infrastructure*, 23 August 1999, p. 6.

9 Class I carriers are those with operating revenues of $250 million or more (1991 USD); Class II those with revenues in excess of $20 million (1991 USD); and Class III, those with revenues of up to $20 million (1991 USD). Class II and III lines are known as short lines and regional railroads (Association of American Railroads, 'Class II and Class III' http://freightrailworks.org/network/class-ii-and-class-iii/, 2014, (accessed 23 May 2014)).

All switching and terminal companies are classified as Class III regardless of their operating revenues (US Government Printing Office, 'Electronic Code of Federal Regulations, Title 49: Transportation, Part 1201- Railroad Companies, Instruction 1-1(b)(1)' http://www.ecfr.gov/cgi-bin/textidx?SID=27113a9126de08a7a3eae834b3efcd5e&node=49:9.1.1.1.3&rgn=div5, 2014, (accessed 20 May 2014)). Switching operations involve activities such as the making and breaking up of trains, while terminal operations involve activities connecting freight from larger rail networks to other modes of transport or rail.

The Class II and III railroads often feed traffic to and receive traffic from Class 1 railroads.

6. Gearing

6.1 Background

44. Gearing is the proportion of a business' assets financed by debt and equity. Gearing is defined as the ratio of the value of debt to total capital (that is, the sum of debt and equity) and is generally expressed as follows:

$$Gearing = \frac{Debt}{Debt + Equity} \quad \text{(equation 4)}$$

45. This ratio is used to weight the costs of debt and equity when the regulated WACC is determined.

46. In addition to being used to weight the expected returns on debt and equity to determine the regulated rate of return, the level of gearing of a benchmark efficient business is also used:

- To re-lever asset betas for the purposes of analysing the level of systematic risk across businesses in the estimate of equity beta.
- As a factor to determine an appropriate credit rating for deriving the debt risk premium.

47. Gearing differs across industries, and among different companies within the same industry.

48. Different firms have different risk profiles and, as a consequence, have varying debt capacities.[10] The optimal capital structure is determined by the business risk of firms in an industry and the expected loss if default occurs.[11] Given that a service provider's expected risk is likely to differ from that of the comparable sample, the optimal capital structure of the entity is likely to differ as well. It may be appropriate to adjust any estimate of gearing levels to reflect differences in the level of risk between railway networks.

6.2 2018 rail approach

49. For the 2018 rail determination, the ERA recognised the differing risk profiles of Western Australian railways and used separate benchmarks for gearing specific to each type of regulated rail network's infrastructure and operations.

50. For the 2018 determination the ERA applied the following gearing ratios:

- 50 per cent for the Public Transport Authority
- 25 per cent for Arc Infrastructure
- 20 per cent for Pilbara Railways.

10 Australian Competition & Consumer Commission, *Access Undertaking – Interstate Rail Network*, July 2008.

11 Brealey, R., Myers, S. and Allen, F., *Corporate Finance*, McGraw Hill, 1996, p. 476.

51. These gearing levels remained fixed until the next rail WACC method review.

6.3 Draft determination

52. For the draft determination, the ERA continues to apply the following gearing ratios:

- 50 per cent for the Public Transport Authority
- 25 per cent for Arc Infrastructure
- 20 per cent for Pilbara Railways.

53. These gearing levels will remain fixed until the next rail WACC method review.

54. The ERA recognises the differing risk profiles of Western Australian railways and uses separate benchmarks for gearing specific to each type of regulated rail network's infrastructure and operations.

55. The ERA considers that benchmark gearing should be determined from observations from an appropriate benchmark comparator set and the use of regulatory discretion.

56. Due to a lack of suitable domestic comparators, the ERA's benchmark sample includes international companies from the United States of America, Canada, Europe, New Zealand and Japan.

57. The ERA measures gearing for the benchmark sample over a 10-year timeframe to understand a long-term capital structure.

58. The ERA updated gearing estimates for the separate benchmark samples previously adopted by the ERA in its 2018 Determination.

59. The ERA notes that six of the sample firms have been delisted across the three rail benchmark samples, including:

- Toll in 2015
- Asciano in 2016
- Abertis Infraestructuras in 2018
- Genesee & Wyoming in 2019
- Kansas City Southern in 2021
- Atlantia in 2022.

60. Given the decreased number of benchmark firms due to delistings, the ERA has reviewed potential additional new benchmark firms for each of the rail benchmark samples. Where additional comparators exist, the ERA adds these firms to the benchmark sample of firms.

61. The 10-year average gearing estimate of the benchmark firm is calculated based on the observable years for the benchmark firms. Although six of the sample firms have been delisted, the ERA considers that gearing levels are relatively stable over time particularly considering rounding, and that the past market information still provides a useful reference. The ERA exercises regulatory discretion on the gearing estimate by placing less weight to historical market data that became relatively obsolete.

6.3.1 Public Transport Authority gearing

62. The 2018 benchmark sample for the Public Transport Authority included a sample of toll roads. Network toll road companies are a rough approximation for a passenger rail network that formed the benchmark sample. However, toll roads are likely to have a more elevated risk profile than rail transport:

- The risks faced by the Public Transport Authority are lower than those faced by the companies in the 2018 benchmark sample.
- Therefore, a benchmark efficient entity representing the Public Transport Authority network will be able to sustain higher levels of gearing.

63. The ERA has examined additional comparators that may have a similar degree of risk to the Public Transport Authority. After reviewing possible additional comparators, the ERA proposes the inclusion of four new comparators from France and Japan:

- Getlink, which operates the Channel tunnel from France to the United Kingdom, the Eurotunnel shuttles and Eurotunnel rail services for Eurostar.
- West Japan Railway Company, which operates the passenger rail network for western Japan.
- Central Japan Railway Company, which operates the passenger rail network for central Japan.
- East Japan Railway Company, which operates the passenger rail network for eastern Japan.

64. The ERA is aware that these proposed comparators do not strictly meet the proposed filters.

- The ERA notes that it currently includes European companies for the Public Transport Authority's benchmark sample. The ERA considers that the addition of Japanese firms to the benchmark sample would be consistent with its past approach given that Japan is an OECD and G20 country that shares similar characteristics with Australia.
- English is not the official language of either France or Japan. However, all four proposed comparators provide financial and shareholder disclosures in English.
- All Japanese comparators face price regulation for passenger rail services, while there is a regulatory price mechanism for Getlink's Eurotunnel operations. [12,13]

[12] See for example JR West, *Outline of Government's Regulations on Railway Fares and Charges*, 2021.

[13] Getlink is subject to economic regulation by the Inter-Governmental Commission, the French Rail Authority and the UK Office of Rail and Road, see Getlink, *2022 Universal Registration Document*, March 2023.

65. However, the alternative would be to estimate gearing using a sample size that is currently very small and would become increasingly historical.

66. The ERA considers that proceeding with a low benchmark sample with a significant number of delisted firms may deviate from a benchmark approach and forward looking incentive based regulation. This is especially the case where international comparators can be identified and have a similar degree of risk to the benchmark entity.

Table 1: Public Transport Authority gearing estimates for benchmark sample[14]

Benchmark firm	2018 estimate (%)	2023 estimate (%)
Vinci	43	36
Abertis Infraestructuras[15]	55	56
Atlantia[16]	51	59
Getlink	N/A	41
European average	**50**	**48**
Macquarie Atlas Roads[17]	50	40
Transurban	35	34
Australian average	**43**	**37**
West Japan Railway	N/A	46
Central Japan Railway	N/A	50
East Japan Railway	N/A	47
Japanese average	**N/A**	**48**
Average	**47**	**46**

Source: ERA analysis, Bloomberg. The 2023 gearing estimate is largely based on the 10-year observable equity and debt data from 2013 to 2022. With the delisted firms, the ERA uses the most recent 10-year observable data available for the gearing estimate.

14 Gearing is estimated as debt to value (debt and equity). Gearing is measured over a 10-year timeframe. Consistent with the ERA's 2018 estimates, equity is measured as current market capitalisation and debt is measured as a book value of net debt.

15 Abertis Infraestructuras was acquired by Atlantia (now named Mundys), ACS Group and Hochtief in October 2018.

16 Atlantia changed its company name to Mundys on 15 March 2023.

17 In 2018, Macquarie Atlas Roads changed its name to Atlas Arteria after entering an agreement to internalise management between Atlas Arteria and Macquarie Group. The 2023 gearing level estimate is calculated based on the observable years for Atlas Arteria. This estimate has excluded some gearing calculations for the years between 2013 and 2016 where these years had zero borrowings and debts possibly caused by corporate restructure activities.

67. For the Public Transport Authority benchmark sample, the updated average gearing reduced slightly from the ERA's 2018 estimate of 47 per cent to 46 per cent:

- The European average gearing has remained at a similar level. While the gearing of Vinci has decreased slightly over the past five years, this is offset by a moderate increase in gearing of Mundys (formerly known as Atlantia).
- The Australian average gearing has decreased, driven by reductions in Macquarie Atlas Roads (currently known as Atlas Arteria).
- The gearing level of the three proposed Japanese comparators ranged from 46 to 50 per cent.

68. The Public Transport Authority has lower risks than the benchmark sample, and therefore may have higher gearing levels than the average.

69. On balance, available information supports the continuation of a benchmark gearing level for the Public Transport Authority of 50 per cent.

6.3.2 Arc Infrastructure gearing

70. The 2018 benchmark sample for Arc Infrastructure included a combination of Australian and overseas rail and freight businesses:

- Arc Infrastructure was likely to face less competition relative to overseas rail operators and the benchmark efficient rail entity representing the Arc Infrastructure network would be able to take on higher levels of gearing relative to overseas rail operators.
- Arc Infrastructure was likely to face higher risk than transport infrastructure and services firms in Australia due to Arc Infrastructure's exposure to particular industries including agriculture and mining.
- Therefore, a representative gearing range for Arc Infrastructure was formed by using the average of overseas railway operators as a lower bound and the Australian average as an upper bound.

71. Given the delistings, the ERA considered including other comparators. However, the ERA is unable to identify further suitable comparators which have a similar degree of risk to Arc Infrastructure.

Table 2: Arc Infrastructure gearing estimates for benchmark sample[18]

Benchmark firm	2018 estimate (%)	2023 estimate (%)
Genesee & Wyoming[19]	27	29
Union Pacific	16	15
Norfolk Southern	24	21
Kansas City Southern[20]	23	17
CSX	25	21
United States average	**23**	**21**
Canadian Pacific Railway	24	18
Canadian National Railway	15	13
Canadian average	**20**	**15**
Aurizon	19	26
Toll[21]	28	28
Asciano[22]	39	43
Australian average	**29**	**32**
Port of Tauranga	13	10
New Zealand average	**13**	**10**
Average	**23**	**22**

Source: ERA analysis, Bloomberg. The 2023 gearing estimate is largely based on the 10-year observable equity and debt data from 2013 to 2022. With the delisted firms, the ERA uses the most recent 10-year observable data available for the gearing estimate.

72. The sample of benchmark firms for Arc Infrastructure exhibited a slight decrease in gearing from the 2018 estimate.

18 Gearing is estimated as debt to value (debt and equity). Gearing is measured over a ten-year timeframe. Consistent with the ERA's 2018 estimates, equity is measured as current market capitalisation and debt is measured as a book value of net debt.

19 Genesee & Wyoming was sold to Brookfield Infrastructure Partners and GIC Private Limited in 2019. As Brookfield's ownership of other rail assets in Australia could have led to the Australian Competition and Consumer Commission blocking the purchase, the 51 per cent shareholding that Genesee & Wyoming had in Genesee & Wyoming Australia was sold separately to the Netherland's pension investor PGGM. The company was then rebranded as One Rail Australia. Aurizon acquired One Rail Australia from Macquarie Asset Management on 29 July 2022.

20 Canadian Pacific acquired Kansas City Southern in 2021. On April 2023, the two companies were combined to create Canadian Pacific and Kansas City Southern (CPKC). The 2023 gearing estimate is based on the financial information ending 31 December 2021 prior to the acquisition.

21 The company was delisted on 29 May 2015.

22 The company was delisted on 25 August 2016.

73. To determine a gearing level for Arc Infrastructure:

- Representative gearing was calculated as the average of overseas railways operators as a lower bound and the Australian average as an upper bound.
- Average gearing for overseas railways (United States of America, Canada and New Zealand) was calculated as 18 per cent.
- Average gearing for transport infrastructure and services firms in Australia was 32 per cent.
- Representative gearing for Arc Infrastructure was calculated as 22 per cent.

74. On balance, available information has not varied significantly enough to change the benchmark gearing level for Arc Infrastructure from 25 per cent.

6.3.3 Pilbara Railways gearing

75. The 2018 benchmark sample for the Pilbara Railways included a combination of Australian and overseas rail businesses that formed the benchmark sample.

76. Given the delistings, the ERA considered including other comparators. However, the ERA is unable to identify further suitable comparators which have a similar degree of risk to the Pilbara Railways.

Table 3: Pilbara Railways gearing estimates for benchmark sample[23]

Benchmark firm	2018 estimate (%)	2023 estimate (%)
Genesee & Wyoming	27	29
Union Pacific	16	15
Norfolk Southern	24	21
Kansas City Southern	23	17
CSX	25	21
United States average	**23**	**21**
Canadian Pacific Railway	24	18
Canadian National Railway	15	13
Canadian average	**20**	**15**
Aurizon	19	26
Australian average	**19**	**26**
Average	**22**	**20**

Source: ERA analysis, Bloomberg. The 2023 gearing estimate is largely based on the 10-year observable equity and debt data from 2013 to 2022. With the delisted firms, the ERA uses the most recent 10-year observable data available for the gearing estimate.

77. For the Pilbara Railways benchmark sample, the updated average gearing slightly decreased from the ERA's 2018 estimate of 22 per cent to 20 per cent in 2023.

78. On balance, available information has not varied significantly enough to change the benchmark gearing level for the Pilbara Railways from 20 per cent.

[23] Gearing is estimated as debt to value (debt and equity). Gearing is measured over a ten-year timeframe. Consistent with the ERA's 2018 estimates, equity is measured as current market capitalisation and debt is measured as a book value of net debt.

7. Cost of debt

7.1 Approach to cost of debt

7.1.1 Background

79. The WACC includes a component for the return on debt. The return on debt is the return that debt holders require from a firm to compensate them for the risk they take in providing debt financing to the company.

80. The estimate of the return on debt will comprise a risk premium above the risk free rate, plus an additional margin for administrative costs:

$$Return\ on\ debt = Risk\ free\ rate\ + Debt\ risk\ premium + Debt\ raising\ costs$$

(equation 5)

81. The risk free rate is the rate of return of a hypothetical investment with no risk of financial loss, over a period of time.

82. The debt risk premium is the margin above the risk free rate of return required to compensate holders of debt securities for the risk in providing debt finance. The debt risk premium is compensation for investors who bear the extra risk, compared to that of a risk free asset.

83. Debt raising costs are the administrative costs and other charges incurred by businesses in raising finance.

84. The cost of debt estimate is based on prevailing rates just prior to each determination of the annual rail WACC update.

7.1.2 2018 rail approach

85. For the 2018 rail determination, the ERA recognised the long-term nature of the WACC estimate for rail.

86. For the 2018 determination, the ERA:

- Used 10-year Commonwealth Government bonds to estimate the risk free rate.
- Estimated the debt risk premium with a 10-year term.

87. The cost of debt estimate is based on prevailing rates on the days just prior to each determination of the annual rail WACC update. The ERA used a 40 business day averaging period for estimating the on-the-day risk free rate and the debt risk premium for the rail WACC annual update.[24]

[24] ERA, *Final Determination: 2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, August 2019, p. 20.

88. For the 2018 determination, the ERA calculated the annual WACC for the period as at 30 June. For any given year where 30 June is not a business day, the ERA used the last business day before 30 June.

7.1.3 Draft determination

89. For the draft determination, the ERA continues its approach to estimating the rail cost of debt as applied in 2018. This approach is based on a risk premium over and above the risk free rate, combined with a margin for administrative costs.

7.2 Risk free rate

7.2.1 Background

90. The risk free rate is the return an investor would expect when investing in an asset with no risk.

91. The risk free rate is the rate of return an investor receives from holding an asset with a guaranteed payment stream (that is, where there is no risk of default). Since there is no likelihood of default, the return on risk free assets compensates investors for the time value of money.

7.2.2 2018 rail approach

92. For the 2018 rail determination, the ERA used the observed yield of 10-year Commonwealth Government bonds to estimate the nominal risk free rate.

93. The 10-year term was consistent with the long term WACC estimate.

94. The risk free rate was re-evaluated for each annual WACC determination for a 40 business day averaging period as at 30 June.

95. This risk free rate was used to inform estimates of both returns on equity and returns on debt.

7.2.3 Draft determination

96. To determine the best estimate of the risk free rate for equity, the ERA has considered:

- The most appropriate term for the risk free rate.
- The most appropriate choice of proxy instrument.

97. As discussed above, the ERA considers that the term for equity which would yield the best estimate of the efficient cost of equity is 10 years.

98. The ERA considers that 10 years is the most appropriate term for the equity risk free rate as it is the longest feasible term that can be reliably estimated from observed data. While Commonwealth Government Security bonds with maturities of greater than 10 years do exist, these bonds are not as liquid as the 10-year bond.

99. For the 2023 draft determination, the ERA continues the approach in the 2018 final determination and will estimate the risk free rate for equity using Commonwealth Government Security bonds as they are:

- essentially free from default risk
- relatively liquid
- transparently and regularly reported.

100. Commonwealth Government Security bonds are also commonly used by other Australian regulators and market practitioners to determine the risk free rate.

101. As the ERA sets the risk free rate based on a 10-year Commonwealth Government Security bond, this reflects the market's long term expectations and therefore is less affected by short term volatility in inflation and interest rate changes. This is consistent with the long term nature of the rail WACC and will also support a level of reduced volatility in the estimates of the risk free rate.

102. For the 2023 draft determination, the ERA determines the risk free rate by:

- Using observed yields from 10 year Commonwealth Government Security bonds.
- Using linear interpolation of observed yields of Commonwealth Government Security bonds.

103. The process by which the ERA calculates an estimate of the risk free rate is described below:

- The ERA maintains a 40 business day averaging period process in calculating the risk free rate. This procedure helps moderate the influence of any anomalous yields that may be present using a single point observation.
- The ERA applies a 10 year term to the relevant determination date and identifies the closest nominal bonds that lie either side of that date from the Bloomberg terminal. This requires the identification of two nominal Commonwealth Government Security bonds (closest bond maturity below 10-years and closest bond maturity above 10-years).
- Once identified, bond yield data is collected from the Bloomberg terminal for those bonds for every day of the averaging period.
- The ERA calculates an interpolated yield for every day of the averaging period.
- The mean is calculated from the above interpolated yields.
- An effective annual rate is then calculated using the abovementioned mean, where this final rate is the ERA's risk free rate estimate.

104. The bond data used for this draft determination is provided in Appendix 4.

105. For this draft determination the ERA applies a risk free rate of 3.63 per cent as a placeholder with an averaging period to 31 March 2023. Consistent with the requirements of the Code, the final determination will use an averaging period to 30 June 2023.

106. The risk free rate will be calculated every year by the ERA in the annual update to the rail WACC.

7.3 Debt risk premium

7.3.1 Background

107. The debt risk premium is the return above the risk free rate that lenders require to compensate them for the risk of providing debt funding to a benchmark business. The debt risk premium compensates holders of debt securities for the possibility of default by the issuer.

108. The debt risk premium is closely related to the risk of the business. When issuing debt in the form of bonds, a credit rating can be assigned that reflects the probability of default of the issuer, and therefore the risk present in the bond.

109. The debt risk premium relies on two inputs:

- The term of debt
- The benchmark credit rating.

110. To estimate a return on debt, a regulator needs to set a benchmark debt term.

111. The credit rating is defined as the forward-looking opinion provided by a ratings agency of an entity's credit risk. Credit ratings provide a broad classification of a firm's probability of defaulting on its debt obligations. Therefore, credit ratings represent the risk present in holding a debt instrument.

112. Credit ratings provide a broadly uniform measure of default risk. Firms with the same credit rating at a particular point in time should have similar levels of default risk.

113. Generally, the debt risk premium is higher when the credit rating is lower, and vice versa. A lower credit rating can be associated with a higher risk of default and lenders generally require higher compensation (a higher debt risk premium) for higher levels of risk.

114. For this reason, both listed and unlisted firms can be used where a credit rating is available.

7.3.2 2018 rail approach

7.3.2.1 Term of debt

115. For the 2018 rail determination, the ERA estimated the debt risk premium with a 10-year term for each of the rail entities.[25] This was consistent with the long-term nature of rail assets and its regulatory framework.

[25] ERA, *Final Determination: 2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, August 2019, p. 23.

7.3.2.2 Benchmark credit rating

116. For the 2018 rail determination, the ERA applied separate credit ratings to each of the rail entities. This practice reflected the differing operational and risk profiles of the individual rail business.[26]

117. For the 2018 determination, the ERA applied the following credit ratings to each of the rail entities:[27]

- A for the Public Transport Authority
- BBB+ for Arc Infrastructure
- BBB- for Pilbara Railways.

7.3.2.3 Estimation method – revised bond yield approach

118. For the 2018 determination, the ERA applied the revised bond yield approach to determine the debt risk premium.[28]

119. The debt risk premium for each benchmark entity rate was re-evaluated for each annual WACC determination.

7.3.3 Draft determination

7.3.3.1 Term of debt

120. For the draft determination, the ERA continues to estimate the debt risk premium with a 10-year term for each of the rail entities. This is consistent with the long-term nature of rail assets and its regulatory framework.

7.3.3.2 Benchmark credit rating

121. For the draft determination, the ERA continues to apply separate credit ratings to each of the rail entities. This practice reflects the differing risk profiles of the individual rail business.

122. The ERA has reviewed the credit ratings of the benchmark sample of firms. The tables below provide the credit ratings for each of the benchmark samples.

[26] ERA, *Final Determination: 2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, August 2019, p. 23.

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

[28] ERA, *Final Determination: 2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks, and the Pilbara Railways*, August 2019, p. 29.

Table 4: Credit ratings for the benchmark sample for the Public Transport Authority, 2023

Benchmark firm	Credit rating
Vinci	A-
Abertis Infraestructuras[29]	BBB-
Atlantia[30]	BB+
Getlink	BB
Macquarie Altas Roads[31]	N/A
Transurban	BBB+
West Japan Railway	AA
Central Japan Railway	AA
East Japan Railway	A+

Source: ERA analysis; Bloomberg

123. The above sample for the Public Transport Authority, which includes the four proposed new comparators from France and Japan, produces a range of credit ratings between BB and A+.

124. The risks faced by the Public Transport Authority are likely to be lower than those European toll road operators in its benchmark sample. On balance, the ERA considers that a benchmark of A remains appropriate.

Table 5: Credit ratings for the benchmark sample for Arc Infrastructure, 2023

Benchmark firm	Credit rating
Genesee & Wyoming	BB
Union Pacific	A-
Norfolk Southern	BBB+
Kansas City Southern	BBB
CSX	BBB+
Canadian Pacific Railway	BBB+
Canadian National Railway	A
Aurizon	BBB+
Toll	Delisted

29 Abertis Infraestructuras was acquired by Atlantia (now named Mundys), ACS Group and Hochtief in October 2018.

30 Atlantia changed its company name to Mundys on 15 March 2023.

31 In 2018, Macquarie Altas Roads changed its name to Atlas Arteria after entering an agreement to internalise management between Atlas Arteria and Macquarie Group.

Benchmark firm	Credit rating
Asciano	Delisted
Port of Tauranga	A-

Source: ERA analysis; Bloomberg

125. The above sample for Arc Infrastructure produces a range of credit ratings between BB and A.

126. The ERA considers that Arc Infrastructure is comparable to a median credit rating. Therefore, the above credit ratings do not suggest that Arc Infrastructure's BBB+ benchmark credit rating should change.

Table 6: Credit ratings for the benchmark sample for the Pilbara Railways, 2023

Benchmark firm	Credit rating
Genesee & Wyoming	BB
Union Pacific	A-
Norfolk Southern	BBB+
Kansas City Southern	BBB
CSX	BBB+
Canadian Pacific Railway	BBB+
Canadian National Railway	A
Aurizon	BBB+

Source: ERA analysis, Bloomberg

127. The above sample for the Pilbara Railways produces a range of credit ratings between BB and A.

128. While Genesse & Wyoming is the best comparator company for the Pilbara Railways, the ERA considers that a credit rating of BB is inappropriate.[32] Given that the benchmark efficient entity is assumed to minimise its cost of capital, the benchmark efficient entity would organise its capital structure to ensure an investment grade credit rating. Allowing a credit rating below investment grade would expose the benchmark efficient entity to greater financing costs than would be efficient.

129. For the benchmark credit rating of the Pilbara Railways, the ERA uses the credit rating of BBB-, which is at the lower end of credit ratings for the Pilbara Railways sample. This is consistent with the reasoning that the Pilbara Railways will face a higher level of risk relative to the comparators in their benchmark sample.

[32] Genesse & Wyoming is considered to be the only operationally comparable firm to the Pilbara Railways on the basis of it being the only class III regional and short-line operator.

130. For the draft determination, the ERA considers the following credit ratings are appropriate:

- A for the Public Transport Authority
- BBB+ for Arc Infrastructure
- BBB- for Pilbara Railways.

131. These credit ratings will remain fixed until the next rail WACC method review.

7.3.3.3 Estimation method – revised bond yield approach

132. For the draft determination, the ERA continues to apply the revised bond yield approach to determine the debt risk premium.

133. The ERA considers that the revised bond yield approach:

- Is transparent because the sample of bonds underlying the bond yield approach estimates is published.
- Is drawn from market data.
- Provides flexibility in sampling bonds within particular credit ratings.
- Reflects market conditions for a nominated averaging period.
- Recognises the reality that Australian firms also source debt funding overseas.
- Directly targets a debt tenor of 10 years.
- Is more robust to volatile market yields by virtue of using yield observations averaged over the averaging period instead of using methods based on one day of observations.

134. Estimating the debt risk premium involves the following steps:

- Step 1: Determining the benchmark sample – Identifying a sample of relevant domestic and international corporate bonds that reflect the credit rating of the benchmark efficient entity.
- Step 2: Collecting data and converting yields to Australian dollar equivalents.
- Step 3: Averaging yields over the averaging period – Calculating an average AUD equivalent bond yield for each bond across the averaging period.
- Step 4: Estimating curves – Estimating yield curves on this data by applying the Gaussian Kernel, Nelson-Siegel and Nelson-Siegel-Svensson techniques.
- Step 5: Estimating the cost of debt – Calculating the 10-year cost of debt estimate for each of the yield curves in the benchmark sample and augmented benchmark sample. Adjusting the bias of cost of debt estimates from the augmented sample.
- Step 6: Calculating the debt risk premium – Calculating the debt risk premium by subtracting the 10-year risk free rate from the 10-year cost of debt.

135. These steps determine the debt risk premium at a point in time, being the date of calculation.

136. To mitigate errors that may arise given the data limitations, the ERA augments the bond sample:

- The Public Transport Authority sample is extended from the A benchmark to A+/A/A-.
- The Arc Infrastructure sample is extended from the BBB+ benchmark to BBB+/BBB.
- The Pilbara railways sample is extended from the BBB- benchmark to BBB/BBB-.

137. To mitigate potential bias, the ERA first establishes the direction of the bias:

- If the bias in an augmented sample-based estimate is likely to be downward, the ERA uses the highest augmented sample-based estimate coming from the three estimation methods. This estimate is then averaged with the highest estimate from the original benchmark rated sample.
- The opposite approach is conducted if the bias is likely to be upward.

138. The 2023 bond sample sizes for each of the benchmark credit ratings are:

- 5 bonds for the Public Transport Authority A rated sample
- 68 bonds for the Arc Infrastructure BBB+ rated sample
- 13 bonds for the Pilbara Railways BBB- rated sample.

139. In 2023 the samples are augmented as follows:

- The Public Transport Authority sample was extended from the A benchmark to A+/A/A- increasing the sample from five to 64 bonds.
- The Arc Infrastructure sample was extended from the BBB+ benchmark to BBB+/BBB increasing the sample from 68 to 101 bonds.
- The Pilbara railways sample was extended from the BBB- benchmark to BBB/BBB- increasing the sample from 13 to 33 bonds.

7.3.3.4 Debt risk premium estimates

140. The results of the ERA's debt risk premium estimation method are outlined below.

141. The 10-year risk free rate for debt risk premium calculation is estimated from 10-year Australian Commonwealth Government securities.

Table 7: 2023 Public Transport Authority – Augmented and original benchmark sample debt risk premium estimates (%)

Approach	High	Mid	Low
A	2.650	2.595	1.798
A+/A/A-	2.077	2.049	1.994
Average of two lowest estimates			**1.896**

Source: ERA analysis, Bloomberg. As a placeholder the estimates use an averaging period to 31 March 2023. Consistent with the requirements of the Code, the final determination will use an averaging period to 30 June 2023.

142. The augmented Public Transport Authority sample is extended to allow the inclusion of A+ and A- rated bonds. Compared to the small addition of A+ bonds added to the sample, there are more A- bonds added. The larger number of A- bonds with a lower credit rating tends to bias the estimates upward. For this reason, the lowest A rated sample-based estimate (1.798 per cent) is averaged with the lowest of the augmented sample-based estimate (1.994 per cent) to produce an estimate of 1.896 per cent (see table above).

Table 8: 2023 Arc Infrastructure – Augmented and original benchmark sample debt risk premium estimates (%)

Approach	High	Mid	Low
BBB+	2.791	2.455	2.417
BBB+/BBB	2.653	2.459	2.428
Average of two lowest estimates			**2.423**

Source: ERA analysis, Bloomberg. As a placeholder the estimates use an averaging period to 31 March 2023. Consistent with the requirements of the Code, the final determination will use an averaging period to 30 June 2023.

143. The augmented Arc Infrastructure BBB+ sample is expanded to allow the inclusion of BBB rated bonds. The addition of bonds with a lower credit rating tends to bias the estimates upward. For this reason, the lowest BBB+ rated sample-based estimate (2.417 per cent) is averaged with the lowest of the augmented sample-based estimates (2.428 per cent) to produce an estimate of 2.423 per cent (see table above).

Table 9: 2023 Pilbara railways – Augmented and original benchmark sample debt risk premium estimates (%)

Approach	High	Mid	Low
BBB-	4.023	3.824	3.803
BBB/BBB-	2.786	2.766	2.763
Average of two highest estimates	**3.405**		

Source: ERA analysis, Bloomberg. As a placeholder the estimates use an averaging period to 31 March 2023. Consistent with the requirements of the Code, the final determination will use an averaging period to 30 June 2023.

144. The augmented Pilbara railways BBB- sample is extended to allow the inclusion of BBB rated bonds. The addition of bonds with a higher credit rating tends to bias the estimates downward. For this reason, the highest of the augmented sample-based debt risk premium estimates (2.786 per cent) is averaged with the highest BBB- rated sample-based estimate (4.023 per cent) to produce an estimate of 3.405 per cent (see table above).

145. For the draft determination, using the averaging period to 31 March 2023 as a placeholder, the 2023 debt risk premium across the three rail businesses are:

- 1.896 per cent for the Public Transport Authority
- 2.423 per cent for Arc Infrastructure
- 3.405 per cent for Pilbara Railways.

146. Consistent with the requirements of the Code, the final determination will use an averaging period to 30 June 2023.

147. The complete set of international bond samples contributing to these debt risk premium estimates is shown in Appendix 3.

148. The debt risk premium across the three rail businesses will be calculated every year by the ERA in the annual update to the rail WACC.

8. Debt-raising costs

8.1 Background

149. Debt-raising costs are the administrative costs incurred by businesses when obtaining finance.

150. Regulators across Australia have typically included allowances to account for the costs of raising finance in their regulatory decisions. Regulators take different approaches to the recovery of these financing costs through either:

- the rate of return
- operating expenditure

or

- the capitalisation of these costs.

151. Australian regulators use benchmark estimates to determine debt-raising costs. To do so, regulators attempt to derive an estimate of the cost of obtaining finance that reflects the costs that would be incurred by a well-managed efficient benchmark business operating in a competitive market.

152. Interest rate swaps are derivative contracts, which typically exchange – or swap – fixed-rate interest payments for floating-rate interest payments. They provide a means to hedge and manage risk, but also have a cost.

8.2 2018 rail approach

153. For the 2018 rail determination, the ERA applied an allowance of 0.100 per cent for debt-raising costs.

154. For the 2018 determination, the ERA did not consider that an allowance for hedging costs was warranted for the rail WACC.

8.3 Draft determination

155. The ERA reviewed debt raising costs as part of the 2022 gas rate of return instrument review. This included targeted consultation on a new report from Chairmont Consulting.[33]

156. The Chairmont Consulting report updated estimates for debt raising and hedging costs for current market conditions and proposed to increase the debt-raising allowance from 0.100 per cent to 0.155 per cent per annum.[34] This increase was due to additional costs of offshore issuance costs, the inclusion of costs for a second credit rating and additional annual surveillance costs.

[33] Chairmont, *Debt Raising and Hedging Costs*, December 2021.

[34] Chairmont, *Debt Raising and Hedging Costs*, December 2021.

157. The ERA considers that the recovery of debt-raising costs through the rate of return should only include the direct cost components recommended by the Allen Consulting Group in its 2004 report to the ACCC.[35] The approach set out in this report has been adopted by Australian regulators over the last 10 years. The ERA considered that this approach is robust, still relevant and fit for purpose.

158. The ERA does not consider indirect debt-raising costs should be included and considers that they cannot be compensated or recovered.

159. The ERA and other comparable Australian regulators have adopted estimates of debt raising costs ranging from 8.0 to 15.0 basis points per annum in previous regulatory decisions.[36]

160. The ERA engaged Chairmont to review debt raising costs for a regulated benchmark energy network that operates efficiently.[37]

161. Chairmont found that the allowance for debt raising costs should be increased from 0.100 per cent to 0.155 per cent per annum. Chairmont considered that an increase was needed to reflect higher offshore issuance costs and the inclusion of costs for a second credit rating and annual surveillance.[38]

162. In considering the advice from Chairmont, the ERA also considered an alternative method to calculate an underwriter/arranger fee, which had been proposed by Competition Economists Group (CEG).[39]

163. In considering debt raising costs, the ERA recognised the merits and limitations of each of the methods used by Chairmont and CEG in estimating the debt raising costs. These include that:

- CEG used market data from Bloomberg to estimate the arranger fee.
- Chairmont undertook informal interviews with several financial market intermediaries and service providers to assist with determining the debt raising costs.

164. In the 2022 final gas rate of return instrument, the ERA:[40]

- Maintained that debt raising costs should be based on direct costs consistent with established regulatory practices.
- Considered that debt raising costs should be estimated using Chairmont's updated estimate of 0.155 per cent per annum and adjusted for a higher allowance for arranger fees.
- Considered that debt raising costs of 0.165 per cent per annum are appropriate.

35 The Allen Consulting Group, *Debt and Equity Raising Transaction Costs: Final Report*, December 2004.

36 ERA, *Explanatory statement for the 2022 final gas rate of return instrument*, 16 December 2022, p. 198.

37 Chairmont consulting, *Debt Raising and Hedging Costs*, 21 December 2021.

38 Chairmont consulting, *Debt Raising and Hedging Costs*, 21 December 2021, p. 2.

39 ERA, *Explanatory statement for the 2022 final gas rate of return instrument*, 16 December 2022, pp. 197-208.

40 ERA, *Explanatory statement for the 2022 final gas rate of return instrument*, 16 December 2022, pp. 197-208.

165. For this draft determination, the ERA applies an allowance of debt-raising costs of 0.165 per cent per annum for debt-raising costs.

166. This allowance for debt-raising costs will remain fixed until the next rail WACC method review.

167. For the draft determination, the ERA does not consider that an allowance for hedging costs is warranted for the rail WACC.

- As the rail regulatory horizon is long-term, rail firms have more certainty about the future and can enter into longer-term funding arrangements, which reduces the need for an efficient entity to hedge. The interest rate risk of the open-ended term of debt is adequately compensated for by using a 10-year term for the regulated risk-free rate.

- Unlike some other regulated industries, rail businesses are not subject to periodic (for example, five-year) regulatory resets of the WACC. There is therefore no need to hedge this risk.

9. Cost of equity

9.1 Approach to cost of equity

9.1.1 Background

168. The cost of equity is the return that equity investors require from a firm to compensate them for the risk they take by investing their capital.

169. There are no readily observable proxies for the expected return on equity. While estimates of the cost of debt can be obtained by observing debt instruments, financial markets do not provide a directly observable proxy for the cost of equity, for either individual firms or for the market as a whole.

170. Estimating a forward-looking return on equity sufficient to enable regulated firms to recoup their prevailing equity financing costs requires the use of models. Generally, these models seek to explain the required return on equity through a relationship with risk.

171. The model most used by Australian regulators for quantifying the return on equity and associated risk has been the Sharpe-Lintner Capital Asset Pricing Model (CAPM).

172. This form of the CAPM directly estimates the required return on the equity share of an asset as a linear function of the risk free rate and a component reflecting the risk premium that investors would require over the risk free rate:

$$R_i = R_f + \beta_i (R_M - R_f)$$

(equation 6)

where:

R_i	is the required rate of return on equity for the asset, firm or industry in question
R_f	is the risk free rate
β_i	is the equity beta that describes how a particular portfolio i will follow the market which is defined as $\beta_i = cov(R_i, R_M)/var(R_M)$
$(R_M - R_f)$	is the market risk premium.

9.1.2 2018 rail approach

173. For the 2018 final determination, the ERA determined a single point estimate for the return on equity for each rail network using the Sharpe-Lintner CAPM.

174. The ERA separately estimated the following three parameters for the return on equity:

- the risk free rate
- the market risk premium
- the equity beta.

9.1.3 Draft determination

175. For the 2023 draft determination, the ERA continues to use the approach adopted for the 2018 final determination.

176. Australian regulators generally use the Sharpe-Lintner CAPM for the purposes of economic regulation to determine the return on equity. The ERA considers that the Sharpe-Lintner CAPM is:

- reflective of economic and finance principles and market information
- commonly used by regulators and market participants
- fit-for-purpose as it was developed for estimating the return on equity.

177. The ERA will determine a single point estimate for each rail network using the Sharpe-Lintner CAPM.

178. To estimate the return on equity, the ERA separately estimates:

- the risk free rate
- the market risk premium
- the equity beta.

179. The ERA separately considers how best to estimate these individual return on equity parameters to ensure they support the best estimate of an efficient forward looking return on equity that facilitates a contestable market for rail operations. The individual equity components are further discussed below.

9.2 Risk free rate

9.2.1 Background

180. The risk free rate is the return an investor would expect when investing in an asset with no risk.

181. The risk free rate is the rate of return an investor receives from holding an asset with a guaranteed payment stream (that is, where there is no risk of default). Since there is no likelihood of default, the return on risk free assets compensates investors for the time value of money.

9.2.2 2018 rail approach

182. For the 2018 final determination the ERA estimated the risk free rate using Commonwealth Government Security bonds with a 10-year term.

183. This 10-year term was consistent with the term for debt, where the ERA applied the same term to estimate components of the final WACC.

9.2.3 Draft determination

184. For the 2023 draft determination the ERA continues the approach in the 2018 final determination and estimates the risk free rate using Commonwealth Government Security bonds with a ten-year term for the reasons provided in Section 7.2.

185. This risk free rate is identical to the one for the return on debt and is calculated according to Section 7.2.3.

186. For this draft determination the ERA applies a risk free rate of 3.63 per cent as a placeholder with an averaging period to 31 March 2023. Consistent with the requirements of the Code, the final determination will use an averaging period to 30 June 2023.

187. The risk free rate will be calculated every year by the ERA in the annual update to the rail WACC.

9.3 Market risk premium

9.3.1 Background

188. The ERA uses the Sharpe-Lintner CAPM to estimate the return on equity. The market risk premium is a parameter of the Sharpe-Lintner CAPM.

189. The market risk premium is the expected rate of return over and above the risk free rate that investors require to invest in a fully diversified portfolio. Ex ante, investors always require a rate of return above the risk free rate to invest and so the expected market risk premium is always positive. Ex post, the realised return to the market portfolio may be negative; that is the nature of risk. To establish the cost of capital, it is the ex ante market premium that is relevant.

190. The market risk premium compensates an investor for the systematic risk of investing in a fully diversified portfolio. Systematic risk is risk that cannot be diversified away by investors because it affects all firms in the market. Therefore, the market risk premium represents an investor's required return, over and above the risk free rate of return, on a fully diversified portfolio of assets. This is a forward looking concept.

191. The market risk premium is calculated as follows:

$$MRP = R_M - R_F \qquad \text{(equation 7)}$$

where:

R_M is the expected market return on equity observed in the Australian stock market

R_F is the risk free rate of return.

192. While estimates of the cost of debt can be obtained by observing debt instruments, financial markets do not provide a directly observable proxy for the cost of equity for either individual firms or the market as a whole. The market risk premium cannot be directly observed because it depends on investor expectations which are unobservable. In order to set the return on equity, the market risk premium needs to be estimated for a future time period.

193. For rail networks, the ERA's forward-looking market risk premium is estimated for a 10-year period, consistent with the long lives of rail networks and the regulatory framework.

9.3.2 2018 rail approach

194. The 2018 determination considered multiple methods that could be considered when estimating the expected market risk premium. The final approach can be summarised by the following:

- Consideration of the historic market risk premium and dividend growth models (DGM).
- Greater reliance on the historic market risk premium estimates relative to DGM estimates.
- A final point estimate of the market risk premium determined by using regulatory judgement considering the relative merits of all relevant material.
- The final point estimate of the market risk premium rounded to one decimal point.

195. The historic market risk premium was determined to be 5.6 per cent as at December 2017. The DGM was determined to be 7.2 per cent using a two-stage model as at October 2018.

196. The ERA applied a final point estimate of 5.9 per cent on the basis of all available information and regulatory discretion.

197. This market risk premium was to be applied to all rail networks and fixed until the next rail WACC method review.

9.3.3 Draft determination

198. The 2023 draft determination generally continues the approach applied for the 2018 final determination but proposes to simplify and refine its current approach to calculating the market risk premium and to update the market risk premium based on current market information.

199. The ERA considered a range of information including expert views, academic literature, market data, stakeholder submissions and other information to inform its review of the gas rate of return instrument and determined how best to estimate the rate of return, including the market risk premium.

200. The ERA's proposed refinements for the 2023 draft determination include:

Estimation of the historic market risk premium

- Only considering market risk premia post-1958 given the data quality issues and representativeness of returns of the 1883-1958 period.
- Including an additional subperiod (2000 onwards).
- Solely relying on Brailsford, Handley and Maheswaran (BHM) historical equity data.

- Refining the use of the arithmetic and geometric means.

Estimation of the dividend growth model

- Averaging the dividend growth model estimates over six months.

201. Further detail on the ERA's market risk premium can be found in the explanatory statement to the 2022 Final Gas Rate of Return Instrument.[41]

202. The following discusses how the ERA will determine the expected market risk premium.

9.3.3.1 Historic market risk premium

203. The ERA estimates the historic market risk premium using current data and largely maintains the approach detailed in the 2018 final determination. The historic market risk premium can be directly measured. The Ibbotson approach is a well-accepted method for calculating the market risk premium using historic data.

204. As the ERA is using a 10-year term for equity, the risk free rate for the market risk premium will also be determined using a 10-year term.

205. The ERA will estimate the market risk premium using the Ibbotson method, which requires the selection of a time period to analyse historical data over.

206. The length of the estimation window involves a trade-off between relevance of the data and statistical robustness:

- Longer periods can include behaviour in the data that is no longer relevant due to changing economic and market conditions.
- However, shorter periods may produce estimates that are less statistically robust.

207. The ERA has adjusted its sampling periods to better reflect forward expectations and simplify its process.

- The historical returns from over 100 years ago may not be relevant to future expected returns as significant market and economic changes have occurred during the period from 1883 to the present that introduce the likelihood of structural breaks that are only partially accounted for by the discrete time periods used.
- The AER and Pink Lake Analytics have raised concerns about data quality for returns pre-1932.[42,43]
- The dividend component of total returns estimated pre-1958 could have been overstated due to methodological issues from an equal weighting approach.[44]

208. The 2023 draft determination is to have regard to more recent time periods and use post-1958 data.

---

41 ERA, *Explanatory statement for the 2022 final gas rate of return instrument*, December 2022, pp. 129-145

42 AER, *Rate of return instrument, Explanatory statement*, December 2018, pp. 240-244, 247-249.

43 Pink Lake Analytics, *Estimation of the Market Risk Premium*, December 2017, pp. 7-9.

44 AER, *Equity Omnibus, Draft working paper*, July 2021, p. 22.

209. For the estimation of the historic market risk premium for the 2023 draft determination the ERA will use the following four overlapping periods:

- 1958 to current
- 1980 to current
- 1988 to current
- 2000 to current.

210. The ERA maintains the use of multiple sub-periods. The ERA considers that the periods chosen represent structural changes in the economy and financial markets that cannot be pooled together into a single period.

211. The 2018 final determination used two datasets from BHM and NERA.

- BHM have produced the furthest backdated source of historical equity risk premium data for Australia. BHM's data series is, in part, based on a series constructed by Lamberton and the Sydney Stock Exchange (now the ASX).[45]
- In 2013, NERA raised concerns about the possibility of a downward bias in some of the older data observations in this dataset and produced an adjusted version of the BHM data.[46]

212. The NERA and BHM datasets prior to 1958 produce some different numbers.

213. The AER solely relies on the BHM dataset as it recognised that relatively few adjustments separated the two datasets and that the more recent periods converged.[47]

214. The ERA's approach for the 2023 draft determination is to simplify its method through the sole use of the BHM dataset to estimate the historic market risk premium:

- With the ERA's move to data post-1958, both the BHM and NERA data converges, which makes the NERA dataset redundant.
- Given that BHM is the original dataset, the ERA will solely use the BHM dataset for the purposes of estimating the market risk premium.
- In the interests of simplification and replication, the ERA will also align the dividend imputation methods of the historic market risk premium with that of the DGM.

45 Brailsford, T., Handley, J. and Maheswaran, K., *Re-examination of the historical equity risk premium in Australia*, Accounting and Finance, Vol. 48, 2008, pp. 78-79.

46 NERA, *The market size and value premiums*, June 2013.

47 AER, *Rate of return instrument, Explanatory statement*, December 2018, pp. 248-249.

215. When applying the historic market risk premium an averaging method must be selected to apply to historical returns. There are two averaging methods which can be used to derive an annualised return — the arithmetic and geometric average.[48]

216. A thorough consideration of arithmetic and geometric means can be found in the explanatory statement to the 2022 Final Gas Rate of Return Instrument.[49]

217. For the 2023 draft determination the ERA considers that an unbiased estimate of the historic market risk premium is likely to be somewhere between the arithmetic average and the geometric average. The ERA continues to support the use of both the arithmetic and geometric means.

218. The ERA has considered the evaluation of statistical weighting approaches undertaken by Pink Lake Analytics.[50] It considers that the optimal weights from the evaluated schemes are highly sensitive to assumptions regarding the data generation process of returns, the forecast window and which objective function is preferred for determining forecast error for the purposes of economic regulation.

219. These sensitivities make it difficult to find a robust way to estimate which weights should be provided to the arithmetic and geometric means through statistical methods. As such, the ERA will set the historic market risk premium estimate informed by the theoretical and analytical conclusions from the Pink Lake Analytics report.

220. For the 2023 draft determination the ERA considers that the weight of evidence lies in favour of providing greater weight to the arithmetic mean. This approach recognises that:

- To the extent that arithmetic or geometric means are biased, a combined approach is more likely to result in a robust estimate.
- An unbiased estimate of the historic market risk premium is likely to be somewhere between the geometric average and the arithmetic average.
- Given the volatility of returns over time, an investor may consider different investment horizons.

---

48 The arithmetic mean is also called the simple average, which is the sum of all numbers in the series divided by the count of all numbers. The arithmetic mean formula is:

$$Arithmetic\ Mean = \frac{\sum_{i=1}^{n} x}{n} = \frac{x_1 + x_2 + \cdots + x_n}{n}$$

The geometric mean is the average of a set of products. The geometric mean formula is:

$$Geometric\ Mean = \left(\prod_{i=1}^{n} x\right)^{\frac{1}{n}} = \sqrt[n]{x_1 \cdot x_2 \cdots x_n}$$

When geometric mean works with percentage returns, the formula is altered to reflect the compounding effect, as below:

$$Geometric\ Mean\ for\ \%\ return = \sqrt[n]{(1 + x_1\%) \cdot (1 + x_2\%) \cdots (1 + x_n\%)} - 1$$

49 ERA, *Explanatory statement for the 2022 final gas rate of return instrument*, December 2022, pp. 133-145

50 Pink Lake Analytics, *Evaluating the Market Risk Premium – Statistical properties of the historic market risk premium*, November 2022.

- Investor practice may favour and place more weight on the arithmetic mean.

221. After considering the above information the ERA considers that an unbiased estimate of the historic market risk premium is likely to be closer to the arithmetic average than the geometric average. The ERA will calculate the historic market risk premium estimate as the weighted average of the arithmetic mean (60 per cent) and geometric mean (40 per cent).

222. For the 2023 draft determination the ERA's historic market risk premium estimation no longer relies on two points (lowest arithmetic mean and highest geometric mean). The ERA instead now incorporates all the data periods to calculate an arithmetic mean and a geometric mean. The ERA then applies a weighting to the resulting arithmetic and geometric means.

223. The ERA considers that the above approach has the following advantages:

- Greater use of all the sample periods, whereas the previous minimum/maximum method takes into account only two periods.
- Does not result in a potential mismatch between the time periods that are chosen with the minimum/maximum approach for the arithmetic and geometric means.
- Through the incorporation of overlapping periods, places more weight on more recent data.
- Places relatively more weight to arithmetic returns than geometric returns as a closer description of how revenues are set and accords with the evidence on investor practices.

224. The estimates of the historic market risk premium are detailed in Table 10.

Table 10: Draft determination historic market risk premium (%)

Time period	Arithmetic mean	Geometric mean
1958-2022	6.63	4.45
1980-2022	6.62	4.60
1988-2022	6.30	4.89
2000-2022	6.44	4.96
Mean	6.50	4.73
Weights	60	40
Historic market risk premium estimate	**5.8**	

Source: ERA analysis.

225. For the 2023 draft determination, the ERA applies a historic market risk premium estimate of 5.8 per cent.

9.3.3.2 Dividend Growth Models

226. The DGM uses an assumed forecast dividend growth rate and current share prices to estimate an implied market risk premium. This forward-looking discount rate is the implied market return on equity.

227. The DGM is based on the following formula to calculate a stock or market index price as presented below.

$$Market\ price\ = \frac{Current\ value\ of\ the\ dividend\ \times (1 + dividend\ growth\ rate)}{Market\ rate\ of\ return - Assumed\ dividend\ growth\ rate}$$

(equation 8)

228. Through rearranging the above formula an implied market rate of return (r) can be calculated from market price (p), current dividend (D_0) and an assumed dividend growth rate (g). The market risk premium can then be calculated by using that market rate of return and subtracting the risk free rate.

229. The 2018 final determination used the DGM to help estimate the market risk premium. However, the ERA acknowledged that there were significant issues with the DGM, but it was a forward-looking model that may provide information about investor expectations of the market risk premium.

230. The ERA used a two-stage DGM. This DGM specification assumed that dividends grow at the long-term growth rate following the dividend forecast period. The ERA's dividend growth model estimate used a growth rate from Dr Lally of 4.6 per cent.[51]

231. While the DGM has the benefit of taking the current economic outlook into account, it is unreliable on its own. The DGM suffers from some weaknesses including the form of the model, its input assumptions, its sensitivity to assumptions and its upward bias. The ERA held concern with the use of the DGM and did not place a large reliance on the model's market risk premium estimate.

232. The 2023 draft determination continues the use of the DGM to contribute to the estimate of the market risk premium.

233. The ERA supports the usage of a simple two-stage approach to the estimation of the implied market risk premium from the DGM. The ERA's DGM estimate retains a growth rate from Dr Lally of 4.6 per cent.

234. Previous analysis by the ERA has revealed that DGM estimates can vary substantially month to month.

235. Accordingly, for the 2023 draft determination, to reduce sensitivity the ERA improves its estimation approach by estimating the DGM monthly in the six months prior to the relevant determination. The DGM estimates of the market risk premium are detailed in Table 11. The average of these estimates will be the DGM estimate.

[51] ERA, *Final Rate of Return Guidelines (2018)*, December 2018, p. 30.

Table 11: Draft determination dividend growth model estimates (%)

	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	Mar 2023	Mean
DGM implied return	10.54	10.26	10.47	9.87	9.95	9.88	10.16
Risk Free Rate	3.92	3.71	3.57	3.62	3.71	3.47	3.67
DGM market risk premium	6.62	6.56	6.90	6.25	6.24	6.41	6.50
DGM estimate							**6.5**

Source: ERA analysis.

236. For the 2023 draft determination, the ERA applies a DGM estimate of 6.5 per cent.

237. For the purposes of the draft determination, the ERA's implementation of the DGM is sufficient to provide a conditional estimate of the market risk premium. However, it still has concerns regarding the DGM that it cannot put equal weight on the DGM estimate as the historic market risk premium estimate.

9.3.3.3 Conditioning Variables

238. In its determinations for electricity and gas networks, the ERA adopted forward looking indicators of market conditions to inform its regulatory judgement to determine a point estimate of the market risk premium. These indicators included:

- dividend yields on the All Ordinaries Index
- interest rate swap spreads
- default spreads
- the Australian Stock Exchange (ASX) 200 volatility index.

239. While these conditioning forward-looking indicators were relevant for gas and electricity, these indicators may be of limited relevance for setting the rail WACC. This is because the rate of return for railways regulated under the Code is long term, approaching 50 years. The indicators used for electricity and gas decisions likely to have limited relevance for the rail WACC estimates as they are more reflective of current market conditions.

9.3.3.4 Determination of the point estimate

240. For the 2023 draft determination the ERA maintains its preference for the historic market risk premium approach as it accords with a plausible model of investor behaviour, where investor expectations are shaped by past information (realised returns) and current practices (adopted methods). The historic market risk premium estimate can be considered as an unconditional estimate that informs the determination of the expected market risk premium.

241. It is consistent Australian regulatory practice that historical returns are considered when estimating the expected market risk premium. This also appears to be a consistent investor, market and academic practice.

242. The DGM receives less weight due to the ongoing concerns the ERA has about the proper implementation of the dividend growth model given the issues surrounding input assumptions, forecasts and variability of outputs. Until these matters are resolved the ERA will continue to put more weight on the historic market return estimates. The dividend growth model estimate can be considered to be a conditional estimate that helps inform the determination of the expected market risk premium.

243. For reasons expressed above the ERA will not use conditioning variables to assist in determining the point estimate of the expected market risk premium.

244. The historical market risk premium estimate (5.8 per cent) and the dividend growth model estimate (6.5 per cent) forms the information base for the exercise of the ERA's regulatory discretion.

245. For the 2023 draft determination the ERA adopts a market risk premium of 5.9 per cent. This is consistent with the estimate from the 2018 final determination, but on the basis of a refined methodology and updated for current returns.

246. The expected market risk premium will remain fixed until the next rail WACC method review.

9.4 Equity beta

9.4.1 Background

247. Equity beta is the 'slope' parameter β_i in the Sharpe-Lintner CAPM. The slope parameter β_i correlates the return on the specific asset, in excess of the risk free rate of return, to the return on the market portfolio.

$$R_e = R_f + \beta_e(R_m - R_f) \qquad \text{(equation 9)}$$

where:

R_e is the required rate of return on equity for the asset, firm or industry in question

R_f is the risk-free rate

β_e is the equity beta that describes how a particular portfolio i will follow the market which is defined as: $\beta_e = \frac{cov(r_i, r_M)}{var(r_M)}$

$(R_m - R_f)$ is the market risk premium, the MRP.

248. The risk of an asset is typically thought of as the variance in asset returns. This variance is a measure of the total risk of an asset. Total risk consists of systematic and non-systematic risk. Systematic risk is that part of total risk in a firm's returns that stems from the economy and markets more broadly. Systematic risk cannot be easily eliminated through diversification. Non-systematic risk is the risk stemming from unique attributes of the firm, which may be eliminated by an investor through diversification. For this reason, only systematic risk is compensated in the return on equity.

249. The equity beta is a parameter that measures the systematic risk of a security or a portfolio in comparison to the market as a whole.

250. Two risk factors are generally considered to affect the value of equity beta for a particular firm:

- The type of business, and associated capital assets, that the firm operates measured by asset or 'un-levered' beta.
- The amount of financial leverage (gearing) employed by the firm, which levers or 'amplifies' the asset beta to arrive at equity beta.

9.4.2 2018 rail approach

251. The 2018 final determination estimated a separate equity beta for each rail network using the following methodology:

- Henry's 2009 advice to the ACCC regarding equity beta estimation.
- 10 year weekly estimates.
- Using domestic and international comparators.
- Four estimators (Ordinary Least Squares (OLS), Least Absolute Deviation (LAD), Maximum Likelihood Robust (MM) and the Theil-Sen (TS) method).
- Deleveraging and leveraging asset betas to equity betas using the Brealey-Myers method.
- Applying regulatory discretion when assessing beta estimates to determine a final point estimate.

252. The ERA determined the following equity betas:

- The Public Transport Authority – an asset beta of 0.3, combined with estimated gearing of 50 per cent, which gives an equity beta of 0.6.
- Arc Infrastructure – an asset beta of 0.70, combined with estimated gearing of 25 per cent, which gives an equity beta of 0.9.
- Pilbara Railways – an asset beta of 1.00, combined with estimated gearing of 20 per cent, which gives an equity beta of 1.3.

253. Equity betas were fixed until the next rail WACC method review.

9.4.3 Draft determination

9.4.3.1 Methodology

254. The 2023 draft determination generally continues the approach applied for the 2018 final determination but proposes to adopt refinements in calculating equity beta, along with updating estimates based on current market information.

255. The ERA considered a range of information including expert views, academic literature, market data and other information to inform its review of the gas rate of return instrument and determined how best to estimate the rate of return, including equity beta.

256. To the extent possible, the ERA will align estimation techniques and methodologies for common parameters across the ERA's regulatory responsibilities. Accordingly, the ERA adopts the refinements and changes for equity beta methodology from the 2022 Final Gas Instrument for the rail WACC.

257. Further information regarding the ERA's equity beta methodology is provided in the explanatory statement to the 2022 final gas instrument.[52]

258. The ERA's proposed refinements for the 2023 draft determination include:

Estimation methodology

- Use of OLS and LAD estimators only.
- Sole use of Bloomberg data for market prices.

Comparator selection

- Preference for countries with similar legal, regulatory and institutional environments to Australia.
- Preference for countries with liquid and informationally efficient capital markets.
- Preference for countries with disclosures in English.
- Preference for comparators with material regulated activities.

259. The ERA notes that for rail there continues to be a lack of comparable Australian companies. Accordingly, and consistent with the 2018 rail WACC approach, the ERA relies on overseas railway network operators in order to form the benchmark samples to estimate equity beta for the Public Transport Authority, Arc Infrastructure and Pilbara Railways.

260. The ERA is aware that some firms in the previous benchmark sample have recently delisted which has resulted in a further reduction in sample size.

261. The ERA has some concerns with the use of small samples, including that:

- A forward-looking equity beta requires live firms that can incorporate information into prices, where historical estimates cannot incorporate information due to being delisted.
- A sample that is largely reflective of one firm deviates from a benchmark approach to an actuals approach.
- A small sample may be overly affected by the idiosyncratic position of one firm and its changes over time.
- A sample largely reflective of one firm also may be statistically unreliable.

[52] ERA, *Explanatory statement for the 2022 final gas rate of return instrument*, December 2022, pp. 160-192.

262. The ERA considers that market circumstances necessitated the examination of further international rail networks in the benchmark sample. The proposed filters are used to identify comparators with a similar degree of risk to the benchmark firm, to the closest extent possible given market realities.

263. The ERA acknowledges that it may not be possible to find additional comparators, but will endeavour to identify and propose suitable candidates for this draft determination.

264. For the 2023 draft determination, the ERA uses weekly data for the 10 year data period from 1 January 2013 to 31 December 2022 where possible. This is consistent with the long lives of rail assets and the Western Australian regulatory rail framework. For firms that have been delisted, the last available 10 years of weekly data is used instead.

265. Given the estimation uncertainty of the beta estimation process, the ERA will continue its practice of rounding to the nearest first decimal place.

266. The betas for the three benchmark samples are presented below.

9.4.3.2 Public Transport Authority equity beta

267. The ERA continues with the Public Transport Authority's benchmark sample for the purposes of estimating equity beta.

268. However, two comparators have been delisted as of 2022:

- Abertis Infraestructuras in 2018
- Atlantia in 2022.

269. As these delistings are relatively recent, the ERA considers that their equity beta estimates are still informative and provide market-based information regarding the Public Transport Authority's expected equity beta.

270. However, the sample size of live firms that can contribute to a market-based estimate has decreased by approximately 27 per cent due to these delistings. Accordingly, the ERA considers that it may be appropriate to examine additional comparators that may have a similar degree of risk to the Public Transport Authority.

271. After reviewing possible additional comparators, the ERA proposes the inclusion of four new comparators from France and Japan:

- Getlink, which operates the Channel tunnel from France to the United Kingdom, the Eurotunnel shuttles and Eurotunnel rail services for Eurostar.
- West Japan Railway Company, which operates the passenger rail network for western Japan.
- Central Japan Railway Company , which operates the passenger rail network for central Japan.
- East Japan Railway Company, which operates the passenger rail network for eastern Japan.

272. The ERA is aware that these proposed comparators do not strictly meet the proposed filters.

- The ERA notes that it currently includes European companies for the Public Transport Authority's benchmark sample. The ERA considers that the addition of Japanese firms to the benchmark sample would be consistent with its past approach given that Japan is an OECD and G20 country that shares similar characteristics with Australia.

- English is not the official language of either France or Japan. However, all four proposed comparators provide financial and shareholder disclosures in English.

- All Japanese comparators face price regulation for passenger rail services, while there is a regulatory price mechanism for Getlink's Eurotunnel operations. [53,54]

273. However, the alternative would be to estimate equity beta using a sample size that is currently very small and would be become increasingly historical.

274. The ERA considers that proceeding with a low benchmark sample with a significant number of delisted firms may deviate from a benchmark approach and forward looking incentive based regulation. This is especially the case where international comparators can be identified that have a similar degree of risk to the benchmark entity.

275. For the 10-year period from 1 January 2013 to 31 December 2022 (where possible), the asset beta estimates for the Public Transport Authority benchmark sample firms are presented in Table 12.

53 See for example JR West, *Outline of Government's Regulations on Railway Fares and Charges*, 2021.

54 Getlink is subject to economic regulation by the Inter-Governmental Commission, the French Rail Authority and the UK Office of Rail and Road, see Getlink, *2022 Universal Registration Document*, March 2023.

Table 12: Asset beta estimates for the Public Transport Authority benchmark sample

Name	Country	Industry	Listed	OLS	LAD	Mean
Vinci	FR	Toll Roads	Y	0.69	0.70	0.69
Getlink	FR	Rail	Y	0.51	0.45	0.48
Abertis Infraestructuras	ES	Toll Roads	N	0.31	0.31	0.31
Atlantia	IT	Toll Roads	N	0.35	0.28	0.31
European mean			**50%**	**0.47**	**0.43**	**0.45**
Central Japan Railway	JP	Rail	Y	0.42	0.45	0.43
East Japan Railway	JP	Rail	Y	0.40	0.37	0.39
West Japan Railway	JP	Rail	Y	0.46	0.46	0.46
Japanese mean			**100%**	**0.43**	**0.43**	**0.43**
Atlas Alteria	AU	Toll Roads	Y	0.46	0.39	0.42
Transurban	AU	Toll Roads	Y	0.49	0.44	0.46
Australian mean			**100%**	**0.48**	**0.41**	**0.44**
Mean of benchmark sample			**78%**	**0.46**	**0.42**	**0.44**

Source: ERA analysis from Bloomberg data.

276. The Public Transport Authority's benchmark sample produced the following estimates for asset beta:

- a mean of 0.44
- a range of 0.31 to 0.70.

277. The distribution of asset beta estimates is presented in Figure 1.

Figure 1: Asset beta distribution for the Public Transport Authority benchmark sample

Source: ERA analysis of Bloomberg data.

Note: Data labels refer to the Bloomberg ticker. For reference, ALX: Atlas Arteria, TCL: Transurban, DG: Vinci, GET: Getlink, ATL: Atlantia, ABE: Abertis Infraestructuras, 9020: East Japan Railway, 9021: West Japan Railway, 9022: Central Japan Railway.

278. For the 2018 final determination, the ERA concluded that:

- The systematic risk present in the 2018 benchmark sample above was expected to be higher than that of the Public Transport Authority rail network.
- The Public Transport Authority rail network primarily transports passengers via rail across the Perth Metropolitan area and its systematic risk was likely to be far lower than that of a toll road company.
- Vinci's systematic risk was likely to be higher than that of the Public Transport Authority network, as Vinci was a diversified business providing other services and owned and operated other types of assets.
- Consistent with the 2015 rail WACC review, the ERA used its discretion to select a relevant asset beta at the lower end of the empirically derived estimated range.
- Therefore, it was appropriate to maintain the Public Transport Authority's asset beta at 0.3.

279. For the 2023 draft determination, the ERA considers that:

- The systematic risk present in the toll roads of the proposed benchmark sample is still expected to be higher than that of the Public Transport Authority rail network.

- This is the case as the Public Transport Authority rail network has not changed since the 2018 review, where it primarily transports passengers via rail across the Perth Metropolitan area and its systematic risk is likely to be far lower than that of a toll road company.

- Additionally, the ERA notes that Vinci remains a diversified business providing other services and owning and operating other types of assets. The ERA maintains that Vinci's systematic risk is likely to be higher than that of the Public Transport Authority network.

- The systematic risk present in the passenger rail comparators of the proposed benchmark sample is also expected to be higher than that of the Public Transport Authority rail network.

- The systematic risk of the Japanese comparators is likely to be higher than the Public Transport Authority because of the other business lines that they engage in. These include activities such as merchandising, construction, hotels, and real estate.

- The systematic risk of Getlink is also likely to be higher due to the greater degree of commercial exposure that is correlated with general business conditions than that of a public transport provider.

280. Accordingly, the ERA exercises its regulatory discretion to select an asset beta at the lower end of the estimated sample.

281. Therefore, consistent with the 2018 rail WACC review, the ERA considers that for the 2023 draft determination it is appropriate to maintain the Public Transport Authority's asset beta at 0.3.

9.4.3.3 Arc Infrastructure equity beta

282. The ERA continues with the Arc Infrastructure benchmark sample for the purposes of estimating equity beta.

283. However, approximately 36 per cent of the sample is delisted as of 2022:

- Toll in 2015

- Asciano in 2016

- Genesee & Wyoming in 2019

- Kansas City Southern in 2021.

284. As the delisting for Genesee & Wyoming and Kansas City Southern are relatively recent, the ERA considers that their equity beta estimates are still informative and provide market-based information regarding Arc Infrastructure's expected equity beta.

285. However, the estimates for Toll and Asciano are now over half a decade old and may not be as informative as they were during the 2018 final determination.

286. Given the reduced sample size, the ERA considered including other comparators. However, the ERA is unable to identify further suitable comparators which have a similar degree of risk to Arc Infrastructure.

287. For the 10 year period from 1 January 2013 to 31 December 2022 (where possible), the asset beta estimates for the Arc Infrastructure benchmark sample firms are presented in Table 13.

Table 13: Asset beta estimates for the Arc Infrastructure benchmark sample

Name	Country	Industry	Listed	OLS	LAD	Mean
Genesee & Wyoming	US	Rail freight	N	0.98	0.95	0.96
Union Pacific	US	Rail freight	Y	0.85	0.82	0.84
Norfolk Southern	US	Rail freight	Y	0.83	0.81	0.82
Kansas City Southern	US	Rail freight	N	0.94	0.85	0.89
CSX	US	Rail freight	Y	0.85	0.83	0.84
US mean			**50%**	**0.89**	**0.85**	**0.87**
Canadian Pacific Railway	CAN	Rail freight	Y	0.82	0.82	0.82
Canadian National Railway	CAN	Rail freight	Y	0.70	0.70	0.70
Canadian mean			**100%**	**0.76**	**0.76**	**0.76**
Aurizon	AUS	Freight	Y	0.58	0.64	0.61
Toll	AUS	Freight	N	0.72	0.79	0.76
Asciano	AUS	Rail freight	N	0.70	0.57	0.63
Australian mean			**33%**	**0.67**	**0.67**	**0.67**
Port of Tauranga	NZ	Ports and cargo	Y	0.61	0.59	0.60
New Zealand mean			**100%**	**0.61**	**0.59**	**0.60**
Mean of benchmark sample			**64%**	**0.73**	**0.72**	**0.72**

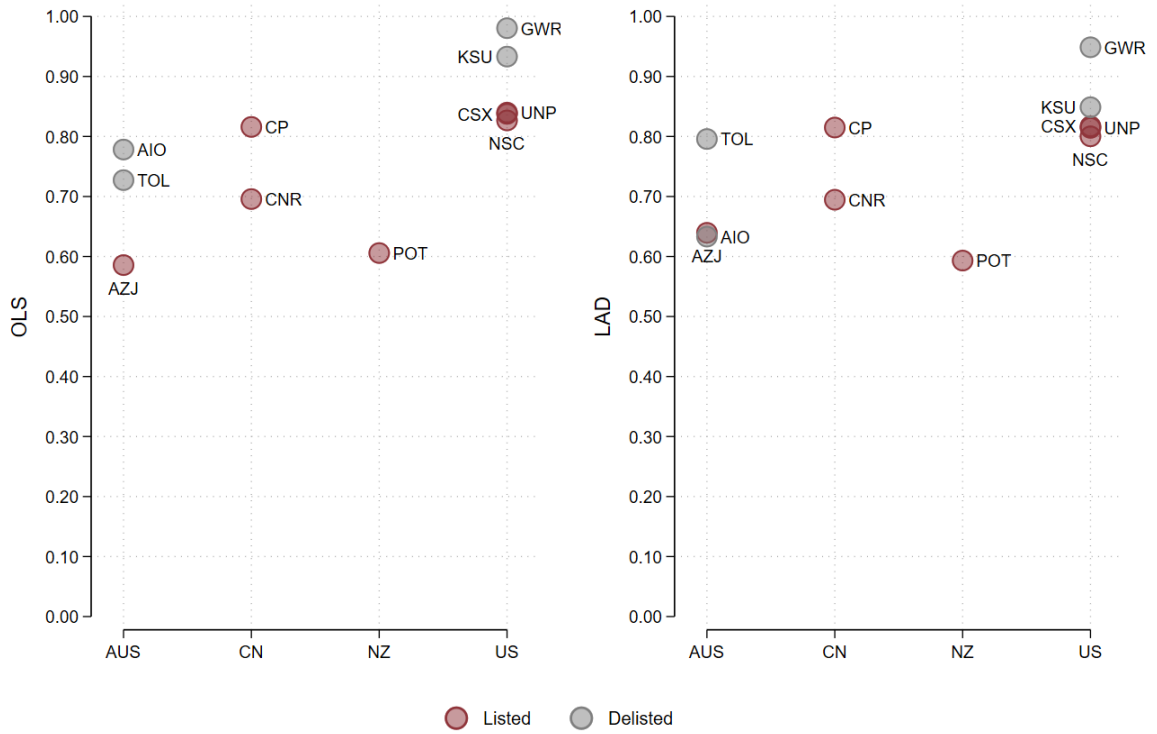
Source: ERA analysis from Bloomberg data.

288. Arc Infrastructure's benchmark sample produced the following asset beta results:

- a mean of 0.72
- a range of 0.57 to 0.98.

289. The distribution of asset beta estimates is presented in Figure 2.

Figure 2: Asset beta distribution for the Arc Infrastructure benchmark sample



Source: ERA analysis of Bloomberg data.

Note: Data labels refer to the Bloomberg ticker. For reference, AIO: Asciano, TOL: Toll, AZJ: Aurizon, CP: Canadian Pacific Railway, CNR: Canadian National Railway, POT: Port of Tauranga, GWR: Genesee & Wyoming, KSU: Kansas City Southern, CSX: CSX, UNP: Union Pacific, NSC: Norfolk Southern.

290. For the 2018 final determination, the ERA concluded that:

- The Aurizon network was not a directly comparable company to Arc Infrastructure.
- There were differences in the operations of the businesses which meant that it was likely that the Aurizon network would have a lower risk than that of the Arc Infrastructure network.
- Therefore, while Aurizon may have some value as a comparator, it was likely that Arc Infrastructure's asset beta would be higher.
- There was some value in considering Toll (which operates in similar markets) and Asciano (which incorporates rail operations).
- Overseas rail operators would possess a higher level of systematic risk, relative to an Australian railway operator.
- The New Zealand port comparator would have a lower level of systematic risk.
- The average estimate across regions for Arc Infrastructure's benchmark sample was 0.70.

- Accordingly, regulatory discretion was exercised to select a relevant asset beta close to the benchmark sample average across regions, but higher than that of Aurizon.

- Consistent with the 2015 rail WACC review, it was appropriate to maintain Arc Infrastructure's asset beta at 0.7.

291. For the 2023 draft determination, the ERA considers that:

- The Aurizon network is still not directly comparable to Arc Infrastructure for the reasons provided in the 2018 final determination.

- The estimates for Toll and Asciano are now becoming increasingly dated since their delisting over half a decade ago and will be accorded less weight through the exercise of regulatory discretion.

- Overseas rail operators will still possess a higher level of systematic risk, relative to an Australian railway operator.

- The New Zealand port comparator will still have a lower level of systematic risk.

- The average estimate across countries for Arc Infrastructure's benchmark sample is 0.73.

292. Accordingly, the ERA exercises its regulatory discretion to select an asset beta close to the benchmark sample average across countries, but higher than that of Aurizon.

293. Therefore, consistent with the 2018 rail WACC review, the ERA considers for the 2023 draft determination that it is appropriate to maintain Arc Infrastructure's asset beta at 0.7.

9.4.3.4 Pilbara Railways equity beta

294. The ERA continues with the Pilbara Railways' benchmark sample for the purposes of estimating equity beta.

295. However, approximately 29 per cent of comparators are delisted as of 2022:

- Genesee & Wyoming in 2019

- Kansas City Southern in 2021.

296. Given the reduced sample size, the ERA considered including other comparators. However, the ERA is unable to identify further suitable comparators which have a similar degree of risk to the Pilbara Railways.

297. For the 10 year period from 1 January 2013 to 31 December 2022 (where possible), the asset beta estimates for the Pilbara Railways benchmark sample firms are presented in Table 14.

Table 14: Asset beta estimates for the Pilbara Infrastructure benchmark sample

Name	Country	Industry	Listed	OLS	LAD	Mean
Genesee & Wyoming	US	Rail freight	N	0.98	0.95	0.96
Union Pacific	US	Rail freight	Y	0.85	0.82	0.84
Norfolk Southern	US	Rail freight	Y	0.83	0.81	0.82
Kansas City Southern	US	Rail freight	N	0.94	0.85	0.89
CSX	US	Rail freight	Y	0.85	0.83	0.84
US mean			**50%**	**0.89**	**0.85**	**0.87**
Canadian Pacific Railway	CAN	Rail freight	Y	0.82	0.82	0.82
Canadian National Railway	CAN	Rail freight	Y	0.70	0.70	0.70
Canadian mean			**100%**	**0.76**	**0.76**	**0.76**
Mean of benchmark sample			**71%**	**0.82**	**0.80**	**0.81**

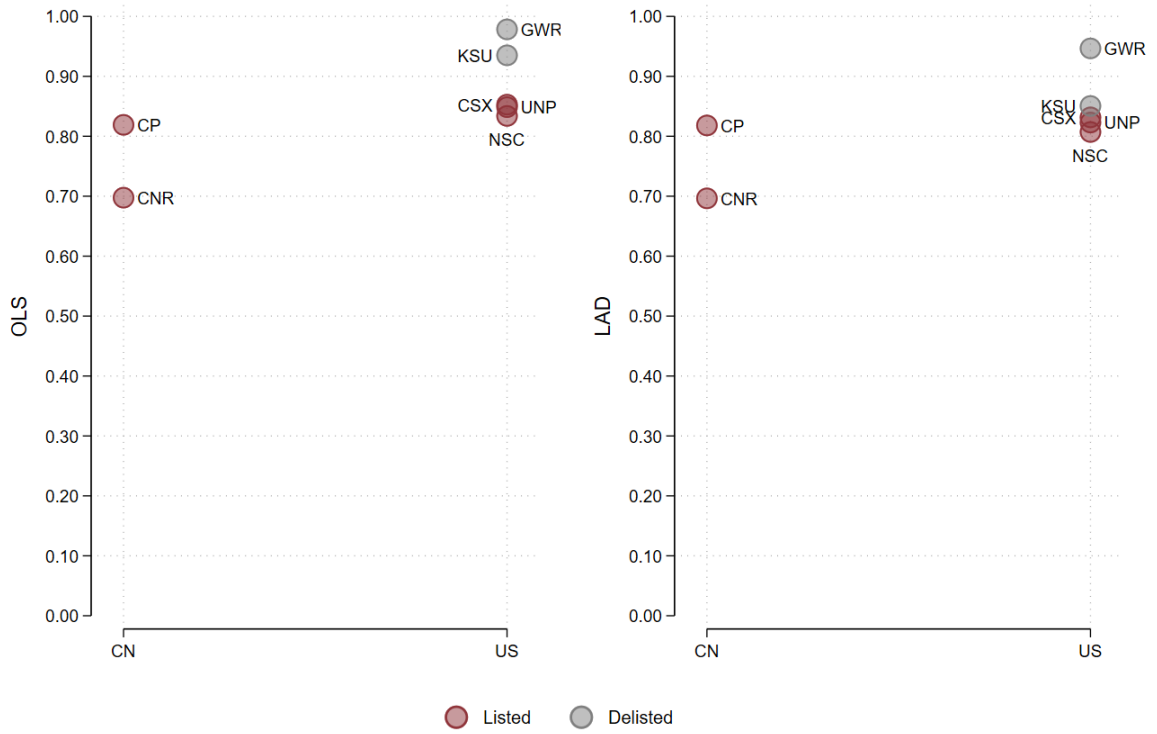
Source: ERA analysis from Bloomberg data.

298. The Pilbara Railways' benchmark sample produced the following asset beta results:

- a mean of 0.81
- a range of 0.70 to 0.98.

299. The distribution of asset beta estimates is presented in Figure 3.

Figure 3: Asset beta distribution for the Pilbara Railways benchmark sample



Source: ERA analysis of Bloomberg data.

Note: Data labels refer to the Bloomberg ticker. For reference, CP: Canadian Pacific Railway, CNR: Canadian National Railway, GWR: Genesee & Wyoming, KSU: Kansas City Southern, CSX: CSX, UNP: Union Pacific, NSC: Norfolk Southern.

300. For the 2018 final determination, the ERA concluded that:

- Genesee & Wyoming was likely to be the best comparator in the benchmark sample for the Pilbara Railways.
- Aurizon was not a direct comparator for the Pilbara Railways.
- Accordingly, regulatory discretion was exercised to select a relevant asset beta for the Pilbara Railways that placed the most weight on the Genesee & Wyoming estimate.
- Therefore, it was appropriate to set the Pilbara Railways' asset beta at 1.0.

301. For the 2023 draft determination, the ERA considers that:

- Genesee & Wyoming is still likely to be the best comparator in the benchmark sample for the Pilbara Railways. Though delisted, it is sufficiently recent such that its estimates are still informative.
- Aurizon is still not a direct comparator for the Pilbara Railways.
- Genesee & Wyoming's asset beta has reduced from 1.05 to 0.96 compared with the 2018 final determination.

- Additionally, the mean benchmark sample asset beta has also reduced from 0.91 to 0.81 compared with the 2018 final determination.

302. Accordingly, the ERA exercises its regulatory discretion to select an asset beta for the Pilbara Railways that places the most weight on the Genesee & Wyoming estimate. The ERA notes that the observed asset betas of the benchmark sample have been decreasing since the 2018 review, which has been confirmed from the estimates above.

303. Therefore, the ERA considers for the 2023 draft determination that it is appropriate to set the Pilbara Railways' asset beta at 0.9.

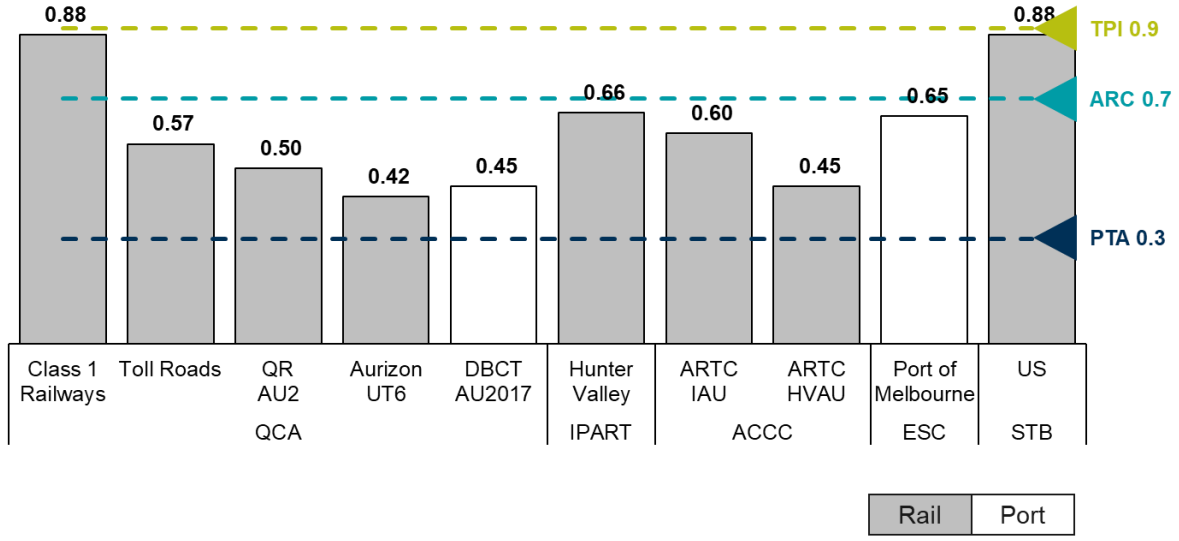
9.4.3.5 Equity beta point estimates

304. For the 2023 draft determination, the ERA applies the following betas:

- The Public Transport Authority – an asset beta of 0.3, combined with estimated gearing of 50 per cent, which gives an equity beta of 0.6.
- Arc Infrastructure – an asset beta of 0.7, combined with estimated gearing of 25 per cent, which gives an equity beta of 0.9.
- Pilbara Railways – an asset beta of 0.9, combined with estimated gearing of 20 per cent, which gives an equity beta of 1.1.

305. The ERA has also considered other economic regulator decisions as a reference point, focusing on asset betas which are illustrated in Figure 4.

Figure 4: Rail and Port asset betas from other economic regulators



Source: *QCA* (2021),[55] QCA (2020),[56] QCA(2018),[57]QCA (2016),[58] IPART (2019),[59] ACCC (2018),[60] ACCC (2017),[61] ESC (2022),[62] Brattle Group (2022),[63] ERA analysis.

Note: *Asset betas presented from either guidelines, access arrangements or reviews from economic regulators in Australia and the United States for rail and port assets, usually from OLS estimators. These estimates are all conducted at different points in time and are not strictly comparable. QCA assumes a debt beta exists in the calculation of their equity beta, but this does not affect the estimate of the asset beta. STB asset betas are calculated using the Brealey-Myers method.*

306. The ERA does not use such reference points in a mechanistic or deterministic manner. However, the ERA notes that the point estimates lie within the range of equity beta determinations from comparable regulators.

307. Equity betas will remain fixed until the next rail WACC method review.

55 QCA, *Rate of Return Review Final Report*, November 2021.

56 QCA, *Queensland Rail 2020 Draft Access Undertaking*, February 2020.

57 QCA, *Aurizon Network's 2017 draft access undertaking*, December 2018.

58 QCA, *DBCT Management's 2015 draft access undertaking*, November 2016.

59 IPART, *Rate of Return and Remaining Mine Life 2019-2024 Final Report*, July 2019.

60 ACCC, *Australian Rail Track Corporation's 2018 Interstate Access Undertaking Draft Decision*, December 2018.

61 ACCC, *Australian Rail Track Corporation's 2017 Hunter Valley Access Undertaking Draft Decision*, April 2017.

62 ESC, *Inquiry into the Port of Melbourne compliance with the pricing order – Final Report*, December 2021.

63 Brattle Group, *International Rate of Return Methods—Recent Developments*, September 2022.

10. Value of imputation credits (gamma)

10.1 Background

308. The imputation tax system prevents corporate profits from being taxed twice. Under the Australian imputation tax system, franking credits are distributed to investors at the time that dividends are paid and provide an offset to those investors' taxation liabilities.

309. The gamma parameter accounts for the reduction in the effective corporate taxation that is generated by the distribution of franking credits to investors. Generally, investors who can use franking credits will accept a lower required rate of return, before personal tax, on an investment that has franking credits, compared with an investment that has similar risk and no franking credits.

310. The ERA uses the Officer framework to adjust the WACC to incorporate the value of imputation credits.[64] This provides a framework for the calculation of a nominal pre tax WACC, as follows:

$$WACC_{nom} = R^{e}_{post} * \frac{1}{(1-T*(1-\gamma))} * \frac{E}{V} + R^{d}_{pre} * \frac{D}{V} \qquad \text{(equation 10)}$$

where:

$WACC_{nom}$	is the nominal pre-tax weighted average cost of capital
R^{e}_{post}	is the post-tax rate of return on equity, or cost of equity
R^{d}_{pre}	is the pre-tax rate of return on debt, or the cost of debt
T	is the tax rate
γ	is the value of imputation credits (gamma)
$\frac{E}{V}$	is the proportion of equity in the total financing (comprising equity and debt)
$\frac{D}{V}$	is the proportion of debt in the total financing.

311. Gamma is commonly estimated through the Monkhouse formula as the product of the distribution rate and the utilisation rate, as follows:[65]

gamma = distribution rate x utilisation rate (equation 11)

312. The distribution rate represents the proportion of imputation credits created that is expected to be distributed to investors. The distribution of franking credits differs amongst companies, primarily as a result of differences in shares of profit that are liable for taxation and the proportion of profits paid as dividends.

64 Officer, B., *The cost of capital of a company under an imputation tax system*, Accounting and Finance, May 1994.

65 Monkhouse, P., *The Valuation of Projects under a Dividend Imputation Tax System*, *Accounting and Finance 36*, 1996, pp. 185-212.

313. The utilisation rate is the weighted average of the utilisation rates of individual investors, with investors able to fully use the credits having a rate of one and those unable to use them having a rate of zero.

10.2 2018 rail approach

314. Under the 2018 rail approach the ERA determined gamma through the following approach:

- Gamma was determined through the Monkhouse formula as the product of the distribution rate and utilisation rate. The distribution rate and utilisation rate were separately estimated.
- The distribution rate represented the proportion of imputation credits generated by a benchmark efficient entity that is expected to be distributed to investors. The ERA considered that the distribution rate is a firm-specific rather than a market wide parameter.
- To estimate the distribution rate, the ERA relied on 0.9 for the distribution rate from financial reports of the 50 largest ASX-listed firms.
- The ERA considered that the distribution rate was at least 0.9.
- The utilisation rate was the weighted average over the utilisation rates of individual investors, with investors able to fully use the credits having a rate of one and those unable to use them having a rate of zero. The ERA considered that the utilisation rate is a market-wide rather than a firm specific parameter.
- To estimate the utilisation rate, the ERA relied on the equity ownership approach to determine the percentage of domestic investors in the Australian equity market. The utilisation rate was estimated for all Australian equity from the national accounts of the ABS. The ERA considered that a utilisation rate of 0.6 was appropriate.

315. The 2018 rail approach applied a gamma of 0.5, being the product between the distribution rate of 0.9 and a utilisation rate of 0.6.

316. Gamma remained fixed until the next rail WACC method review.

10.3 Draft determination

317. For the draft determination, the ERA continues its approach to determine gamma based on the utilisation approach using the Monkhouse formula as the product of the distribution rate and the utilisation rate.

318. For the draft determination, the ERA applies a gamma of 0.5.

319. Gamma will remain fixed until the next rail WACC method review.

320. Over the course of its reviews of electricity, gas and rail rates of return, the ERA has considered gamma. The ERA's current approach to gamma is based on:

- Contemporary Australian Competition Tribunal and Federal Court judicial reviews, which supported the use of the utilisation approach.
- Consideration of available data, including reviewing the limitations of ATO data for the estimation of gamma.
- Expert reports and analysis, which presented new methods and numbers to inform improved calculations of gamma.

321. The ERA separately estimates the distribution rate and utilisation rate, which is discussed below.

10.3.1 The distribution rate

322. The distribution rate represents the proportion of imputation credits created that is expected to be distributed to investors. The ERA considers that the distribution rate is a firm-specific parameter, rather than being a market-wide parameter.

323. The ERA's estimates that the distribution rate is 0.9. This is based on Dr Lally's estimate of the distribution rate based on the financial reports of the 50 largest ASX-listed firms (0.887), rounded to one decimal place.[66]

324. Further, the ERA considers that Dr Lally's finding that the distribution rate may be slightly higher with the removal of foreign operations supports the view that the distribution rate should be at least 0.9.[67]

325. For the three rail benchmark efficient entities, it is difficult to construct a data set for such companies, particularly where some benchmark sample firms are overseas entities to which the Australian tax imputation system does not apply. The definition of the benchmark efficient entity is an entity that operates in Australia and has a similar degree of risk as that which applies to the particular regulated entity. Consistent with the 2018 rail WACC approach, to estimate the distribution rate for the ERA considered an appropriate approach was to use data from a broader range of companies. The ERA, therefore, considers that the 50 largest ASX-listed firms was a reasonable set of companies. Data from financial statements was of high quality given it was audited and subject to scrutiny in financial markets.

326. Accordingly, for this draft determination the ERA's estimate of the distribution rate is 0.9.

---

66 Dr Lally, M., *Estimating the Distribution Rate for Imputation Credits for the Top 50 ASX Companies*, June 2021, p. 3.

67 Dr Lally, M., *Estimating the Distribution Rate for Imputation Credits for the Top 50 ASX Companies*, June 2021, pp. 3-4.

10.3.2 The utilisation rate

327. The utilisation rate is the weighted average of the utilisation rates of individual investors. Investors who are able to fully use the credits have a rate of one and those unable to use them have a rate of zero. The ERA considers that the utilisation rate is a market-wide parameter, rather than a firm-specific parameter.

328. The ERA's estimate of the utilisation rate is derived using the equity ownership approach to determine the value-weighted percentage of domestic investors in the Australian equity market.

329. The ERA considers it appropriate to base its estimate of the utilisation rate on listed equity due to the different considerations regarding dividend policy in listed and unlisted businesses.

330. Dr Lally found that many unlisted companies are sole traders that have incorporated to reduce their tax rate (but only if they retain rather than distribute their profits), and many others are closely-held entities with dividend policy considerations quite different to those for listed companies.[68]

331. The ERA's estimate of the utilisation rate is from the national accounts of the ABS, based on a ten year average to December 2022 and rounded to the first decimal point.[69]

332. The ERA considers the ABS data is the best available data to estimate the utilisation rate. While it is possible to consider ATO taxation data as an alternative source, the ERA considers that they are not sufficiently reliable for that purpose. Further details regarding the ATO tax statistics can be found in the explanatory statement to the 2022 Final Gas Rate of Return Instrument.[70]

333. Accordingly, for this draft determination the ERA's estimate of the utilisation rate is 0.6.

10.3.3 Determination of the gamma point estimate

334. The ERA determines gamma as a product of the ERA's estimate of the distribution rate (0.9) and the utilisation rate (0.6) which provides a gamma of 0.5.

335. The ERA has also used a gamma of 0.5 for its most recent rate of return determinations.[71, 72]

336. Further detail on the ERA's gamma methodology can be found in the explanatory statement to the 2022 Final Gas Rate of Return Instrument.[73]

337. Gamma will be fixed until the next rail WACC review.

---

68 Dr Lally, M., *Gamma and the ACT Decision*, May 2016, p. 26.

69 ABS, *Australian National Accounts: Finance and Wealth, Catalogue 5232.0*, Tables 48 and 49.

70 ERA, *Explanatory statement for the 2022 final gas rate of return instrument*, December 2022, pp. 221-223.

71 ERA, *2022 Final Gas Rate of Return Instrument*, December 2022, p. 22.

72 ERA, *Final decision on proposed revisions to the access arrangement for the Western Power Network 2022/23 – 2026/27Attachment 5: Return on regulated asset base*, March 2023, pp. 71-73.

73 ERA, *Explanatory statement for the 2022 final gas rate of return instrument*, December 2022, pp. 219-220

11. Inflation

11.1 Background

338. Inflation is the rate of change in the general level of prices of goods and services.

339. Forecast inflation can be used to translate the nominal WACC to a real WACC.

340. A nominal rate of return incorporates the real rate of return, compounded with a rate that reflects expectations of inflation.

341. As stated in Section 3.3, the ERA calculates a nominal pre-tax WACC but provides an expected inflation estimate as a reference for stakeholders. The ERA utilises a consistent inflation forecast methodology across the ERA's regulatory regimes.

11.2 2018 rail approach

342. Under the 2018 rail approach the ERA used the Treasury bond implied inflation approach for the purpose of estimating inflation for rail networks.

343. To calculate forecast inflation for rail the ERA used the Fisher equation and the observed yields of:[74]

- 10 year Commonwealth Government Securities, which reflect a market based estimate of the nominal risk free rate.
- 10 year indexed Treasury bonds, which reflect a market based estimate of a real risk free rate.

344. This approach is known as the Treasury bond implied inflation approach and is based on the premise that the yield on Commonwealth Government Securities and the yield on Treasury bonds differ by an inflation component. This can be expressed in the equation below:

$$\pi = \frac{(1+ R_f)}{(1+ R_{Rf})} - 1 \qquad \text{(equation 12)}$$

where

π is the expected inflation rate

R_f is the 10-year nominal risk free rate of return estimated on Treasury Bonds

R_{Rf} is the 10-year real risk free rate of return estimated on Treasury indexed bonds.

[74] The formal Fisher equation is: $1 + i = (1 + r)(1 + \pi^e)$
where: *i* is the nominal interest rate, *r* is the real interest rate and π^e is the expected inflation rate.

11.3 Draft determination

345. For the draft determination, the ERA continues its approach to forecast inflation applied in 2018.

346. The ERA considers that the Treasury bond implied inflation approach provides the best estimate of inflation expectations for the purpose of estimating inflation for rail networks.

347. The ERA considers the Treasury bond implied inflation approach for estimating expected inflation should be applied as follows:

- Using linearly interpolated yields on 10 year Commonwealth Government Securities bonds.
- Use these daily point estimates of both the nominal 10 year risk free rate and the real ten year risk free rate, for use in the Fisher equation.

348. The ERA considers that recent increases in inflation and current inflation uncertainty underscores the need for a method for estimating expected inflation that is responsive to shifting and potentially volatile economic conditions and market expectations.

349. The Treasury bond implied inflation approach has the following advantages:

- It is a market-based approach. The rationale for using a market-based approach is that market prices reflect the aggregation of expectations of diverse market participants that invest and commit money. The forecasts of many different market participants are considered to contain more information and be more relevant than any one particular forecast model or method.
- The method is a dynamic market measure that is updated daily.
- The method is consistent with market forecasts built into other WACC parameters.
- The method is relatively easy to calculate.

350. The ERA considers that the term of expected inflation should be 10 years, consistent with the rail access regime as it offers the best estimate of what inflation is expected to be over the long run.

351. For this draft determination, the process by which the ERA calculates an inflation estimate is described below:

- The ERA maintains a 40 business day averaging period process in calculating the bond yields. This procedure helps moderate the influence of any anomalous yields that may be present using a single point observation.
- The ERA takes the 10 year risk free estimate as described in Section 7.2 as the nominal risk free rate estimate.
- To calculate the real risk free rate the ERA applies a 10 year term to the relevant determination date and identifies the closest indexed bonds that lie either side of that date from the Bloomberg terminal. This requires the identification of two indexed Commonwealth Government Security bonds.

- Once identified, bond yield data is collected from the Bloomberg terminal for those bonds for every day of the averaging period.
- The ERA calculates an interpolated yield for every day of the averaging period.
- The mean is calculated from the above interpolated yields.
- An effective annual rate is then calculated using the above mean.
- The inflation estimate is then calculated according to equation 11 using the estimates of the nominal and real risk free rates.

352. The bond data used for this draft determination is provided in Appendix 4.

353. For this draft determination the ERA applies an inflation rate of 2.34 per cent as a placeholder with an averaging period to 31 March 2023. Consistent with the requirements of the Code, the final determination will use an averaging period to 30 June 2023.

354. The expected inflation rate will be calculated every year by the ERA in the annual update to the rail WACC.

12. Draft determination on the rail rate of return

355. The ERA has reviewed the rail WACC approach considering available information and developments since the last review. The considerations of the ERA are set out in the preceding chapters.

356. Based upon the assessment of each rate of return parameter, the point estimates for each parameter that may reasonably be applied to Western Australian railways are detailed in Table 15.

357. For the purposes of the draft determination placeholder estimates use an averaging period to 31 March 2023. Consistent with the requirements of the Code, the final determination will use an averaging period to 30 June 2023.

358. For the draft determination, the ERA has determined a pre-tax nominal rate of return at 31 March 2023 of:

- 7.06 per cent for the Public Transport Authority
- 9.44 per cent for Arc Infrastructure
- 10.96 per cent for the Pilbara Railways.

Table 15: The ERA's draft determination for rail WACC for period to 31 March 2023

Parameter	Public Transport Authority	Arc Infrastructure	Pilbara Railways
	2023	2023	2023
Cost of equity parameters			
Nominal risk free rate (%)	3.63	3.63	3.63
Market risk premium	5.9	5.9	5.9
Equity beta	0.6	0.9	1.1
Nominal after tax return on equity (%)	**7.17**	**8.94**	**10.12**
Cost of debt parameters			
Nominal risk free rate (%)	3.63	3.63	3.63
Benchmark credit rating	A	BBB+	BBB-
Term of debt	10	10	10
Debt risk premium (%)	1.896	2.423	3.405
Debt issuing costs (%)	0.165	0.165	0.165
Nominal return on debt (%)	**5.69**	**6.22**	**7.20**
Other parameters			
Debt proportion (gearing) (%)	50	25	20
Forecast inflation rate (%)	2.34	2.34	2.34
Gamma	0.5	0.5	0.5
Corporate tax rate (%)	30	30	30
Weighted average cost of capital (%)			
Nominal after-tax WACC (%)	6.43	8.26	9.54
Real after tax-WACC (%)	4.00	5.78	7.03
Nominal pre-tax WACC (%)	**7.06**	**9.44**	**10.96**
Real pre-tax WACC (%)	4.62	6.94	8.43

Source: ERA analysis.

Appendix 1 List of Tables

Appendix 2 List of Figures

Appendix 3 2023 International bond sample

Table 16: Public Transport Authority bond sample

Ticker	Issuer (Short name)
EI452667 Corp	Rio Tinto Finance USA Ltd
BS198166 Corp	Rio Tinto Finance USA Ltd
EH437851 Corp	Rio Tinto Finance USA Ltd
EJ329466 Corp	Rio Tinto Finance USA PLC
EJ101048 Corp	Rio Tinto Finance USA PLC
ZL271656 Corp	BHP Billiton Finance USA Ltd
ZL271652 Corp	BHP Billiton Finance USA Ltd
ZL271657 Corp	BHP Billiton Finance USA Ltd
ZL342825 Corp	Telstra Group Ltd
EJ855408 Corp	BHP Billiton Finance USA Ltd
LW938501 Corp	SGSP Australia Assets Pty Ltd
AN129025 Corp	Telstra Corp Ltd
EJ372146 Corp	BHP Billiton Finance Ltd
BR897356 Corp	Wesfarmers Ltd
BW016119 Corp	CSL Finance PLC
AX729250 Corp	Telstra Corp Ltd
BW018337 Corp	CSL Finance PLC
AP811577 Corp	Telstra Corp Ltd
AZ151179 Corp	Optus Finance Pty Ltd
EJ038718 Corp	BHP Billiton Finance USA Ltd
BH885805 Corp	Telstra Corp Ltd
ZO283166 Corp	SGSP Australia Assets Pty Ltd
EJ651064 Corp	BHP Billiton Finance Ltd
EJ372241 Corp	BHP Billiton Finance Ltd
BP960220 Corp	Wesfarmers Ltd
EK875768 Corp	BHP Billiton Finance Ltd
BS422627 Corp	Optus Finance Pty Ltd
AO147640 Corp	SGSP Australia Assets Pty Ltd

Ticker	Issuer (Short name)
BP960362 Corp	Wesfarmers Ltd
DD105676 Corp	BHP Billiton Finance USA Ltd
JK730176 Corp	Telstra Corp Ltd
BK140531 Corp	Optus Finance Pty Ltd
BK140529 Corp	Optus Finance Pty Ltd
BW023383 Corp	CSL Finance PLC
BW018087 Corp	CSL Finance PLC
ZN734842 Corp	SGSP Australia Assets Pty Ltd
BW021641 Corp	CSL Finance PLC
EK835349 Corp	Telstra Corp Ltd
BP151663 Corp	Australian Gas Networks Ltd
BW023426 Corp	CSL Finance PLC
ZR653913 Corp	United Energy Distribution Pty Ltd
BS841983 Corp	SGSP Australia Assets Pty Ltd
AR868580 Corp	Victoria Power Networks Finance Pty Ltd
BP151662 Corp	Australian Gas Networks Ltd
ED104267 Corp	WMC Finance USA Ltd
ZN679766 Corp	SGSP Australia Assets Pty Ltd
BP046702 Corp	Victoria Power Networks Finance Pty Ltd
AO674434 Corp	Victoria Power Networks Finance Pty Ltd
BG207158 Corp	ETSA Utilities Finance Pty Ltd
BP086271 Corp	Victoria Power Networks Finance Pty Ltd
BQ959130 Corp	Victoria Power Networks Finance Pty Ltd
BP046707 Corp	Victoria Power Networks Finance Pty Ltd
BM363856 Corp	Victoria Power Networks Finance Pty Ltd
ZR723028 Corp	United Energy Distribution Pty Ltd
BQ269730 Corp	Victoria Power Networks Finance Pty Ltd
BG116601 Corp	SGSP Australia Assets Pty Ltd
BS474087 Corp	SGSP Australia Assets Pty Ltd
DD109142 Corp	WMC Finance USA Ltd

Ticker	Issuer (Short name)
AS177694 Corp	Victoria Power Networks Finance Pty Ltd
AZ677851 Corp	SGSP Australia Assets Pty Ltd
BX334069 Corp	Toyota Finance Australia Ltd
BT335203 Corp	Toyota Finance Australia Ltd
BH621666 Corp	Toyota Finance Australia Ltd
BW722531 Corp	PACCAR Financial Pty Ltd

Table 17: Arc Infrastructure bond sample

Ticker	Issuer (Short name)
BO221169 Corp	Glencore Capital Finance DAC
ZO292719 Corp	Glencore Capital Finance DAC
BO221170 Corp	Glencore Capital Finance DAC
BV712840 Corp	South32 Treasury Ltd
BR468470 Corp	Glencore Funding LLC
BV508582 Corp	AusNet Services Holdings Pty Ltd
LW077755 Corp	Aurizon Network Pty Ltd
BP375805 Corp	Newcastle Coal Infrastructure Group Pty Ltd
EK146211 Corp	Glencore Finance Europe Ltd
ZO140969 Corp	Glencore Funding LLC
AM402825 Corp	AusNet Services Holdings Pty Ltd
ZS106969 Corp	Glencore Finance Europe Ltd
BO149790 Corp	Aurizon Finance Pty Ltd
ZO072844 Corp	Aurizon Network Pty Ltd
AP138040 Corp	Brambles Finance PLC
ZO140967 Corp	Glencore Funding LLC
ZO408308 Corp	Transurban Finance Co Pty Ltd
BR468472 Corp	Glencore Funding LLC
BP207479 Corp	Glencore Funding LLC
AR226811 Corp	AusNet Services Holdings Pty Ltd

Ticker	Issuer (Short name)
BG070568 Corp	AusNet Services Holdings Pty Ltd
BP207461 Corp	Glencore Funding LLC
AX751745 Corp	Glencore Finance Europe Ltd
JK876383 Corp	Sydney Airport Finance Co Pty Ltd
EK755216 Corp	AusNet Services Holdings Pty Ltd
AX523734 Corp	Glencore Funding LLC
BP207481 Corp	Glencore Funding LLC
BO733251 Corp	WestConnex Finance Co Pty Ltd
BH496203 Corp	Transurban Finance Co Pty Ltd
AM946329 Corp	Glencore Funding LLC
AP678913 Corp	Glencore Funding LLC
AZ593934 Corp	AusNet Services Holdings Pty Ltd
AX393924 Corp	Woodside Finance Ltd
AS241348 Corp	Sydney Airport Finance Co Pty Ltd
EK849482 Corp	Glencore Funding LLC
ZS562160 Corp	Transurban Finance Co Pty Ltd
EI866858 Corp	Glencore Finance Canada Ltd
EJ410755 Corp	Glencore Finance Canada Ltd
QZ418350 Corp	Transurban Finance Co Pty Ltd
BM572667 Corp	AGI Finance Pty Ltd
EH033131 Corp	Glencore Finance Canada Ltd
EK878745 Corp	Sydney Airport Finance Co Pty Ltd
AO953984 Corp	Transurban Finance Co Pty Ltd
QJ413201 Corp	Transurban Finance Co Pty Ltd
QJ221786 Corp	Brambles USA Inc
BM413847 Corp	AGI Finance Pty Ltd
ZQ348432 Corp	Coles Group Treasury Pty Ltd
BQ008251 Corp	AGI Finance Pty Ltd
AZ347082 Corp	Transurban Finance Co Pty Ltd
AP094552 Corp	Newcastle Coal Infrastructure Group Pty Ltd

Ticker	Issuer (Short name)
AP044525 Corp	Woodside Finance Ltd
EK911822 Corp	Transurban Finance Co Pty Ltd
QZ372379 Corp	Woodside Finance Ltd
BQ008260 Corp	AGI Finance Pty Ltd
QJ539736 Corp	Australia Pacific Airports Melbourne Pty Ltd
ZO057190 Corp	Coles Group Treasury Pty Ltd
ZQ348382 Corp	Coles Group Treasury Pty Ltd
QZ932852 Corp	Australia Pacific Airports Melbourne Pty Ltd
AS533603 Corp	DBNGP Finance Co Pty Ltd
BK686761 Corp	AusNet Services Holdings Pty Ltd
BK686424 Corp	AusNet Services Holdings Pty Ltd
ZO056864 Corp	Coles Group Treasury Pty Ltd
AS664612 Corp	AusNet Services Holdings Pty Ltd
AR408024 Corp	AusNet Services Holdings Pty Ltd
BK686432 Corp	AusNet Services Holdings Pty Ltd
BK686434 Corp	AusNet Services Holdings Pty Ltd
AR408188 Corp	AusNet Services Holdings Pty Ltd
AS664625 Corp	AusNet Services Holdings Pty Ltd
BP749491 Corp	Worley US Finance Sub Ltd
QJ190880 Corp	BHP Billiton Finance Ltd
BO485266 Corp	APA Infrastructure Ltd
BJ442776 Corp	Woolworths Group Ltd
AX350089 Corp	Incitec Pivot Ltd
AO547987 Corp	Incitec Pivot Finance LLC
BK182364 Corp	Brisbane Airport Corp Pty Ltd
BJ368112 Corp	Newcrest Finance Pty Ltd
BR318092 Corp	Woolworths Group Ltd
BR642545 Corp	Woolworths Group Ltd
BK099175 Corp	Amcor UK Finance PLC
BK647179 Corp	Ausgrid Finance Pty Ltd

Ticker	Issuer (Short name)
BP151661 Corp	Transurban Queensland Finance Pty Ltd
AS197471 Corp	Transurban Queensland Finance Pty Ltd
BR642542 Corp	Woolworths Group Ltd
BJ085023 Corp	APA Infrastructure Ltd
AM796866 Corp	APA Infrastructure Ltd
BK182313 Corp	Brisbane Airport Corp Pty Ltd
BJ368115 Corp	Newcrest Finance Pty Ltd
BO485268 Corp	APA Infrastructure Ltd
AX613734 Corp	APA Infrastructure Ltd
BO485269 Corp	APA Infrastructure Ltd
EK805538 Corp	APA Infrastructure Ltd
EI870493 Corp	Newcrest Finance Pty Ltd
AS344445 Corp	Ausgrid Finance Pty Ltd
BJ324638 Corp	Woolworths Group Ltd
BK534389 Corp	QPH Finance Co Pty Ltd
EK805526 Corp	APA Infrastructure Ltd
AS072056 Corp	Ausgrid Finance Pty Ltd
EK807839 Corp	APA Infrastructure Ltd
AS239645 Corp	Brisbane Airport Corp Pty Ltd
BR555926 Corp	Ausgrid Finance Pty Ltd
BK534344 Corp	QPH Finance Co Pty Ltd

Table 18: The Pilbara railways bond sample

Ticker	Issuer (Short name)
BP749491 Corp	Worley US Finance Sub Ltd
QJ190880 Corp	BHP Billiton Finance Ltd
BO485266 Corp	APA Infrastructure Ltd
BJ442776 Corp	Woolworths Group Ltd
AX350089 Corp	Incitec Pivot Ltd

Ticker	Issuer (Short name)
AO547987 Corp	Incitec Pivot Finance LLC
BK182364 Corp	Brisbane Airport Corp Pty Ltd
BJ368112 Corp	Newcrest Finance Pty Ltd
BR318092 Corp	Woolworths Group Ltd
BR642545 Corp	Woolworths Group Ltd
BK099175 Corp	Amcor UK Finance PLC
BK647179 Corp	Ausgrid Finance Pty Ltd
BP151661 Corp	Transurban Queensland Finance Pty Ltd
AS197471 Corp	Transurban Queensland Finance Pty Ltd
BR642542 Corp	Woolworths Group Ltd
BJ085023 Corp	APA Infrastructure Ltd
AM796866 Corp	APA Infrastructure Ltd
BK182313 Corp	Brisbane Airport Corp Pty Ltd
BJ368115 Corp	Newcrest Finance Pty Ltd
BO485268 Corp	APA Infrastructure Ltd
AX613734 Corp	APA Infrastructure Ltd
BO485269 Corp	APA Infrastructure Ltd
EK805538 Corp	APA Infrastructure Ltd
EI870493 Corp	Newcrest Finance Pty Ltd
AS344445 Corp	Ausgrid Finance Pty Ltd
BJ324638 Corp	Woolworths Group Ltd
BK534389 Corp	QPH Finance Co Pty Ltd
EK805526 Corp	APA Infrastructure Ltd
AS072056 Corp	Ausgrid Finance Pty Ltd
EK807839 Corp	APA Infrastructure Ltd
AS239645 Corp	Brisbane Airport Corp Pty Ltd
BR555926 Corp	Ausgrid Finance Pty Ltd
BK534344 Corp	QPH Finance Co Pty Ltd
BP548462 Corp	CIMIC Finance Ltd
ZR653898 Corp	Pacific National Finance Pty Ltd

Ticker	Issuer (Short name)
AO951980 Corp	Santos Finance Ltd
AR620052 Corp	Pacific National Finance Pty Ltd
AX518215 Corp	Santos Finance Ltd
BR221504 Corp	Pacific National Finance Pty Ltd
BO357863 Corp	AusNet Services Holdings Pty Ltd
BP221177 Corp	Santos Finance Ltd
BS376502 Corp	Port of Newcastle Investments Financing Pty Ltd
ZO526158 Corp	AusNet Services Holdings Pty Ltd
AN191913 Corp	Pacific National Finance Pty Ltd
AN441270 Corp	Pacific National Finance Pty Ltd
EK907291 Corp	Pacific National Finance Pty Ltd

Appendix 4 Bond pricing

Table 19: Commonwealth Government Bond pricing

Date	Interpolated Nominal Yield	Interpolated Real Yield
6-Feb-23	3.47	1.05
7-Feb-23	3.60	1.23
8-Feb-23	3.62	1.25
9-Feb-23	3.67	1.28
10-Feb-23	3.71	1.30
13-Feb-23	3.76	1.34
14-Feb-23	3.74	1.30
15-Feb-23	3.74	1.30
16-Feb-23	3.76	1.30
17-Feb-23	3.82	1.34
20-Feb-23	3.81	1.35
21-Feb-23	3.82	1.37
22-Feb-23	3.88	1.42
23-Feb-23	3.89	1.45
24-Feb-23	3.83	1.41
27-Feb-23	3.88	1.51
28-Feb-23	3.86	1.46
1-Mar-23	3.79	1.43
2-Mar-23	3.87	1.45
3-Mar-23	3.91	1.45
6-Mar-23	3.77	1.30
7-Mar-23	3.69	1.26
8-Mar-23	3.75	1.38
9-Mar-23	3.71	1.38
10-Mar-23	3.59	1.30
13-Mar-23	3.53	1.27
14-Mar-23	3.46	1.23

Date	Interpolated Nominal Yield	Interpolated Real Yield
15-Mar-23	3.44	1.20
16-Mar-23	3.34	1.13
17-Mar-23	3.40	1.21
20-Mar-23	3.25	1.11
21-Mar-23	3.20	1.03
22-Mar-23	3.37	1.16
23-Mar-23	3.30	1.07
24-Mar-23	3.22	0.99
27-Mar-23	3.20	1.00
28-Mar-23	3.30	1.07
29-Mar-23	3.29	1.04
30-Mar-23	3.36	1.07
31-Mar-23	3.30	1.02

Source: Bloomberg, ERA analysis.