Rate of Return Annual Update 2023

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Amendment record

Version	Date	Pages
1.0	7 December 2023	34

Contents

1 Introduction

In February 2023 the AER published the 2022 Rate of Return Instrument (2022 Instrument).[1]

This binding Instrument specifies how we determine the allowed rate of return on capital invested in regulated electricity and gas networks during the following four-year period. The rate of return is a significant driver of regulated revenue, and estimation of the rate of return is complex and contentious. Our intention is to publish the next Rate of Return Instrument in December 2026.[2]

As part of our Pathway to the 2022 Instrument we published annual updates to provide stakeholders with regular rate of return data between reviews.[3] We committed to maintain the publication of these updates annually in our 2022 Instrument Explanatory Statement.[4]

The intent of our annual update paper is to provide stakeholders with regular information on rate of return data, particularly time series market data, showing changes since the publication of the Instrument. We have not attempted to update all data series considered during the 2022 review, but have selected content with regard to its importance and practical considerations such as availability of data.

The tables and figures in this update have been prepared using our existing calculation approaches, as used to inform the 2022 Instrument, so that stakeholders can compare changes in market data on a consistent basis.[5]

Our intent is that our annual updates should help to provide a foundation for substantive, constructive discussion with all stakeholders during the 2026 review.

This paper does not provide justification for our methodological choices or interpretation of the results of the tables and figures in this paper. This information is provided in the Explanatory Statement to the 2022 Instrument which should be read alongside this update.[6] In Appendix A we have provided chapter references to the Explanatory Statement from our 2022 Instrument for each section covered in this paper.

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[1]   AER, *Rate of Return Instrument,* February 2023 (version 1.1 as amended August 2023)

[2]   AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, pp. 38-39.

[3]   AER, *Rate of Return annual updates 2019–2022.* See https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/rate-of-return-annual-updates-2019-2022

[4]   AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, p. 33.

[5]   AER, *Rate of Return Instrument, Explanatory Statement*, February 2023.

[6]   AER, *Rate of Return Instrument, Explanatory Statement*, February 2023.

2 Indicative rate of return

Table 1 presents key rate of return parameters and an indicative rate of return given the application of the 2022 Instrument using current market data. To that end, in Table 1 we have:

- updated those parameters where the 2022 Instrument specifies a method informed by market data at each regulatory determination.

- kept constant those parameters where the 2022 Instrument specifies that the value is fixed.

Table 1 Key components of the regulated rate of return (2022 to 2023)

Parameter	2022 Instrument (Data as published in the 2022 Instrument Explanatory Statement)	2023 update
Indicative overall rate of return (nominal vanilla)	6.84%	6.98%
Gearing ratio	60%	60%
Indicative return on debt (annual estimate)	6.52% (using on-the day return on debt estimated over Dec 2022)	6.37% (Using on-the day return on debt estimated over Aug 2023)
Market risk premium	6.2%	6.2%
Equity beta	0.60	0.60
Indicative risk-free rate	3.60% (10-year term)	4.19% (10-year term)
Indicative return on equity	7.32% (using a risk-free rate of return estimated over Dec 2022)	7.91% (using a risk-free rate of return estimated over Aug 2023)
Value of imputation credits (gamma)	0.57	0.57
Benchmark credit rating	BBB+	BBB+

Comparator: Table 0.1 (pages 10–12) of the 2022 Instrument Explanatory Statement.
Notes: Uses indicative averaging period across all business days in December 2022 (2022 Instrument) and 20 business days to 31 August 2023 (this annual update), Indicative rates are based on 'on-the-day' return on debt estimates and do not reflect a trailing average portfolio.
Source: AER, *Rate of Return Instrument,* February 2023 (version 1.1 as amended August 2023)

The indicative return on debt presented in Table 1 is an on-the-day rate, reflecting the annual (spot) cost of debt in the indicative averaging period. As specified in the 2022 Instrument, energy networks are in the process of transitioning from an on-the-day approach to a trailing average portfolio that reflects ten years of historical return on debt. The transition itself takes ten years. The regulated return on debt for each service provider will therefore depend on the date at which it commenced the transition to the trailing average portfolio approach.

We note that the indicative return on debt has decreased slightly from December 2022 to August 2023 (as shown in the table above) despite the yield on commonwealth government securities (CGS) increasing over the period. This is because the difference (or margin) between the CGS yield and the indicative debt yield has narrowed over this period.

3 Gearing

3.1 Estimation based on market values

Table 2 presents gearing estimates for five comparator businesses over the past five and ten years using market values of equity and debt (with book value of debt used as a proxy for the market value of debt).[7]

Table 2 AER gearing based on market values of equity and book values of debt

Year	ENV	APA	DUE	AST	SKI	Average
2006	66%	51%	79%	56%	60%	62%
2007	65%	59%	67%	55%	57%	61%
2008	77%	73%	76%	59%	70%	71%
2009	75%	68%	80%	70%	70%	73%
2010	74%	61%	80%	64%	65%	69%
2011	66%	53%	79%	64%	62%	65%
2012	63%	47%	72%	59%	59%	60%
2013	53%	46%	71%	57%	62%	58%
2014	47%	45%	64%	58%	55%	54%
2015		50%	62%	59%	56%	57%
2016		49%	51%	54%	54%	52%
2017		49%		50%	52%	50%
2018		45%		53%	57%	52%
2019		45%		53%	59%	52%
2020		45%		57%	59%	54%
2021		49%		49%	58%	52%
2022		45%		44%		45%
2023		50%				50%
5-year average		**47%**		**51%**	**59%**	**51%**
10-year average	**47%**	**47%**	**59%**	**53%**	**56%**	**52%**
Average since 2006	**65%**	**52%**	**71%**	**57%**	**60%**	**58%**

Comparator: Table 4.1 (page 87) of the 2022 Instrument Explanatory Statement.
Notes: Spark Infrastructure (SKI) estimates are as at 31 December each year. AusNet Services (AST) estimates are as of 31 March each year. Duet Group (DUE), APA Group (APA) and Envestra (ENV) estimates are as of 30 June each year. The average for all firms in a year does not make any adjustment for these timing differences.

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[7] Our gearing estimation method is described in AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, pp. 84-94.

3.2 Estimation based on book values

Table 3 presents gearing estimates for five comparator businesses over the past five and ten years using book values of equity and debt.[8]

Table 3 AER gearing estimates based on book values of equity and debt

Year	ENV	APA	DUE	AST	SKI	Average
2006	91%	67%	82%	57%	81%	76%
2007	90%	69%	75%	57%	80%	74%
2008	82%	71%	76%	58%	89%	75%
2009	80%	70%	79%	67%	85%	76%
2010	79%	68%	79%	62%	66%	71%
2011	78%	63%	77%	60%	69%	70%
2012	78%	64%	77%	61%	68%	70%
2013	71%	63%	79%	61%	68%	68%
2014	71%	65%	76%	64%	67%	69%
2015		68%	74%	69%	66%	69%
2016		71%	65%	64%	69%	67%
2017		71%		62%	69%	67%
2018		70%		66%	73%	70%
2019		74%		69%	76%	73%
2020		77%		74%	77%	76%
2021		77%		66%	76%	73%
2022		81%		81%		81%
2023		86%				86%
5-year average		**79%**		**72%**	**76%**	**78%**
10-year average	**71%**	**74%**	**72%**	**68%**	**72%**	**73%**
Average since 2006	**80%**	**71%**	**76%**	**65%**	**74%**	**73%**

Comparator: Table 4.2 (page 87-88) of the 2022 Instrument Explanatory Statement.
Notes: Spark Infrastructure (SKI) estimates are as at 31 December each year. AusNet Services (AST) estimates are as of 31 March each year. Duet Group (DUE), APA Group (APA) and Envestra (ENV) estimates are as of 30 June each year. The average for all firms in a year does not make any adjustment for these timing differences.
Source: As per Table 2. Annual reports, AER analysis; APA, *Annual report 2023*, 23 August 2023, p. 78, 93, 147; all other data is the same as published with the 2022 Instrument Explanatory Statement.

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[8]   Our gearing estimation method is described in AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, pp. 84-94.

4 Risk-free rate

The risk-free rate is an important parameter in the calculation of return on equity.[9] The primary data source we have been using to estimate the risk-free rate is the Reserve Bank of Australia's (RBA)'s F16 data series. However, on 31 March 2023 the RBA ceased publishing new F16 data. We have amended the 2022 Instrument to set out contingencies that will be used if F16 data is unavailable.[10] The contingency that has been triggered at this point of time is the requirement to use the RBA's F2 data series for estimating the risk-free rate for the period post the RBA ceasing to publish the F16 data (i.e. post 31 March 2023).

The values obtained for the risk-free rate from the use of the RBA's F2 data are not expected to be materially different to those which would be obtained if the RBA's F16 continued to be published and used. The reason there is not expected to be a material difference is the RBA uses the data underlying the F16 table to calculate the F2 table and the RBA methodology for calculating the F2 yields is very similar to our prior approach. We confirmed there was not expected to be a material difference before amending the 2022 Instrument.[11]

Figure 1 Impact of different lengths of averaging CGS yields (January 2013 to August 2023)

Comparator: Figure 6.4 (page 125) of the 2022 Instrument Explanatory Statement.
Source: RBA interest rate statistics, F16 data series until 30 March 2023, F2 data series from 31 March 2023, AER analysis.

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[9]   Our use of the risk-free rate is described in AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, pp. 105-128.

[10] AER, *Rate of Return Instrument,* February 2023 (version 1.1 as amended August 2023); AER*, Consultation paper – Rate of Return Instrument amendment,* June 2023.

[11] AER*, Explanatory note - Rate of Return Instrument Amendment,* June 2023, p.8.

5 Equity beta

The equity beta is a key parameter within the Sharpe–Lintner CAPM which we use to estimate the return on equity. It measures the 'riskiness' of a firm's returns compared with that of the market. Specifically, the equity beta measures the standardised correlation between the returns on an individual asset or firm with that of the overall market.[12]

In determining a value for equity beta in the 2022 Instrument, we considered empirical estimates of equity beta from relevant Australian energy network businesses (domestic estimates) and international energy network businesses.[13] We present the results of our update (to August 2023) in the sections below.

5.1 Domestic estimates

Table 4 lists our comparator firms used for equity beta estimates.

Table 4 List of our comparator firms

Firm (ASX ticker)	Time/trading period	Sectors
AGL Energy Limited (AGK)	January 1990 – October 2006	Electricity, gas
Alinta (AAN)	October 2000 – August 2007	Gas
APA Group (APA)	June 2000 – present	Gas, minority interest in other energy infrastructure
DUET Group (DUE)	August 2004 – April/May 2017	Electricity, gas
Envestra Ltd. (ENV)	August 1997 – October 2014	Gas
GasNet (GAS)	December 2001 – November 2006	Gas
Hastings Diversified Utilities Fund (HDF)	December 2004 – November 2012	Gas
Spark Infrastructure Group (SKI)	March 2007[14] – November 2021	Electricity, gas
AusNet Services (AST), formerly SP AusNet (SPN)	December 2005 – February 2022	Electricity, gas

Comparator: Table 8.1 (page 178) of the 2022 Instrument Explanatory Statement.

The recent delisting of SKI and AST means that 8 of the 9 firms in our comparator set have now been delisted, with only APA remaining Consequently, as foreshadowed in our 2022 Instrument explanatory statement, we are starting to look at the information available to inform our beta estimate at the next review.

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[12]   R. Brealey, S. Myers, G. Partington and D. Robinson, *Principles of corporate finance*, McGraw–Hill: First Australian edition, 2000, pp. 186–188 (Brealey et al, Principles of corporate finance, 2000).

[13]   AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, p. 171.

[14]   The SKI data is available from December 2005, but the data prior to March 2007 reflects stapled securities traded as instalment receipts—these instalments require further leverage adjustment and makes beta estimation difficult.

There are eight portfolios (labelled P1 to P8) with differing constituent firms and differing time periods. Table 5 presents the re-levered weekly equity beta estimates for these portfolios using ordinary least squares (OLS) regression.

Table 5 Re-levered weekly beta estimates (OLS, data to August 2023)

Portfolios	Average of firm estimates	P1	P2	P3	P4	P5	P6	P7	P8	APA
Firms	All firms	APA, ENV	AAN, AGL, APA, ENV, GAS	APA, DUE, ENV, HDF, AST	APA, DUE, ENV, HDF, SKI, AST	APA, DUE, ENV, SKI, AST	APA, DUE, SKI, AST	APA, SKI, AST	SKI, AST	APA
Start	Various	23 Jun 2000	28 Dec 2001	23 Dec 2005	9 Mar 2007	9 Mar 2007	9 Mar 2007	9 Mar 2007	9 Mar 2007	23 Jun 2000
End	Various	12 Sep 2014	6 Oct 2006	23 Nov 2012	23 Nov 2012	12 Sep 2014	28 Apr 2017	26 Nov 2021	26 Nov 2021	25 Aug 2023
Equal weighted										
Longest available period	0.56	0.49	0.50	0.54	0.52	0.43	0.46	0.52	0.41	0.69
Post tech boom and excl. GFC	0.59	0.53	0.51	0.59	0.58	0.50	0.54	0.58	0.47	0.74
Recent 5 years	0.46	n/a	n/a	n/a	n/a	n/a	n/a	0.47	0.34	0.74
Value weighted										
Longest available period	n/a	0.53	0.68	0.47	0.47	0.44	0.49	0.56	0.40	n/a
Post tech boom and excl. GFC	n/a	0.58	0.69	0.56	0.55	0.53	0.58	0.63	0.48	n/a
Recent 5 years	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.53	0.32	n/a

Comparator: Table 8.4 (page 187) of the 2022 Instrument Explanatory Statement.
Note: Our comparator firms include AusNet Services (AST). This firm was included in the 2013 Guidelines under its former name of SP Ausnet (SPN). It was renamed in 2014. Portfolio estimates for a scenario reflect beta estimates available over that scenario. Portfolio estimates can start and end on different dates. Please refer to Tables 8.1 and 8.2 (page 178-179) of the 2022 Instrument Explanatory Statement for more information on our comparator firms.
Source: AER analysis; Bloomberg.

Table 6 summarises the historical ranges of beta estimates and Table 7 shows the historical average firm beta estimates.

Table 6 Historical ranges of re-levered weekly beta estimates (OLS, data to September 2018/August 2019/August 2021/December 2022/August 2023)

Equal and value weighted portfolio estimates	Whole comparator set [P1 to P8]	Still listed and recently delisted firms (APA, SKI, AST) [P7]	Recently delisted majority regulated firms (SKI, AST) [P8]
Longest period			
2018 Instrument	0.42 - 0.67	0.52 - 0.55	0.42 - 0.43
2019 update	0.42 - 0.68	0.53 - 0.56	0.42 - 0.43
2020 update	0.40 - 0.68	0.51 - 0.54	0.40 - 0.41
2021 update	0.40 - 0.68	0.51 - 0.55	0.40 - 0.41
2022 Instrument	0.40 - 0.68	0.52 - 0.56	0.40 - 0.41
2023 update	0.40 - 0.68	0.52 - 0.56	0.40 - 0.41
Post tech boom and excl. GFC			
2018 Instrument	0.50 - 0.67	0.64 - 0.67	0.52 - 0.53
2019 update	0.50 - 0.69	0.64 - 0.68	0.54 - 0.55
2020 update	0.47 - 0.69	0.60 - 0.62	0.47 - 0.47
2021 update	0.47 - 0.69	0.59 - 0.62	0.47 - 0.47
2022 Instrument	0.47 - 0.69	0.58 - 0.63	0.47 - 0.48
2023 update	0.47 - 0.69	0.58 - 0.63	0.47 - 0.48
Recent 5 years			
2018 Instrument	0.49 - 0.88	0.81 - 0.88	0.70 - 0.72
2019 update	0.69 - 0.89	0.83 - 0.89	0.73 - 0.74
2020 update	0.44 - 0.69	0.59 - 0.68	0.44 - 0.44
2021 update	0.37 - 0.70	0.53 - 0.59	0.37 - 0.38
2022 Instrument	0.35 - 0.57	0.51 - 0.57	0.35 - 0.36
2023 update	0.32 - 0.53	0.47 - 0.53	0.32 - 0.34

Comparator: Table 8.5 (page 187-188) of the 2022 Instrument Explanatory Statement.
Notes: The results for the 2020 update have been revised since its original publication due to an anomaly in SKI data.
Source: AER analysis; Bloomberg.

Table 7 Historical re-levered weekly average firm beta estimates (OLS, data to September 2018/August 2019/August 2021/December 2022/August 2023)

Period	Henry (Apr 2014)	Sep 2018	Aug 2019	Aug 2020	Aug 2021	Dec 2022	Aug 2023
Longest period	0.52	0.57	0.56	0.56	0.56	0.56	0.56
Post tech boom and excluding GFC	0.56	0.61	0.61	0.59	0.59	0.59	0.59
Recent 5 years	0.46	0.72	0.72	0.56	0.59	0.51	0.46

Comparator: Table 8.6 (page 188) of the 2022 Instrument Explanatory Statement.
Notes: The results for the 2020 update have been revised since its original publication due to an anomaly in SKI data.
Source: Bloomberg; AER analysis; Olan Henry, *Estimating beta: An update*, April 2014.

Table 8 Historical re-levered weekly beta estimates for APA (OLS, data to September 2018/August 2019/August 2021/December 2022/August 2023)

Period	Henry (Apr 2014)	Sep 2018	Aug 2019	Aug 2020	Aug 2021	Dec 2022	Aug 2023
Longest period	0.59	0.68	0.69	0.70	0.69	0.69	0.69
Post tech boom and excluding GFC	0.64	0.75	0.75	0.77	0.75	0.75	0.74
Recent 5 years	0.54	1.06	1.06	0.93	0.87	0.82	0.74

Comparator: Table 8.7 (page 189) of the 2022 Instrument Explanatory Statement.
Source: Bloomberg; AER analysis; Olan Henry, *Estimating beta: An update*, April 2014.

Figure 2 shows the distribution of beta estimates.

Figure 2 Distribution of re-levered weekly beta by range (OLS, data to September 2018/August 2019/August 2021/December 2022/August 2023)
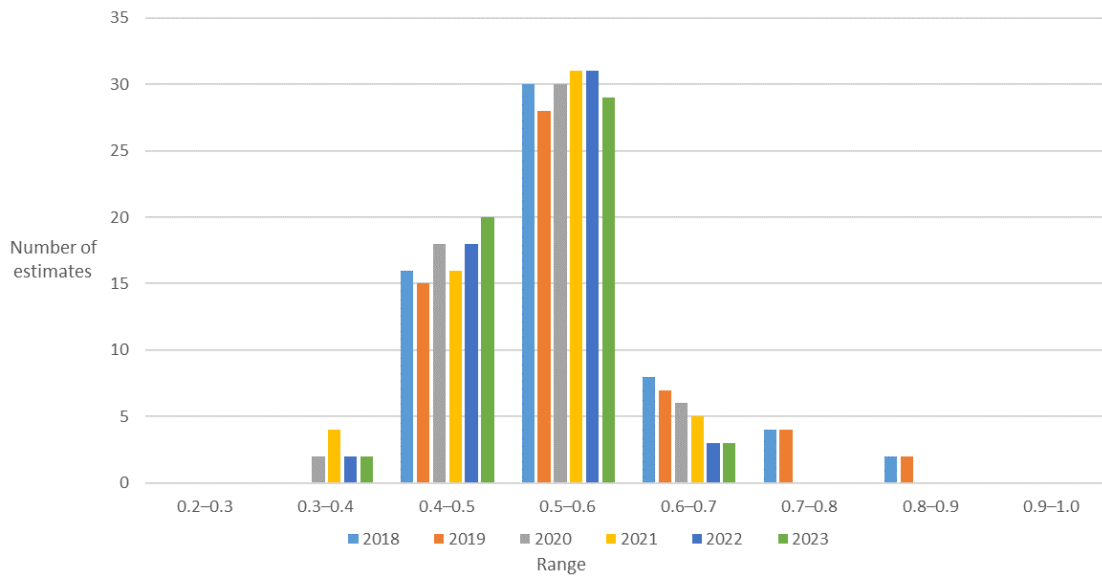
Comparator: Figure 8.1 (page 189) of the 2022 Instrument Explanatory Statement.
Notes: There are fewer total estimates from 2019 onwards because the 'recent 5 years' category no longer includes portfolios ending in 2014 (P1 and P5). Similarly, the 'recent 5 years' category in 2022 excluded P6, which ended in 2017. We have updated the chart to include P8.
Source: AER analysis; Bloomberg.

5.2 International estimates

Our international beta estimates are based on a comparator set of 56 US firms.

Figure 3 summarises the range of results of our updated international estimates and compares against estimates from the 2022 Instrument.[15]

Figure 3 Summary of re-levered weekly international estimates (OLS, data to September 2018/August 2019/August 2021/December 2022/August 2023)
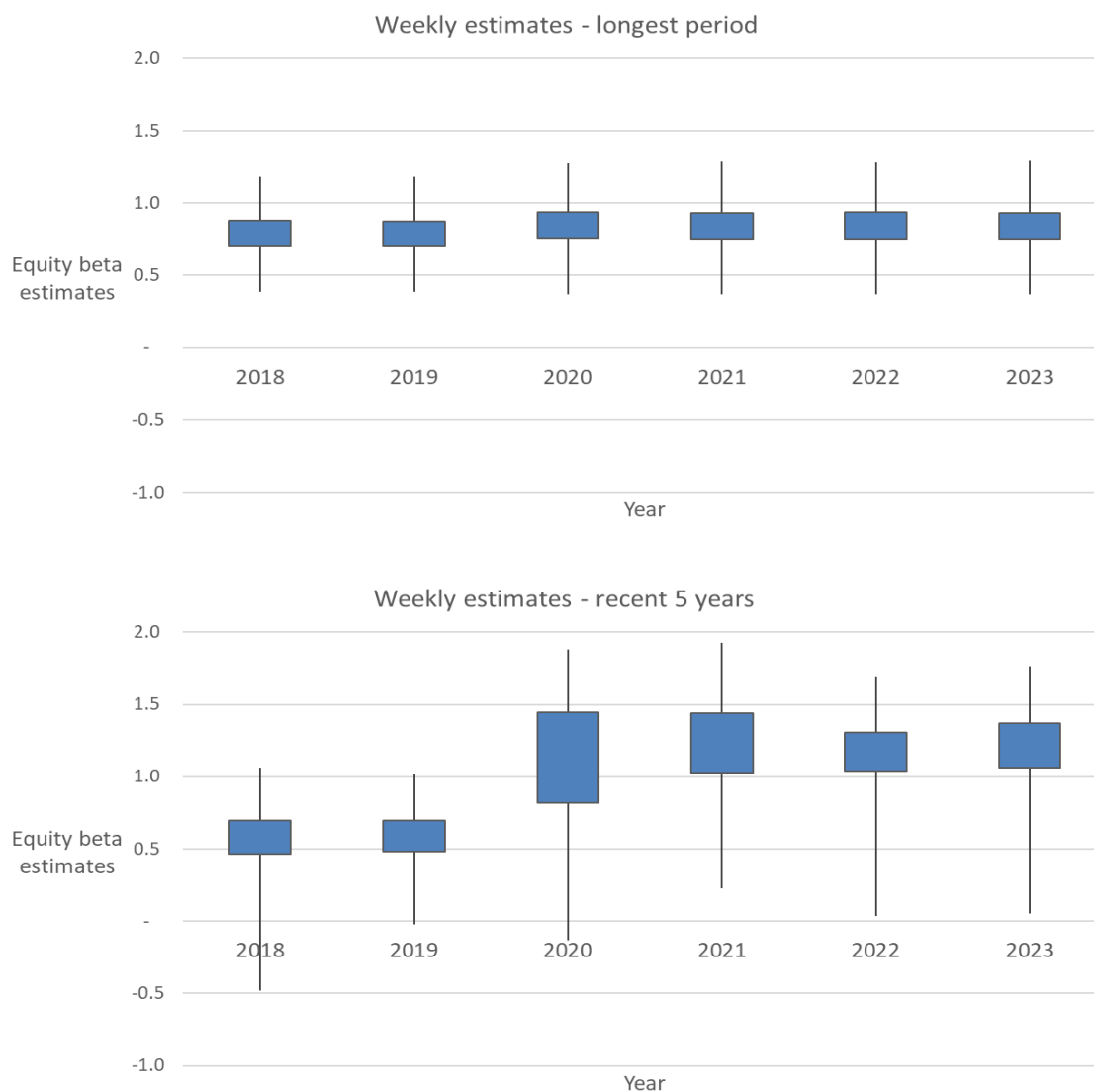
Comparator: Figure 8.2 (page 190) of the 2022 Instrument Explanatory Statement.
Note: This figure shows the quartile distribution of estimates by charting the minimum, first quartile, third quartile and maximum of the relevant estimates. The top of the top line indicates the maximum and bottom of the bottom line indicate the minimum. The bottom of the rectangle represents the first quartile. The top of the rectangle represents the third quartile.
Source: AER analysis; Bloomberg.

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[15]   Our use of international estimates for equity beta is described in AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, pp. 180–182. We have used total return data and have recalculated our 2023 update using this data.

6 Market risk premium

6.1 Historical excess returns

In the 2022 Instrument we estimated historical excess returns (HER) data up to December 2022. In estimating the HER we use December to December averages of growth (or decline) in the ASX All Ordinaries index to estimate the growth or decline of the Australian market portfolio (total market returns). We have not updated the HER since the publication of the 2022 Instrument as we require December 2023 returns data.

Table 9 presents the arithmetic, geometric and weighted averages for five sampling periods.[16]

Table 9 Historical excess returns using a 10-year term as of 31 December 2022

Sampling Period	Arithmetic average (%)	Geometric average (%)	Weighted average 10 years (%)
1883-2022	6.3	5.0	6.3
1937-2022	6.1	4.4	5.9
1958-2022	6.6	4.4	6.3
1980-2022	6.6	4.6	6.1
1988-2022	6.2	4.9	5.9

Comparator: Table 7.3 (page 159) of the 2022 Instrument Explanatory Statement
Notes: Calculated using an assumed imputation utilisation value (or theta value) of 0.65.
Source: Handley, *An estimate of the historical equity risk premium for the period 1883 to 2011*, April 2012, p. 6; AER update for 2012–2022 market data.

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[16]   AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, p. 159.

6.2 Dividend growth model

The dividend growth model (DGM) uses analyst forecasts of dividend growth to estimate a forward looking MRP. We use a range of assumptions and input growth rates in order to arrive at a range of estimates.[17]

Table 10 Two stage and three stage DGM results as of December 2022

Sensitivity	Two stage model (2022)	Three stage model (2022)
2-month average to end Dec 2022	5.5	5.0
6-month average to end Dec 2022	5.7	5.2
12-month average to end Dec 2022	5.8	5.3

Comparator: Table 7.4 (page 160) of the 2022 Instrument Explanatory Statement.
Notes: The growth rate used for the two stage and three stage DGM is 3.85%
Source: Bloomberg, AER analysis, Consensus Economics

Table 11 Two stage and three stage DGM results as of August 2023

Sensitivity	Two stage model (2023)	Three stage model (2023)
2-month average to end Aug 2023	5.2	4.8
6-month average to end Aug 2023	5.6	5.1
12-month average to end Aug 2023	5.8	5.0

Notes: The growth rate used for the two stage and three stage DGM is 3.97% (We have used July 2023 Consensus Economics forecasts)
Source: Bloomberg, AER analysis, Consensus Economics

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[17] Our DGM estimation method is described in AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, pp. 145–148.

6.3 MRP survey results

We note survey evidence comes from market practitioners who are asked what they expect the MRP to be in the Australian market. These surveys take on different forms and can vary in different ways, including questions asked, type of participants and number of participants. As such it is important to view each piece of evidence in the context it is presented. In reporting the results for the MRP, we note that the survey results indicate some market participants adjust the risk-free rate rather than the MRP.[18] In the approach to date, we have used the survey evidence to inform our MRP estimate. It informs us about investors' and market practitioners' expectations and/or what they apply in practice.[19]

Table 12 MRP survey results (2012 to 2023)

Survey	Number of responses	Mean (per cent)	Median (per cent)	Mode (per cent)
Fernandez et al (2012)	73	5.9	6.0	N/A
Fernandez et al (2013)	17	6.8	5.8	N/A
Fernandez et al (2014)	93	5.9	6.0	N/A
Fernandez et al (2015)	40	6.0	5.1	N/A
Fernandez et al (2016)	87	6.0	6.0	N/A
Fernandez et al (2017)	26	7.3	7.6	N/A
Fernandez et al (2018)	74	6.6	7.1	N/A
Fernandez et al (2019)	54	6.5	6.1	N/A
Fernandez et al (2020)	37	7.9	6.2	N/A
Fernandez et al (2021)	31	6.4	6.3	N/A
Fernandez et al (2022)	34	6.3	6.0	N/A
Fernandez et al (2023)	39	6.2	6.0	N/A
KPMG (2013)	19	N/A	6.0	6.0
KPMG (2015)	~27	N/A	6.0	6.0
KPMG (2017)	45	N/A	6.0	6.0
KPMG (2018)	56	5.5	6.0	6.0
KPMG (2019)	59	5.9	6.0	6.0

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[18]   Cross reference to the final omnibus paper.

[19]   Our MRP survey results estimation method is described in AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, p. 162.

Survey	Number of responses	Mean (per cent)	Median (per cent)	Mode (per cent)
Asher and Hickling (2013)	46	4.8	5.0	6.0
Asher and Hickling (2014)	27	4.4	4.6	6.0
Asher and Carruther (2015)	29	4.9	N/A	N/A
Carruther (2016)	24	5.3	N/A	N/A

Comparator: Table 7.5 (page 162) of the 2022 Instrument Explanatory Statement.
Source: KPMG, *Valuation practices survey 2018,* November 2018; Fernandez, Ortiz, Acín, *Market Risk Premium and Risk-Free Rate used for 69 countries in 2019: a survey*, April 2019; KPMG, *Valuation practices survey 2019,* February 2020; Fernandez et al, *Survey: Market risk premium and risk- free rate used for 81 countries in 2020,* March 2020; Fernandez et al, *Survey: Market Risk Premium and Risk-Free Rate used for 88 countries in 2023*, June 2023. All other data is the same as published with the 2022 Instrument Explanatory Statement.

6.4 Conditioning variables

Conditioning variables are market data and indicators that provide information on the potential risk in the market.[20]

Dividend Yields

Dividend yields can be measured over time to give a signal of potential risk.

Figure 4 Dividend yields from ASX200 (August 2001 to August 2023)
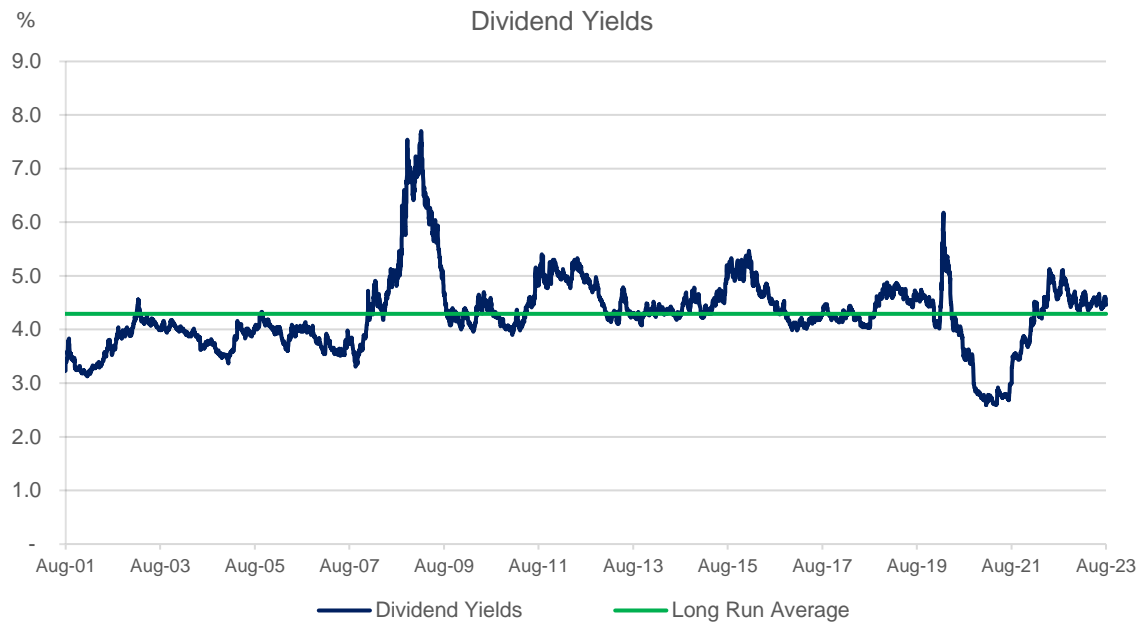
Comparator: Figure 7.5 (page 164) of the 2022 Instrument Explanatory Statement.
Notes: Long run average taken from the start of the data series in 2000.
Source: AER analysis; sourced via Bloomberg code AS51.

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[20]   Our use of conditioning variables is described in AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, p. 155

Volatility index

The ASX200 volatility index (VIX) uses year ahead option prices to arrive at a measure of market volatility over time.

Figure 5 Implied volatility of ASX200 (August 1997 to August 2023)
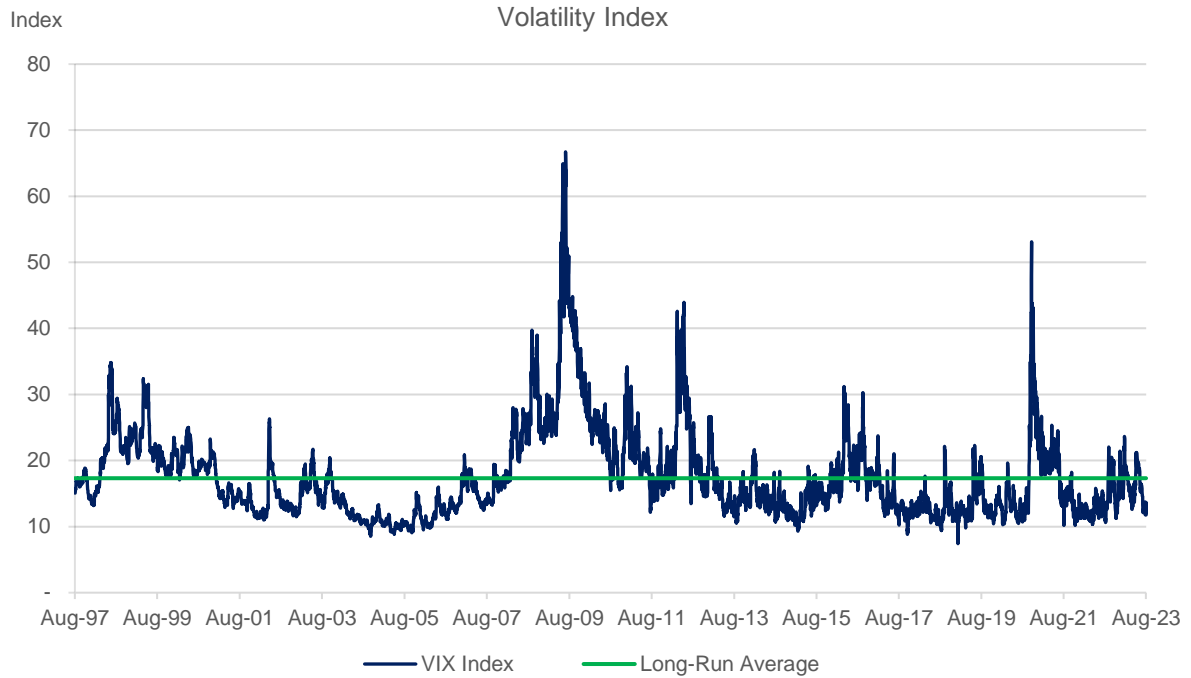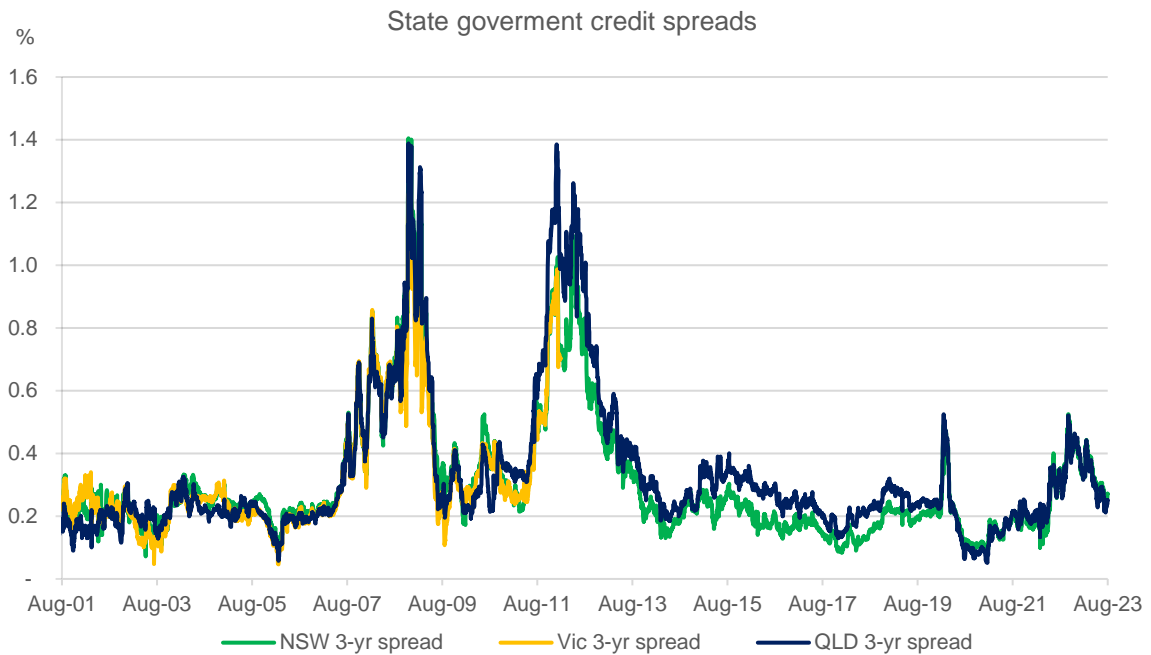

Comparator: Figure 7.4 (page 163) of the 2022 Instrument Explanatory Statement.
Source: AER analysis; ASX200 VIX volatility index, sourced via Bloomberg code AS51VIX from 2/01/2008 and code CITJAVIX prior to 2/01/2008. Long run average taken from the start of the data series in 1997.

Credit Spreads

Credit spreads from state government and corporate debt can indicate risk in the market.

Figure 6 Credit spreads from state government debt (August 2001 to August 2023)


State goverment credit spreads

Comparator: Figure 7.6 (page 164) of the 2022 Instrument Explanatory Statement.
Source: AER analysis; Spreads from Australian government securities to state government bonds with 3 years term to maturity, sourced via Bloomberg interest rate statistics.

Figure 7 Spread of corporate debt

Australian Non-financial Corporate Bond Spreads
Spread to government yields; 3-year target
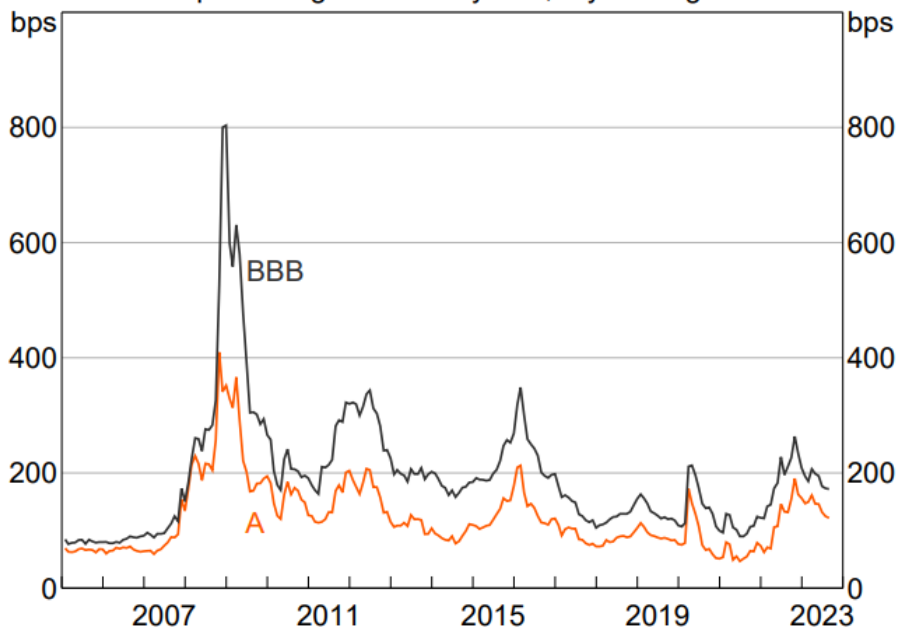
Notes: Data updated to 28 September 2023.
Source: RBA, Chart Pack, downloaded October 2023.

7 Return on debt

7.1 Benchmark credit rating

Table 13 presents the median credit rating over time.[21]

Table 13 Median credit rating (2013 to 2023)

Issuer	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023[22]
APA Infrastructure Ltd	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB
ATCO Gas Australia LP	A-	A-	A-	A-	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+
DBNGP Trust	BBB-	BBB-	BBB-	BBB-	BBB	BBB	BBB	BBB	NR	NR	NR
DBNGP Finance Co P/L	BBB-	BBB-	BBB-	BBB-	BBB	BBB	BBB	BBB	A-	A-	A-
DUET Group	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
ElectraNet P/L	BBB	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+	BBB	NR	BBB	BBB
Energy Partnership (Gas) P/L	BBB-	BBB-	BBB-	BBB-	BBB+	BBB+	BBB+	BBB+	A-	A-	A-
Australian Gas Networks Ltd	BBB	BBB+	BBB+	BBB+	BBB+	BBB+	A-	A-	A-	A-	A-
ETSA Utilities	A-	A-	A-	A-	A-	NR	A-	NR	NR	NR	NR
ETSA Utilities Finance P/L	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-
Powercor Australia LLC	BBB+	BBB+	NR	NR	NR	NR	NR	NR	NR	NR	NR
AusNet Services (Distribution) Pty Ltd	A-	A-	A-	A-	A-	NR	NR	NR	NR	NR	NR
AusNet Services Ltd	A-	A-	A-	A-	A-	A-	A-	A-	A-	BBB+	BBB+
AusNet Service Holdings P/L	A-	A-	A-	A-	A-	A-	A-	A-	A-	BBB+	BBB+
AusNet Transmission Group P/L	A-	A-	A-	A-	A-	A-	A-	A-	A-	BBB+	BBB+

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[21] Our benchmark credit rating estimation method is described in AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, pp. 222–225.

[22] Data in 2023 has been updated till August.

Issuer	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023[22]
SGSP (Australia) Assets Pty Ltd	BBB+	BBB+	BBB+	A-	A-	A-	A-	A-	A-	A-	A-
The CitiPower Trust / CitiPower I	BBB+	BBB+	NR	NR	NR	NR	NR	NR	NR	NR	NR
United Energy Distribution P/L	BBB	BBB	BBB	BBB	A-	A-	A-	A-	A-	A-	A-
Victoria Power Networks Pt/L	NR	NR	BBB+	BBB+	BBB+	BBB+	BBB+	A-	BBB+	BBB+	BBB+
Victoria Power Networks (Finance) P/L	NR	NR	BBB+	A-	A-	A-	BBB+	A-	A-	A-	A-
NSW Electricity Networks Finance P/ L	NR	NR	NR	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB
Ausgrid Finance P/ L	NR	NR	NR	BBB+	BBB+	BBB	BBB	BBB	BBB	BBB	BBB
Network Finance Company P/L	NR	NR	NR	NR	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+
Industry Median	**BBB+**	**BBB+**	**BBB+**	**BBB+**	**BBB+**	**BBB+**	**BBB+**	**BBB+**	**A-**	**BBB+**	**BBB+**

Comparator: Table 9.6 (page 222-223) of the 2022 Instrument Explanatory Statement.
Note: Data for all years is till December except 2023. Data in 2023 has been updated until August.
Source: Bloomberg, Standard & Poor's, Moody's. All other data is the same as published with the Instrument Explanatory Statement.

7.2 Return on debt from third party yield curves

Figure 8 presents the 'on-the-day' regulated return on debt calculated under the 2022 Instrument, which uses a weighted average of BBB-rated and A-rated yield curves sourced from RBA, Bloomberg and Thomson Reuters.[23]

Figure 8 Third party yield curve time series (January 2014 to August 2023)

Source: Bloomberg, RBA, Thomson Reuters, AER analysis.

The return on debt presented in Figure 8 is the on-the-day rate. As noted in section 2, energy networks are in the process of transitioning from an on-the-day approach to a trailing average portfolio that reflects a rolling ten year window of the historical return on debt.

Table 14 presents an indicative trailing portfolio return on debt for a regulated network that commenced the transition in 2015. In that year, the portfolio was set using the on-the-day rate (the annual estimate). In each subsequent year, the most recent annual estimate is added to the portfolio with 10 per cent weight and the weight on the first year decreases by 10 per cent.

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[23]   Our return on debt estimation method is described in AER, *Rate of Return Instrument, Explanatory Statement*, February 2023 pp. 195–239 (choice of third party providers is discussed on pp. 225–228). We have not reported the yield curves by individual provider because this data is proprietary.

Table 14 Indicative trailing average portfolio return on debt (2015 to 2023)

Year	Annual estimate	Trailing average portfolio	Portfolio composition (weight x return on debt year)
2015	4.92%*	4.92%	100% x 2015
2016	4.15%*	4.85%	90% x 2015, 10% 2016
2017	4.45%*	4.80%	80% x 2015, 10% x 2016, 10% x 2017
2018	4.42%*	4.75%	70% x 2015, 10% x 2016, 10% x 2017, 10% x 2018
2019	2.69%	4.53%	60% x 2015, 10% x 2016, 10% x 2017, 10% x 2018, 10% x 2019
2020	2.40%	4.27%	50% x 2015, 10% x 2016, 10% x 2017, 10% x 2018, 10% x 2019, 10% x 2020
2021	2.49%	4.03%	40% x 2015, 10% x 2016, 10% x 2017, 10% x 2018, 10% x 2019, 10% x 2020, 10% x 2021
2022	6.14%	4.15%	30% x 2015, 10% x 2016, 10% x 2017, 10% x 2018, 10% x 2019, 10% x 2020, 10% x 2021, 10 x 2022
2023	6.37%	4.30%	20% x 2015, 10% x 2016, 10% x 2017, 10% x 2018, 10% x 2019, 10% x 2020, 10% x 2021, 10 x 2022, 10 x 2023

Notes: Indicative averaging periods were chosen in August each year. Calculations prior to 2019 (marked with*) use the return on debt calculation method specified in the 2013 rate of return guideline. The 2022 figure here (6.14%) differs from the 2022 figure in Table 1 (6.52%) because they reflect different averaging periods (August 2022 vs December 2022).
Source: Bloomberg, RBA, Thomson Reuters, AER analysis.

7.3 Energy infrastructure credit spread index

The energy infrastructure credit spread index (EICSI) was developed by Chairmont during the 2018 review, using data on actual debt costs collected from regulated networks.[24] It reports a rolling 12-month historical average of all new debt instruments issued by privately owned energy networks.[25] The primary EICSI metric is the spread over the swap rate (broadly equivalent to the debt risk premium), but the EICSI dataset is also used to report average debt term and credit rating. It was used as a sense check on our proposed regulated return on debt approach.[26]

Figure 9 to Figure 12 present the updated EICSI with updated information on the average term to maturity of actual debt issuance by regulated networks. The average term is reported on a rolling 12 month window based on new debt issued (green squares). For comparison purposes, the spread on the AER's regulated return on debt is also presented (orange line). The base analysis uses the same approach used by Chairmont in its 2018 report and considered in the 2018 review.

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[24]   Chairmont, *Aggregation of return on debt data*, 28 April 2018.

[25]   AER, *Discussion paper, Estimating the allowed return on debt*, May 2018, pp. 27–35.

[26]   Our use of the EICSI is described in AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, pp. 198–203.

Figure 9 displays the unweighted EICSI with the updated actual cost of debt information and revisions to historical data.[27]

Figure 9 Comparing the EICSI (unweighted) against the bank bill swap rate (BBSW) (January 2014 to June 2023)
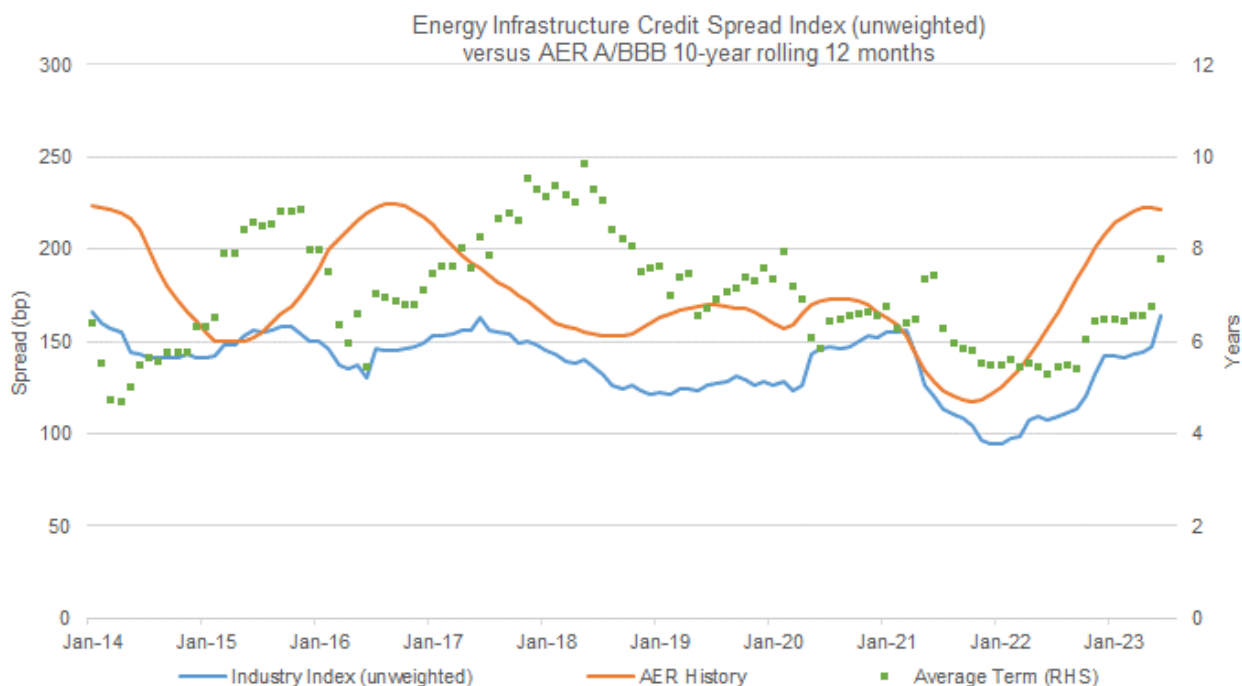
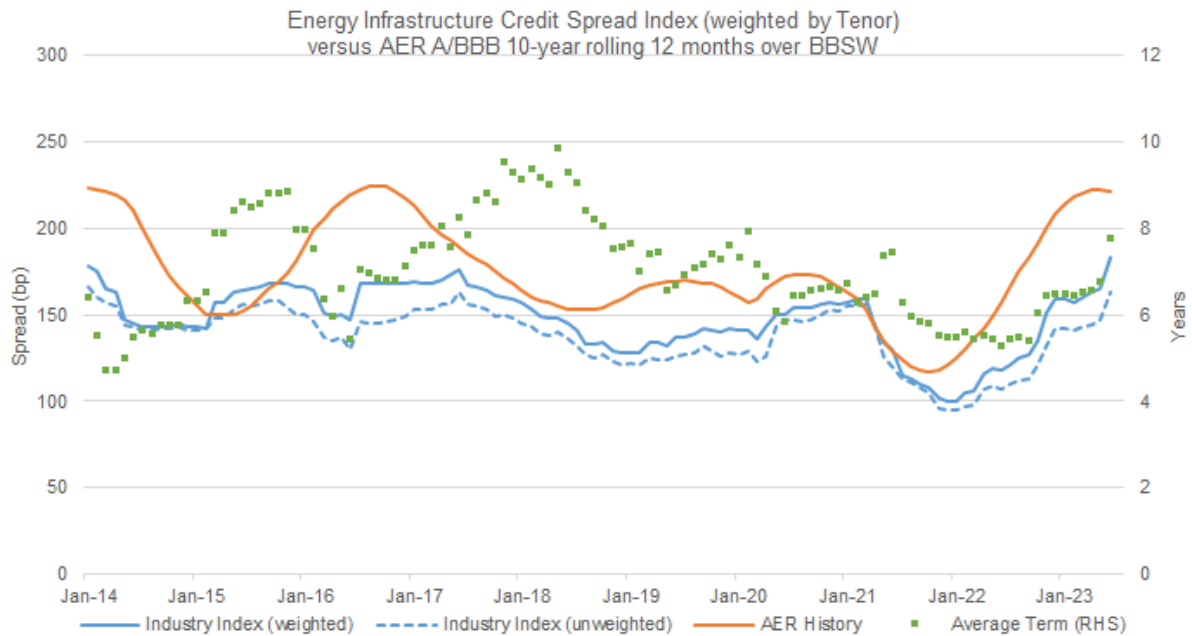Comparator: Graph 3 (page 10) of the 2018 Chairmont report
Notes: Spread is reported in basis points above the variable 3-month bank bill swap rate.
Source: AER analysis; Chairmont, *Aggregation of return on debt data*, 28 April 2018.

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[27]   In 2023 we collected actual debt costs from private-sector regulated networks through a Regulatory Information Notice (RIN). This information was received on 15 September 2023 and included new debt issued between 1 July 2022 and 30 June 2023 as well as resubmission of all old debt issued back to 1 July 2013.

Figure 10 displays the EICSI reweighted by tenor to account for the difference in issuing long term debt compared to short term debt. This means the spread of longer term debt in the rolling data window (12 months) is given more weight than the spread of shorter term debt.

Figure 10 Comparing the EICSI weighted by tenor against the bank bill swap rate (BBSW) (January 2014 to June 2023)

Notes: Spread is reported in basis points above the variable 3-month bank bill swap rate.
Source: AER analysis; Chairmont, Aggregation of debt data for portfolio term to maturity, 28 June 2019.

Figure 11 presents the recalculated EICSI as a spread over the AER risk free rate (from 10-year Commonwealth Government Securities) instead of the bank bill swap rate (BBSW).

Figure 11 Comparing the EICSI weighted by tenor against the risk-free rate (January 2014 to June 2023)
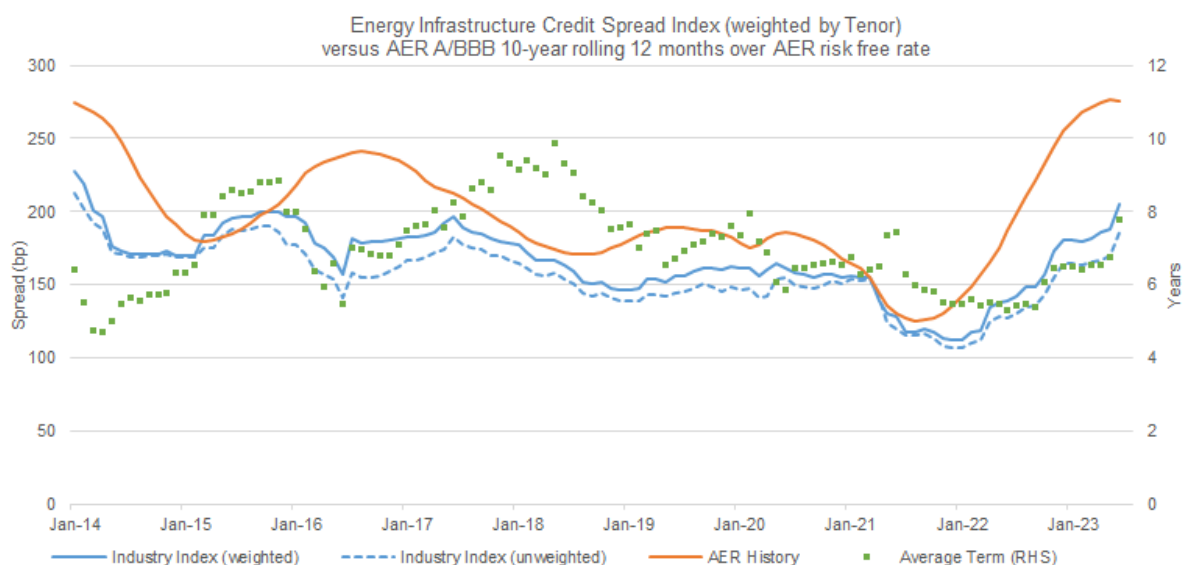
Source: AER analysis; Chairmont, *Aggregation of debt data for portfolio term to maturity*, 28 June 2019.

Figure 12 presents the comparison between EICSI (tenor weighted) and AER history with a matched term (matched to the EICSI term and not to the 10-year benchmark).

Figure 12 Comparison of EICSI 12-month rolling average (tenor weighted) against AER A/BBB (matched-term) estimate (June 2015 to June 2023)
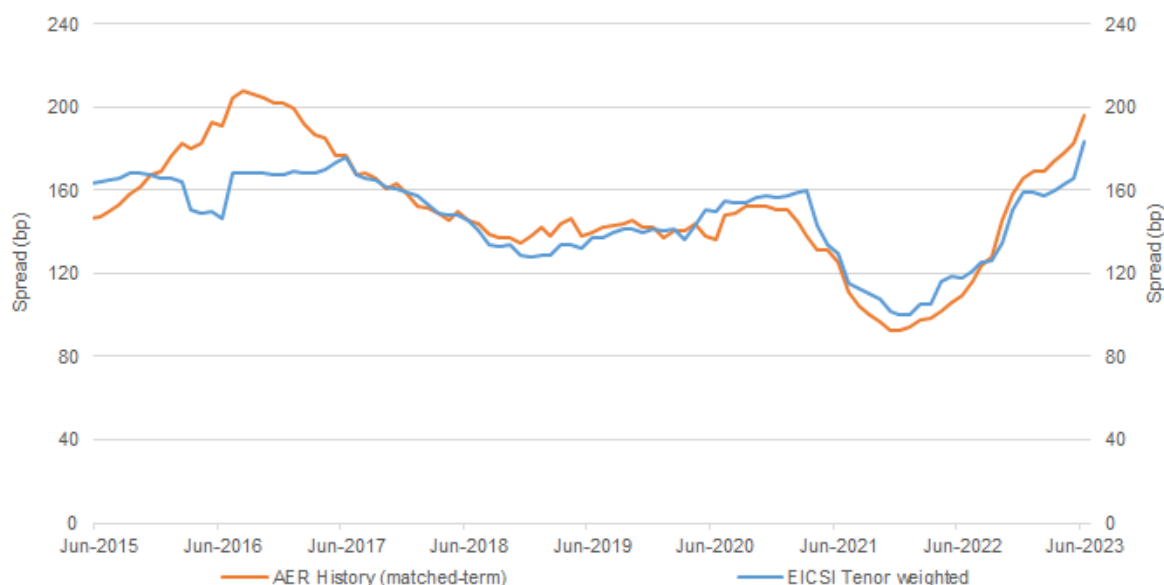
Source: AER analysis; Chairmont, *Aggregation of debt data for portfolio term to maturity*, 28 June 2019.
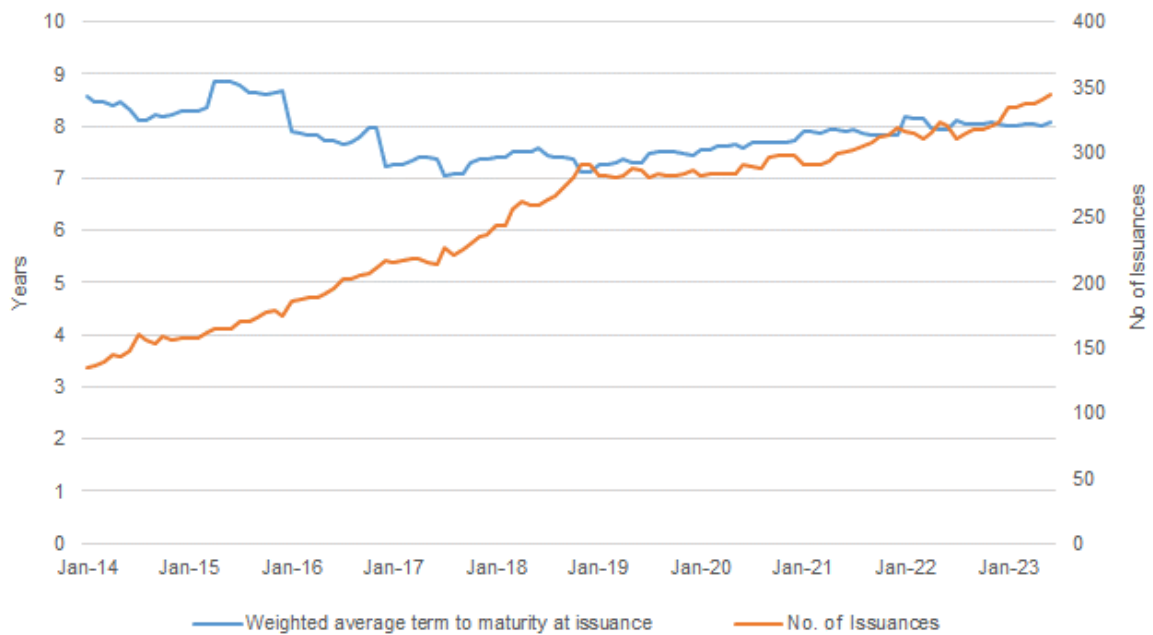
Debt term to maturity

Figure 13 shows the graphical representation of the weighted average term to maturity at issuance (WATMI) and number of debt issuances in the period of 2014-2023. WATMI is dependent on three parameters:

- Term to Maturity;
- Face value of issuance; and
- Number of debt issuances.

To obtain the industry WATMI, the drawdown sensitivity is taken as 100% (i.e. all debt instruments are fully drawn) and the term of each issuance is weighted by its face value. Debt is included in the WATMI from issuance until its maturity date. This analysis uses the same approach used by Chairmont in its 2019 report[28].

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[28] Chairmont, *Aggregation of debt data for portfolio term to maturity*, 28 June 2019.

Figure 13 WATMI and number of debt issuances (January 2014 to June 2023)


Notes: Data has also been updated to reflect information received through the formal RIN received on 15 September 2023.
Source: AER analysis; Chairmont, *Aggregation of debt data for portfolio term to maturity*, 28 June 2019.

Figure 14 is a comparison of WATMI at different drawdown sensitivities on a month-to-month basis. Scenarios 1, 2 and 3 represent drawdowns of 0%, 50% and 100% respectively.

Figure 14 WATMI drawdown scenarios (January 2014 to June 2023)
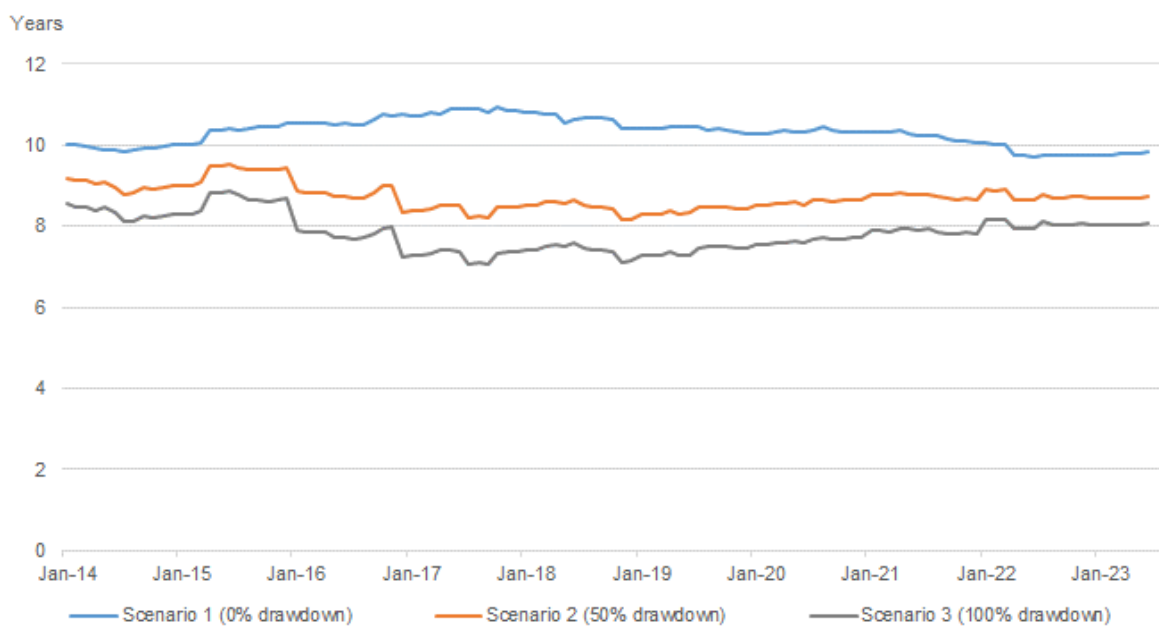
Source: AER analysis; Chairmont, *Aggregation of debt data for portfolio term to maturity*, 28 June 2019.

8 Return on equity cross check

8.1 Equity risk premium versus debt risk premium

We compare our equity risk premium (ERP) and debt risk premium (DRP).[29] Figure 15 compares on-the-day ERP against the on-the-day DRP, not a trailing average portfolio.

Figure 15 Comparison of ERP and DRP (December 2012 to August 2023)
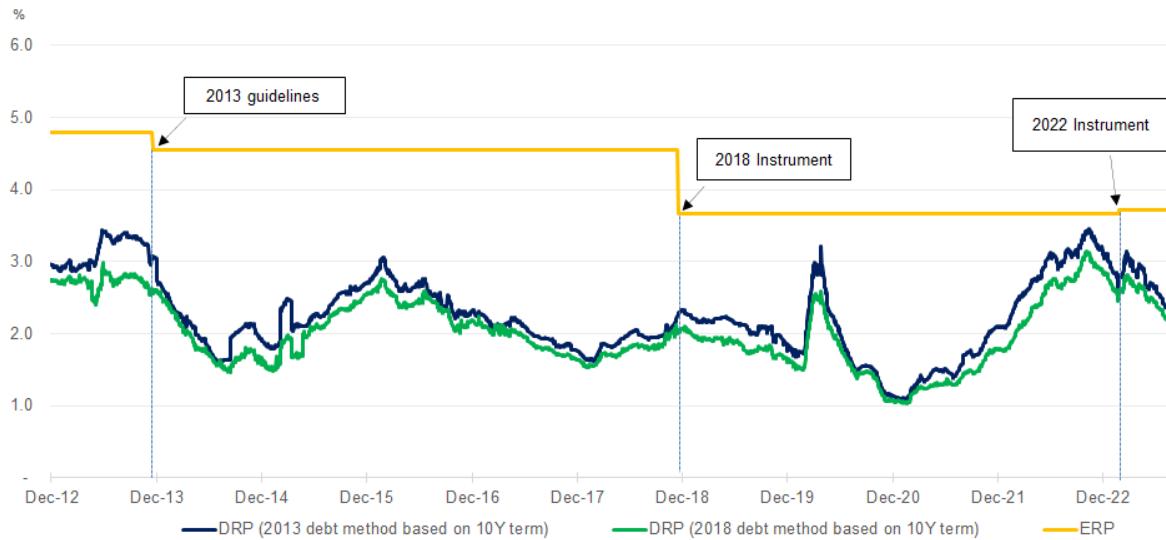
Comparator: Figure 11.17 (page 294) of the 2022 Instrument Explanatory Statement. We adopted the same DRP method in the 2018 and 2022 instrument.
Source: AER analysis; Bloomberg; Thomson Reuters; RBA.

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[29] Our comparison of ERP and DRP is described in AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, pp. 293–295.

9 Value of imputation credits

9.1 Distribution rate from ASX top 50

One component of our estimate of the value of imputation credits (gamma) is the distribution rate (or payout ratio).[30] This is the proportion of imputation credits generated that are distributed to investors. Dr Martin Lally estimated the distribution rate for the top 50 ASX companies as part of the 2018 review and we have updated these estimates annually since then.[31] The latest update incorporates 2022 data and applies the same methodology used by Dr Lally.

Table 15 shows the overall distribution rate with updated data.

Table 15 Distribution rates for the ASX top 50 (2000 to 2023)

ASX top 50	2018 Instrument (2000-2017)	2022 Instrument (2000–2021)	2023 update (2000–2022)
Imputation distribution ($m)	235,970	346,008	388,612
Tax payments ($m)	265,770	393,786	428,659
Distribution rate	0.888	0.879	0.907

Comparator: Table 10.3 (page 248) of the 2022 Instrument Explanatory Statement provided more detail on previous updates.
Notes: The top 50 ASX companies were determined at 1 August 2018, consistent with the 2018 report.
Source: AER analysis; Lally, *Estimating the distribution rate for imputation credits for the top 50 ASX companies*, 17 October 2018, p. 3; 2021 & 2022 annual reports for the top 50 ASX companies as determined by Dr Lally in his report on 1 August 2018.

9.2 Utilisation rate from equity ownership

A component of our estimate of the value of imputation credits is the utilisation rate. This is the utilisation value to investors in the market per dollar of imputation credits distributed.

Our approach to estimating the utilisation rate is informed by the Monkhouse framework, where the utilisation value is equal to the weighted average, by wealth and risk aversion, of the utilisation rates of individual investors.[32]

We updated our estimates using September 2023 ABS finance and wealth data.

Table 16 shows the utilisation rates with updated data.

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[30] Our approach to gamma is discussed in AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, pp. 240–249.

[31] Lally, *Estimating the distribution rate for imputation credits for the top 50 ASX companies*, 17 October 2018; Table 10.3 (page 248) of the 2022 Instrument Explanatory Statement.

[32] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp.18–20; Our use of equity ownership to estimate the utilisation rate is described in AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, pp. 248–249.

Table 16 Utilisation rates from the equity ownership approach (2000 to 2023)

Estimates	2018 Instrument (2000-2018)	2022 Instrument (2000–2022 Sep)	2023 update (2000–2023)
Range of annual results	0.612–0.697	0.618–0.702	0.618–0.702
Most recent point estimate	0.638	0.625	0.628
Average over last 5 years	0.646	0.642	0.637
Average over last 10 years	0.643	0.647	0.646

Comparator: Table 10.4 (page 249) of the 2022 Instrument Explanatory Statement provided more detail on previous updates.

Notes: ABS data commences in September 2000 and runs to June 2018 (2018 instrument), September 2022 (2022 Instrument) and June 2023 (2023 update).

Source: AER analysis; ABS Australian National Accounts: Finance and Wealth.

Appendix A