



Return on capital, inflation and financeability



Prepared for and in collaboration with NBN Co | 11 March 2022



Frontier Economics Pty Ltd is a member of the Frontier Economics network, and is headquartered in Australia with a subsidiary company, Frontier Economics Pte Ltd in Singapore. Our fellow network member, Frontier Economics Ltd, is headquartered in the United Kingdom. The companies are independently owned, and legal commitments entered into by any one company do not impose any obligations on other companies in the network. All views expressed in this document are the views of Frontier Economics Pty Ltd.

Disclaimer

None of Frontier Economics Pty Ltd (including the directors and employees) make any representation or warranty as to the accuracy or completeness of this report. Nor shall they have any liability (whether arising from negligence or otherwise) for any representations (express or implied) or information contained in, or for any omissions from, the report or any written or oral communications transmitted in the course of the project.



Contents

Summary	6
Overview of return on capital approach	6
Summary of approaches to estimating each WACC parameter	6
Placeholder estimates for the first regulatory cycle	8
Other estimates related to the BBM	9
<hr/>	
1 Introduction	12
1.1 Variation to the Special Access Undertaking	12
1.2 Purpose of this report	12
<hr/>	
2 Approach to developing a return on capital methodology	14
2.1 Key principles and statutory criteria	14
2.2 Our approach and NBN Co's proposal	17
<hr/>	
3 The return on equity	19
3.1 The Capital Asset Pricing Model (CAPM)	19
3.2 Internally consistent estimates	19
3.3 Prevailing risk-free rate	23
3.4 Long-run risk-free rate	26
3.5 Prevailing market risk premium	26
3.6 Long-run average market risk premium	30
3.7 Equity beta	31
<hr/>	
4 The return on debt	37
4.1 Proposed regulatory approach	37
4.2 Rationale for the 'trailing average' approach	37
4.3 Benchmark credit rating	40
4.4 Data source for return on debt	41
4.5 Debt raising costs	41



4.6	Return on debt true-up mechanism	42
5	Gearing	45
5.1	Benchmark gearing estimated in market value terms	45
5.2	Benchmark gearing estimated using same beta sample data	45
6	Gamma	47
6.1	The role of gamma in the regulatory framework	47
6.2	The components of gamma	48
6.3	Competing approaches for interpreting and estimating gamma	48
6.4	Gamma for the first replacement module	49
7	Estimates for the first replacement module	51
7.1	WACC for the first replacement module	51
8	Inflation forecasting	52
8.1	The role of inflation forecasts	52
8.2	Regulatory methods for forecasting inflation	52
8.3	Inflation for the first replacement module	54
9	A financeability test	55
9.1	The purpose of a financeability test	55
9.2	Regulatory financeability test to be applied only to test the adequacy of the ABBRR	56
9.3	Form of the proposed benchmark test	56
9.4	Interpretation of regulatory financeability test results and remedial action	61

Tables

Table 1	Overview of approaches to estimate of WACC parameters	6
Table 2:	Estimates for first replacement module, 2023-24 - 2024-25	9
Table 3:	Historic Excess Returns based market risk premium estimates	31
Table 4:	Equity beta and gearing estimates	34
Table 5:	Equity beta estimates relevered at benchmark gearing	34
Table 6:	Gearing estimates	46



Table 7: Estimates for first replacement module, 2023-24 - 2024-25	51
Table 8: Financial metrics and weightings considered by Moody's	57
Table 9: Rating thresholds specified in the Moody's methodology	58
Table 10: Moody's mapping of implied rating to numeric score	59
Table 11: Moody's mapping of overall numeric score to overall credit rating	60



Summary

Overview of return on capital approach

1. NBN Co's Special Access Undertaking (**SAU**) variation proposes a building block model (**BBM**) to set revenue allowances for future regulatory cycles to apply from July 2023 until the expiry of the SAU. A key building block is the return on capital allowance, which is conventionally estimated by applying a weighted average cost of capital (**WACC**) to the regulatory asset base.
2. Frontier Economics has worked with NBN Co to produce a suitable methodological approach for estimating the WACC over the remainder of the SAU term to 2040. This report documents the proposed methodology and 'placeholder' estimates for the first regulatory period or cycle¹, noting that some parameter values will be subject to updating prior to the commencement of that period to ensure it reflects the latest available information.
3. We start from the conventional regulatory approach that the minimum return that a business must pay its investors, in order to attract and retain the capital necessary to finance efficient and prudent investments, is the 'market cost of capital' associated with that investment. We submit that this approach is consistent with the legislative criteria relating to the reasonableness of terms, and would promote the long-term interests of end-users, in that accurate estimates of the market cost of capital would avoid incentives for inefficient underinvestment and overinvestment.
4. Consistent with NBN Co's views that the methodological approach should be suitable for the remainder of the SAU term, our methodological approach proposes that:
 - The WACC methodology should be capable of producing reliable estimates of the market cost of capital for a benchmark entity in a wide range of plausible market conditions; and
 - The WACC methodology should promote stability in the allowed return on capital—and prices for consumers—over time.

Summary of approaches to estimating each WACC parameter

5. Table 1 provides an overview of the approaches we have taken to estimation of each WACC parameter. These approaches are further outlined in later sections of this report.

Table 1 Overview of approaches to estimate of WACC parameters

Parameter/issue	Approach
Form of WACC	<p>Nominal vanilla WACC:</p> <ul style="list-style-type: none"> • $WACC = Return\ on\ equity \times (1 - Gearing) + Return\ on\ debt \times Gearing$

¹ Regulatory period and regulatory cycle are used interchangeably in this report.



Parameter/issue	Approach
Return on equity formula	<p>Estimated using Capital Asset Pricing Model (CAPM)</p> <ul style="list-style-type: none"> • $Return\ on\ equity = Risk\text{-}free\ rate + Equity\ beta \times Market\ risk\ premium$ <p>Point estimate of the return on equity derived by giving equal weight to estimates of the 'long-term' and 'current' return on equity:</p> <ul style="list-style-type: none"> • $Return\ on\ equity_{long} = Risk\text{-}free\ rate_{long} + Equity\ beta \times Market\ risk\ premium_{long}$ • $Return\ on\ equity_{current} = Risk\text{-}free\ rate_{current} + Equity\ beta \times Market\ risk\ premium_{current}$ <p>Risk-free rate and market risk premium estimates are paired consistently when estimating the required return on equity.</p>
Risk-free rate	<ul style="list-style-type: none"> • Current risk-free rate estimated using a 40-day average of the prevailing annualised yield on 10-year Commonwealth Government Securities. • Long-term risk-free rate fixed at an assumed 5%, in line with the long-term risk-free rate assumed in the Australian Government's 2021 Intergenerational Report.
Market risk premium	<ul style="list-style-type: none"> • Current market risk premium estimated using four differently-specified Dividend Growth Models (DGMs): <ul style="list-style-type: none"> ○ Damodaran (2013); ○ Bank of England (2002); ○ Bank of England (2010); and ○ 3-stage DGM (implemented using Bloomberg and consensus analyst earnings forecasts) and calibrated to the long-term market risk premium of 6.5% (see below). • Long-term market risk premium fixed at 6.5% (consistent with the available evidence on the arithmetic average of historical excess returns for Australia).



Parameter/issue	Approach
Equity beta	<ul style="list-style-type: none"> An industry-specific parameter that is estimated using a broad sample of listed comparator firms. <ul style="list-style-type: none"> Adopt the equity beta estimate determined by the ACCC in its 2015 fixed line services Final Access Determination for Telstra: 0.7 (asset beta = 0.42, gearing = 40%), which is also consistent with more recent estimates. Consider departing from the existing/established beta estimate only if: <ul style="list-style-type: none"> the established value was more than one standard deviation from the new mean estimate across all comparators; and the evidence supporting a different value was persistent over a long timeframe (two regulatory cycles).
Return on debt	<ul style="list-style-type: none"> Estimated as a 10-year historical trailing average of 10-year BBB corporate bond yields. Apply a 'return on debt true-up': <ul style="list-style-type: none"> Changes to the return on debt allowance are to be computed annually. The difference between (a) the return on debt allowance fixed at the start of the regulatory period; and (b) the updated trailing average return on debt allowance in each year are to be true-up in an NPV-neutral way in the next regulatory period (i.e., a 'return on debt true-up'). Historical data on 10-year BBB corporate bond yields obtained from published RBA statistics.
Allowance for debt raising costs	<ul style="list-style-type: none"> 12.5 basis points per annum (bppa) added to the prevailing return on debt in each year.
Gearing	<ul style="list-style-type: none"> An industry-specific parameter that is estimated using a broad sample of listed comparator firms. <ul style="list-style-type: none"> Adopt the gearing estimate determined by the ACCC in its 2015 fixed line services Final Access Determination for Telstra and consistent with more recent estimates: 40%.

Placeholder estimates for the first regulatory cycle

- Table 2** presents the individual parameter estimates, and overall rate of return estimates, to be applied for the first regulatory cycle.
- Note that these estimates have been prepared as at December 2021, and will continue to be updated up until the commencement of the regulatory cycle. As highlighted in **Table 2**, updates



will reflect the latest available data relating to risk-free rates, market risk premiums, inflation forecasts and the cost of debt.

Table 2: Estimates for first replacement module, 2023-24 - 2024-25

Approach	'Current' estimate	'Long-term' estimate	Midpoint estimate	Parameter to be updated
Risk-free rate	1.7%	5.0%	3.4%	*
Equity beta	0.7	0.7	0.7	
Market risk premium	9.0%	6.5%	7.8%	*
Return on Equity (nominal, post-tax)	8.0%	9.6%	8.8%	*
Return on Debt (nominal, pre-tax; incl. allowance for debt raising costs; FY 2024)	4.9%	4.9%	4.9%	*
Return on Debt (nominal, pre-tax; incl. allowance for debt raising costs; FY 2025)	4.6%	4.6%	4.6%	*
Gearing	40%	40%	40%	
Nominal vanilla WACC (FY 2024)	6.8%	7.7%	7.2%	*
Nominal vanilla WACC (FY 2025)	6.7%	7.6%	7.1%	*

Source: Frontier Economics

Other estimates related to the BBM

8. Our report also documents the approach we have recommended to NBN Co, and which NBN Co has adopted, relating to the use of 'gamma' in the BBM, the forecasting of inflation and the use of a benchmark financeability test.

Gamma

9. The BBM contains a standard revenue allowance for taxation expenses. That is, a business will be liable to pay some tax and the ABBRR will need to be escalated to allow for the payment of that tax, as well as recover its other efficient costs. Gamma is a parameter relevant to that tax calculation, as it measures the value of franking credits created under the Australian dividend imputation system. That is:
- the amount of corporate tax to be paid by the regulated firm is estimated, which is also an estimate of the quantum of franking credits created;
 - the quantum of franking credits is then multiplied by gamma to provide an estimate of the value of those credits to investors;



- c That value is deducted from the total required return on equity; and
 - d The regulatory allowance is then set such that the firm is able to provide the balance to investors in the form of dividends and capital gains.
10. NBN Co will not be liable to pay corporate income tax for many years, as it has accumulated significant tax losses which offset against future tax profits. In those circumstances (as per 2C.16.4 of the SAU), if the value of the sum of Taxable Profit and Tax Losses Carried Forward is negative, the value of gamma is unspecified. Nonetheless, we have provided a methodology and proposed an estimate for the first regulatory cycle of 0.25. This value is based on the 'market value' interpretation of franking credits and dividend drop-off analyses performed over the last 10 years, which have consistently concluded that the best market value estimate of gamma is 0.25.

Inflation forecasting

11. Under the SAU, for the forthcoming regulatory period, the real RAB will be indexed using actual (i.e., outturn CPI) to compute the nominal RAB. Furthermore, the forecast nominal ABBRR must specify and include a return on capital that is determined using:
- a nominal vanilla WACC; and
 - a forecast nominal RAB.
12. To avoid compensating investors twice for inflation (which would occur as a result of applying a nominal WACC to a forecast nominal RAB (i.e., a RAB indexed using forecast inflation), the SAU requires the use of forecast nominal regulatory depreciation (determined using a forecast of inflation over the regulatory period).²
13. To derive the forecast nominal RAB and forecast nominal regulatory depreciation, a forecast of inflation over the regulatory period is required. We have recommended to NBN Co an approach that is similar to the approach adopted recently by the Queensland Competition Authority (QCA).³
14. Under this approach, for a two-year regulatory period such as the first regulatory cycle, inflation would be forecast by computing the geometric average of the RBA's inflation forecasts for years 1 and 2.
15. For longer regulatory periods, the forecasts are determined by using the RBA's inflation forecasts for years 1 and 2 and then supplemented using a glidepath towards a year 5 'anchor point' based on the two-year ahead forecast. For further details, see **Section 8**.

The regulatory financeability test

16. We have recommended, and NBN Co has accepted, that the adequacy of any ABBRR amount proposed by NBN Co and/or approved by the ACCC should be tested by means of a 'regulatory financeability test', akin to the 'benchmark financeability test' applied by IPART and other regulators in Australia.

² Regulatory depreciation is defined as straight line depreciation less the forecast indexation of the RAB.

³ <http://www.qca.org.au/project/inflation-forecasting/inflation-forecasting-review-2021/>



17. The rationale for such a test is that, in order to determine the ABBRR, an assumption is made about the benchmark level of gearing, cost of debt and credit rating of the hypothetical, efficient (i.e., 'benchmark') business in NBN Co's circumstances. It follows that the notional efficient business that received a revenue allowance in line with the forecast ABBRR (and that adopted the benchmark gearing and cost of debt assumed when determining the ABBRR) would be able to maintain the benchmark credit rating used to determine the ABBRR, all else being equal. The purpose of the benchmark financeability test is simply to test the internal consistency of the ABBRR determination. We therefore submit that the application of a regulatory financeability test is consistent with sound regulatory practice.
18. If the ABBRR is insufficient for the hypothetical efficient firm to service its efficient debt obligations and maintain the benchmark credit rating used to set the allowance, that would suggest there is an internal inconsistency (i.e., an error) in the regulatory decision that needs to be addressed by adjusting the ABBRR.
19. The essential features of the proposed regulatory financeability test are the following:
 - the test would apply symmetrically to NBN Co when proposing its ABBRR, and to the ACCC when making a determination on NBN Co's ABBRR;
 - the test would not be applied to test the financeability of NBN Co's actual business (i.e., using NBN Co's actual gearing, interest expenses and other cash flows related to the actual business). Rather, the test would be conducted using only the information on a benchmark efficient business in NBN Co's circumstances, derived from the BBM used to set the ABBRR;
 - the test would exclude revenues related to recovery of the ICRA, since a business without access to these revenues could not rely on those revenues to address a financeability problem caused by the ABBRR being set too low; and
 - the test would be purely quantitative in nature, focussing on the quantitative financial metrics, metric weighting factors, and approach to converting weighted average financial metrics into an overall credit rating set out in Moody's Rating Methodology for Communications Infrastructure.
20. The benchmark efficient business would be deemed to have failed the regulatory financeability test in any given year within a Regulatory Cycle if the credit rating of the benchmark efficient business implied by ABBRR is lower than the benchmark credit rating assumed when setting the ABBRR.
21. In such circumstances, a failure of the regulatory financeability test would be remedied by:
 - a first determining if the cause of the financeability concern is an insufficient allowance for the return on equity or for regulatory depreciation or both; and
 - b then addressing the specific cause of the failure of the regulatory financeability test by adjusting the ABBRR by:
 - i increasing the allowed return on equity up to the upper bound of the return on equity range; and/or
 - ii increasing the depreciation allowance in an NPV-neutral way.
22. The regulatory benchmark test may need to be updated periodically, to ensure that it remains reasonably aligned with Moody's methodology.



1 Introduction

1.1 Variation to the Special Access Undertaking

23. NBN Co intends to submit a variation to its special access undertaking (**SAU**) to the Australian Consumer and Competition Commission (**ACCC**) in 2022. This variation will propose a regulatory framework for use in periodic regulatory resets (replacement modules) that will apply from 2023 until the expiry of the undertaking in 2040.
24. The ACCC is required to assess the variation against the “reasonableness criteria” specified in Part XIC of the *Competition and Consumer Act 2010* (Cth) (**CCA**).⁴ The reasonableness criteria include the long-term interests of end-users (**LTIE**) including whether the arrangements promote the efficient use of, and investment in, infrastructure, as well as promote the legitimate business interests of the access provider.
25. A key component of NBN Co’s proposed regulatory framework for replacement modules is the development of a building block model (**BBM**). A BBM provides NBN Co with a means of recovering its efficient costs, through the recovery of ‘building block’ costs.
26. One of the building blocks is the return on capital - the return that suppliers of equity and debt finance would require to invest in NBN Co’s supply of core regulated services.⁵

1.2 Purpose of this report

27. Frontier Economics has worked with NBN Co to develop an appropriate methodology for determining a suitable return on capital that will be applied in regulatory resets to 2040 under the varied SAU.
28. This report documents the operation of the methodology as it has been incorporated into the SAU, and describes how the methodology satisfies the reasonableness criteria including the promotion of the LTIE by facilitating the recovery of NBN Co’s benchmark efficient financing costs.
29. The report also covers two other issues that are commonly considered alongside the return on capital:
 - a the value of ‘gamma’ as an input into determining post tax cash flows from the BBM; and

⁴ Subsection 152CBD(2) of the CCA requires that the ACCC must not accept an SAU unless the ACCC is satisfied that:

- the terms and conditions of the SAU are consistent with the Category B SAOs in section 152AXB;
- the terms and conditions of the SAU are reasonable; and
- the SAU is consistent with any Ministerial pricing determinations.

⁵ Core regulated services are distinct from competitive services as defined in the SAU. References in this report to RAB and ABBRR should be read as references to the Core Services RAB Portion and the Core Services ABBRR as defined in the SAU.



- b the forecast of inflation that is used to the index the regulatory asset base and determine real straight-line depreciation.
30. Finally, we have also proposed the use of a benchmark financeability test for NBN Co, which NBN Co has adopted in the SAU. We describe the application and consequences of this test in the SAU.
31. The report proceeds as follows:
- In section 2, we describe the approach to determining a suitable return on capital methodology for NBN Co, based on the weighted average cost of capital for a benchmark firm;
 - In section 3, we outline the proposed approach to estimate of the return on equity;
 - In section 4, we outline the proposed approach to estimate the return on debt;
 - In section 5, we consider gearing - the proportion of debt vs equity financing;
 - In section 6, we consider the value of gamma;
 - In section 7, we outline the inflation forecasting methodology; and
 - In section 8, we describe the operation of the Financeability test.



2 Approach to developing a return on capital methodology

2.1 Key principles and statutory criteria

2.1.1 The role of the return on capital allowance

32. The return on capital allowance is one of the ‘building block’ allowances that form the basis of the Australian regulatory system. Investors in any business, including a regulated business such as NBN Co, require a return that is sufficient to compensate them for the opportunity costs and risks they bear when committing capital to the firm. The minimum return that a business must pay its investors, in order to attract and retain the capital necessary to finance efficient and prudent investments, is the ‘market cost of capital’ associated with that investment.
33. The Australian regulatory framework recognises that there are broadly two types of capital investment – equity and debt. Each type of capital requires a particular return, commensurate with the risk of that type of capital investment. The standard approach for estimating the total required return on capital is via the weighted-average cost of capital (WACC), that is defined as:

$$WACC = \text{Return on equity} \times (1 - \text{Gearing}) + \text{Return on debt} \times \text{Gearing}$$

where:

- *Return on equity* represents the cost of equity capital – the return that investors must expect to receive in order to commit equity capital to the firm;
 - $(1 - \text{Gearing})$ represents the relative proportion of equity capital;
 - *Return on debt* represents the cost of debt capital – the return that investors must expect to receive in order to commit debt capital to the firm; and
 - *Gearing* represents the relative proportion of debt capital.
34. This approach for determining the allowed return on capital is well-accepted among Australian regulators, and we consider that it also should be adopted in the SAU.

2.1.2 Guidance from statutory criteria

35. Section 152CBD of the Competition and Consumer Act 2010 sets out the criteria for accepting an access undertaking. This section requires, among other things, that an access undertaking can only be accepted if its terms and conditions are “reasonable.” The reasonableness of terms and conditions is addressed in section 152AH as follows:⁶

⁶ Competition and Consumer Act 2010 (Cth), s 152AH.



For the purposes of this Part, in determining whether particular terms and conditions are reasonable, regard must be had to the following matters:

- a. whether the terms and conditions promote the long-term interests of end-users of carriage services or of services supplied by means of carriage services;*
- b. the legitimate business interests of the carrier or carriage service provider concerned, and the carrier's or provider's investment in facilities used to supply the declared service concerned;*
- c. the interests of persons who have rights to use the declared service concerned;*
- d. the direct costs of providing access to the declared service concerned;*
- e. the operational and technical requirements necessary for the safe and reliable operation of a carriage service, a telecommunications network or a facility;*
- f. the economically efficient operation of a carriage service, a telecommunications network or a facility.*

36. The central role of the long-term interests of consumers and the economic efficiency of the regulated service closely resembles the National Electricity Objective (NEO)⁷ and National Gas Objective (NGO)⁸ that guides the operation of the AER's regulatory process. The AER has recently considered the approach to the allowed return on capital that best promotes the long-term interests of consumers, concluding that the allowed return should be set at the best possible estimate of the market cost of capital:
- If the allowed rate of return is set below the firm's true cost of capital, then it will be unable to attract the capital required to make the prudent and efficient investments to deliver the regulated services; and
 - If the allowed rate of return is set above the firm's true cost of capital, that would result in consumers paying more than is required in order to deliver the regulated services.
37. On this point, the AER has recently stated that:⁹

Setting the expected rate of return in [sic] not a precise science and involves uncertainty and judgement. Due to inevitable uncertainty, there is a risk that the

⁷ National Electricity Law, s 7.

⁸ National Gas Law 23.

⁹ AER, May 2021, *Assessing the long-term interests of consumers*, p. 2.



estimated expected rate of return will be higher or lower than the actual market cost of capital. If the expected rate of return deviates from the market cost of capital then it may not promote efficient investment in, and use of, the service provider's energy network in the long term interests of consumers. Therefore, the best possible estimate of the expected rate of return, will promote efficient investment in, and efficient operation and use of, energy network services for the long term interests of consumers.

38. The AER concluded that setting an allowed return above or below the market cost of capital is likely to be inconsistent with the long-term interests of consumers:¹⁰

Due to inevitable uncertainty, there is a risk that the estimated, expected rate of return will be higher or lower than the market cost of capital. If the expected rate of return deviates from the market cost of capital then the expected rate of return may not achieve the legislative objectives - it may not promote efficient investment in and use of the service provider's energy network for the long term interests of consumers. That is, there may be costs associated with the expected rate of return being higher or lower than the market cost of capital.

39. The AER has also noted that the rationale for seeking the best possible estimate of the market cost of capital is that:

- Setting the allowed return too low would lead to inefficient underinvestment and would prevent regulated firms from recovering efficient costs; and
- Setting the allowed return too high would create an incentive for inefficient overinvestment and may lead to inefficient underutilisation of regulated assets.

40. In this regard, the AER has recently stated that:¹¹

*Each of these principles has an important guiding role when determining an appropriate way to calculate the rate of return in order to achieve the national gas and electricity objectives. For example, **if the rate of return is set at a rate that is too low to promote efficient investment in infrastructure, it will lead to underinvestment.** It may not allow a provider a reasonable opportunity to recover at least its efficient costs in providing services or complying with regulatory obligations. It will not provide effective incentives for efficient investment in, or provision for, or use of services. It will not be a rate that provides for a return that is likely to be commensurate with the commercial and regulatory risks. It may lead*

¹⁰ AER, May 2021, *Assessing the long-term interests of consumers*, p. 8.

¹¹ AER, 2018, *Rate of Return Instrument, Final Decision, Explanatory Statement*, pp. 30-31, emphasis added.



to various economic costs and risks that might arise from under-investment in the network system. All of these factors would compromise the realisation of the national gas and electricity objectives.

41. Similarly, if the rate of return is set too high, it will provide an incentive to over-invest in network infrastructure. It will not reflect a return that is commensurate with the regulatory and commercial risks. It will not promote efficient investment in the network system and it is likely to lead to underutilised investment in regulated assets.
42. In its recent Position Paper, the AER summed up its proposed approach in terms of ‘an unbiased estimate’:¹²

In our view, for the 2022 Instrument to advance the NEO and NGO to the greatest degree, the expected rate of return [i.e., the allowed return] should be an unbiased estimate of the expected efficient return, consistent with the relevant risks involved in providing regulated network services. If it does, then it will (all else being equal) promote both efficient investment in, and efficient use of, energy network services for the long term interests of consumers.

43. We agree with this analysis and support the conclusion that the allowed rate of return should be set equal to the best possible estimate of the market cost of capital.

2.2 Our approach and NBN Co’s proposal

44. We propose that setting the allowed rate of return to the best possible estimate of the market cost of capital best promotes the long-term interests of users of the regulated service.
45. We also propose that:
- The WACC methodology should be capable of producing reliable estimates of the market cost of capital for a benchmark entity in a wide range of plausible market conditions; and
 - The WACC methodology should promote stability in the allowed return on capital—and prices for consumers—over time.
46. The WACC formula, i.e. $WACC = \text{Return on equity} \times (1 - \text{Gearing}) + \text{Return on debt} \times \text{Gearing}$, requires estimates of three components:
- The required return on equity capital;
 - The required return on debt capital; and
 - Gearing, being the relative proportion of debt capital.

¹² AER, May 2021, *Assessing the long-term interests of consumers*, p. 12.



47. The following sections set out our proposed approach, which has been accepted by NBN Co and incorporated into the SAU, to the methodology for deriving these estimates.



3 The return on equity

3.1 The Capital Asset Pricing Model (CAPM)

48. The return on equity allowance represents an estimate of the minimum return that equity investors would require in order to commit capital to a benchmark efficient business delivering the regulated services provided by NBN Co, and to leave that capital invested in the business rather than allocating it to another investment opportunity of comparable risk.
49. The return on equity cannot be observed because it represents a forward-looking, expected/required return. It must therefore be estimated using financial models. In practice, the most common approach to estimating the required return on equity is the Capital Asset Pricing Model (CAPM):

$$\text{Return on equity} = \text{Risk-free rate} + \text{Equity beta} \times \text{Market risk premium}$$

50. where:
- *Risk-free rate* represents the 'risk-free rate of return.' This is the return that is available to investors on an investment that is completely free of risk. Commonwealth government bonds are usually assumed to be such a risk-free investment;
 - *Market risk premium* represents the amount of extra return (over and above the return on a risk-free asset) that investors would require for investing in an asset with an average level of risk; and
 - *Equity beta* represents the 'equity beta,' which indicates the extent to which the particular investment has more or less risk than average. For example, an equity beta of 0.7 indicates that the investment in is 30% less risky than average, in which case it would require a risk premium that is 30% less than would be required for an investment of average risk.
51. The CAPM is used extensively in practice. For example, all economic regulators in Australia, including the ACCC, routinely use the CAPM to estimate the required return on equity capital. For this reason, we submit that the CAPM should be used to determine the allowed return on equity.

3.2 Internally consistent estimates

52. When implementing the CAPM, it is important to ensure that parameters are estimated in an internally consistent manner. In particular, the risk-free rate and market risk premium parameters can each be estimated as prevailing, forward-looking parameters or as long-run average parameters.
53. It is well-known and well-accepted that both of these parameters vary over time. Risk-free rates (estimated as the yield on government bonds) vary over market conditions. For example, in different market conditions the yield on 10-year government bonds has been higher than 10% and lower than 1%. Similarly, the premium that investors require for risk is materially higher during financial crises than during periods of sustained economic growth.



54. In order to obtain internally consistent and economically meaningful outputs from the CAPM, it is important to ensure that parameters are estimated on a consistent basis. For example:
- Prevailing estimates of the risk-free rate and market risk premium will produce an estimate of the prevailing, forward-looking return that investors require; and
 - Long-run average estimates of the risk-free rate and market risk premium will produce an estimate of the long-run average of the returns that investors might require from time to time.
55. When parameters are estimated inconsistently, the result is an output that is not economically meaningful. For example, using a prevailing, forward-looking estimate of the risk-free rate and a long-run historical average estimate of the market risk premium produces an output that has no obvious economic interpretation. Moreover, such an approach produces implausible outcomes over time. For example, government bond yields tend to decline markedly during financial crises (such as the global financial crisis (GFC), European debt crisis, and COVID crisis) as investors move funds to investments with low risk and high liquidity such as government bonds. Thus, pairing the prevailing risk-free rate with the (essentially constant) long-run historical average market risk premium implies that the required return on equity *falls* during financial crises. This is clearly implausible and is therefore not a reasonable basis for setting regulatory allowances.
56. IPART has reached the same view, noting that:¹³

In relatively stable market conditions, there may be little difference between long-term historic and current market implied estimates of the expected market risk premium. Since the GFC, market conditions have become significantly more volatile. Estimates of the market implied expected market risk premium are currently above the historic long-term average of 6%.

The application of the CAPM using a stable historic market risk premium (of 6%) and a prevailing market rate for the risk free rate means that the cost of equity will move in synchronicity with the risk free rate for a given level of equity beta. If the risk free rate fluctuates significantly so will the cost of equity.

In late 2008/early 2009, and then again from late 2011, the risk free rate fell to a 50-year low. The overall effect is that the regulatory cost of equity has fallen and may underestimate the cost of equity for regulated businesses when the risk free rate is low. Conversely, it may overestimate the cost of equity when the risk free rate is high.

57. IPART went on to explain that:¹⁴

¹³ IPART, *Review of method for determining the WACC: Dealing with uncertainty and changing market conditions*, December 2012 (**IPART discussion paper**) p. 55.

¹⁴ IPART discussion paper, pp. 57-58.



...estimated risk premiums are not stable through time. Risk premiums tend to move in the opposite direction to the risk free rate. As investors may respond to recent losses on riskier assets by shifting to safer assets, prices of those assets are likely to fall, increasing the expected rate of return for a given flow of future dividends. In periods of high risk aversion there is a flight from risky assets to safe assets (such as the risk free rate). This tends to push up the price of safe assets, thereby pushing down their yields. Thus, in these circumstances, a falling risk free rate tends to be associated with rising equity risk premiums (and vice versa).

58. To the extent there is a negative relationship between the risk-free rate and the risk premiums on listed equities, the required return of the equity market (being the sum of risk-free rate and the market risk premium) is relatively more stable than its individual components.
59. In circumstances where the prevailing risk-free rate and market risk premium are negatively correlated, the total required return on equity is more stable than each component – any fall in one tends to be offset by a rise in the other. In these circumstances, the inconsistent pairing of a prevailing risk-free rate with a long-term average market risk premium will tend to:
- Overstate the true required return on equity when risk-free rates are high (as the average market risk premium overstates the true prevailing market risk premium, which tends to be lower when risk-free rates are high); and
 - Understate the true required return on equity when risk-free rates are high (as the average market risk premium understates the true prevailing market risk premium, which tends to be higher when risk-free rates are low).
60. In a recent report commissioned by the AER, CEPA investigates the relationship between the prevailing risk-free rate and market risk premium and concludes that:¹⁵

In the period since 1993, we consider there is a strong and convincing negative relationship between the implied [market risk premium] and the [risk-free rate].

The relationship that we find for Australia is consistent with the data from the US published by Damodaran.

61. CEPA further concludes that there is “no good evidence” to support an approach that pairs a prevailing risk-free rate with a long-run average market risk premium within the CAPM.¹⁶

¹⁵ CEPA, June 2021, *Relationship between RFR and MRP*, p. 6, emphasis added.

¹⁶ CEPA, June 2021, *Relationship between RFR and MRP*, pp. 6, 44.



62. The desire to avoid an approach that mixes prevailing and long-run average parameters and which produces implausible outcomes over time has led IPART to adopt an approach that involves:
- Deriving an estimate of the cost of equity using only current market data, whereby a contemporaneous estimate of the risk-free rate is coupled with a contemporaneous estimate of the market risk premium. IPART refers to this estimate as the 'current' cost of equity.
 - Deriving an estimate of the cost of equity using only long-term historical averages, whereby a long-term average risk-free rate is coupled with a long-term average market risk premium. IPART refers to this estimate as the 'long-term' or 'historic' cost of equity.
 - As a default position, determining the allowed cost of equity by giving equal weighting to the current and long-term average estimates.
63. In a subsequent review of its approach to setting allowed returns, IPART has affirmed its approach, noting the problems that arise from pairing inconsistent parameter estimates within the CAPM:¹⁷

We consider it would be invalid to combine a current risk-free rate with a historic market risk premium, because the result of that calculation would not represent the state of the equity market at any point of time. By combining a current estimate of the risk-free rate with a current market risk premium estimate, we can approximate the current market price of equity. Likewise, by combining a historic estimate of the risk-free rate with a historic market risk premium estimate, we can approximate the historic average market price of equity. Either of these benchmarks would be a valid point of reference. When we combine the risk-free rates and market risk premium estimates in this time-consistent way, the current cost of equity is closer to the historic average cost of equity than either of them is to the time-inconsistent sum.

64. In a recent submission to ESCOSA's review of SA Water's regulated prices, IPART further explained why the approach of pairing a prevailing risk-free rate with a long-run average market risk premium is likely to produce unreasonably low return on equity allowances in the current market conditions. IPART submitted that:¹⁸

¹⁷ IPART, *Review of our WACC methodology*, February 2018, pp. 51-52.

¹⁸ IPART, *Submission on Draft Report, SA Water Regulatory Determination 2020*, 3 April 2020, pp. 2-3.



As spot risk free rates are very low right now and the long-term [market risk premium] is lower than the current [market risk premium], this procedure gives a low estimate of the cost of equity...

This approach will generate biased estimates of the market cost of equity because it combines incompatible short term and long term market observations. As you note in your statement of reasons (p 156) Frontier Economics recommended that, because there is an inverse relationship between the [market risk premium] and risk-free rate, it is important to adopt an approach to estimating the required return on equity that pairs the risk-free rate consistently with the [market risk premium]. We agree with Frontier on this point.

65. Our approach avoids the possibility of bias that arises when the two parameters are estimated inconsistently. Both current and long-term average cost of equity estimates employ matched market risk premium and risk-free rate observations. It is highly significant that our current and long-term average cost of equity estimates are quite similar to each other.
66. We submit that:
- When implementing the CAPM, it is important to ensure that parameters are estimated in an internally consistent manner. For example, pairing an estimate of the prevailing risk-free rate with the long-term average market risk premium is likely to produce estimates that are biased and even implausible in some market conditions.
 - The allowed return on equity should be set using the (internally consistent) IPART approach of:
 - Pairing prevailing, forward-looking estimates of the risk-free rate and market risk premium to produce a prevailing estimate of the required return on equity;
 - Pairing long-term average estimates of the risk-free rate and market risk premium to produce a long-term average estimate of the required return on equity; and
 - Applying 50% weight to each estimate.

3.3 Prevailing risk-free rate

67. The prevailing risk-free rate represents the prevailing rate of return available to investors on an investment with zero risk. It is standard commercial and regulatory practice to estimate the risk-free rate using the yields on government bonds. This leaves only the question of the term that should be used. The standard approach among Australian regulators is to estimate the risk-free rate as the yield on 10-year government bonds. This approach is currently used by the AER, ACCC, IPART, QCA, ICRC, ESCOSA and ESCV.
68. The AER has noted that a 10-year term:
- Reflects the actual practices of investors;
 - Is more consistent with the theory of the SL CAPM; and
 - Best reflects well accepted academic literature.



69. For example, the AER has concluded that:¹⁹

We consider the use of a 10 year term will lead to an overall rate of return that will better contribute to the achievement of the NEO and NGO. We consider a 10 year term is consistent with the theory of the Sharpe-Lintner CAPM which is a single period equilibrium model, estimating the returns an investor requires over a long-term investment horizon. The 10-year term also reflects the actual investor valuation practices and academic works.

70. In relation to consistency with the theory of the SL CAPM, the AER explained that the standard approach is to adopt a term that reflects the life of the assets:²⁰

We use the CAPM to estimate how an investor will value the potential returns from an investment in an infrastructure business with long-lived underlying assets. Equity investors seek out efficient returns for their diversified investment portfolio over long-term investment horizons. Although reinvestments may be [made] more frequently, they are still being made with reference to a long-term equilibrium rate of return. This will reflect the excess return required for bearing the systematic risk of the investment over the return on a long-term riskless asset.

71. The AER has also noted that the standard approach adopted by market practitioners, and advocated in the academic literature, is a 10-year term:²¹

We find support for using a 10 year term in actual investor valuation practices, and academic works. The 2013 and 2017 KPMG market practitioner surveys indicate around 85 per cent of practitioners use 10 year CGSs as a proxy for the risk free rate. Academic works by Pratt & Grabowski (2010), and Damodoran (2008) also argued that 10 year CGS yields were appropriate proxies for the risk free rate, as they reflect the long-term nature of the underlying assets.

72. For example, the leading Berk and DeMarzo textbook indicates that:²²

¹⁹ AER, *Rate of Return Instrument Explanatory Statement*, December 2018, p. 126.

²⁰ AER, *Rate of Return Instrument Explanatory Statement*, December 2018, p. 127.

²¹ AER, *Rate of Return Instrument Explanatory Statement*, December 2018, p. 127.

²² Berk, J. and P. DeMarzo, 2020, *Corporate Finance: Global 5th edition*, pp. 447-448.



When discounting risk-free cash flows we **match the maturity of the interest rate to that of the cash flows**. It is common to do the same when applying the CAPM...For example, where valuing a long-term investment with an indefinite horizon, such as a stock, most financial analysts report using the yields of **long-term (10-30 year) bonds** to determine the risk-free interest rate.

73. And the well-known McKinsey corporate valuation manual also recommends the use of long-term bonds.²³

Use longer-term bonds; they will be better in line with the time horizon of corporate cash flows.

74. Independent expert valuation reports, issued in conjunction with major corporate transactions, also adopt a 10-year risk-free rate as standard practice. For example, the recent KPMG expert report in relation to the Spark Infrastructure transaction states that:²⁴

The risk-free rate of return is the return on a risk-free security, typically for a long-term period. In practice, long dated government bonds are accepted as a benchmark for a risk-free security. In Australia, the spot yield to maturity of 10-year Australian Government Bonds has traditionally been accepted as a proxy for the risk-free rate in determining a cost of equity under the CAPM. Further, the market in 10 year Australian Government Bonds is liquid such that, in our view, the current yield on government bonds represents the best indicator of the risk free opportunity cost of the assets for the forthcoming 10 year period at any particular point in time.

75. Similarly, the Grant Samuel expert report in relation to the recent AusNet Services transaction observes that:²⁵

²³ Koller, T., M. Goedhart and D. Wessels, 2015, *Valuation*: 6th University Edition, Wiley, p. 290.

²⁴ KPMG, *Independent expert report for Spark Infrastructure*, October 2021, p. 101.

²⁵ Grant Samuel, *Independent expert report for AusNet Services*, December 2021, Appendix 3, p. 4.



The ten year bond rate is a widely used and accepted benchmark for the risk free rate.

76. For all of the above reasons, we submit that the prevailing risk-free rate should be estimated as the prevailing yield on 10-year government bonds.
77. In relation to the technical estimation of the prevailing 10-year government bond yield, we propose that the approach adopted by the AER should be used. This involves:
- Interpolating between the Australian government bonds with just less, and just more than, 10 years to maturity to obtain an estimate of the yield with precisely 10 years to maturity;
 - Converting the quoted semi-annual yield to an annual basis using the conversion formula:
 - $Annualised\ yield = \left(1 + \frac{Semi-annual\ yield}{2}\right)^2 - 1$; and
 - Taking an average of the annualised yields over the 40 business days prior to the date of the regulatory determination.
78. This approach is illustrated in the AER's risk-free rate model.²⁶

3.4 Long-run risk-free rate

79. The long-run risk-free rate represents the long-run average rate of return that investors would expect to receive on a risk-free investment. For the reasons set out above, NBN Co proposes that the yield on 10-year government bonds should be used as a proxy for the risk-free rate. Thus, what is required is an estimate of the long-run average yield on 10-year government bonds.
80. The Commonwealth Government's 2021 Intergenerational Report considers three scenarios for the future evolution of the 10-year government bond yield. These scenarios were developed by the Reserve Bank of Australia and the Commonwealth Treasury. In all three scenarios, the rate is assumed to "converge to a long-run rate of around 5 per cent, consistent with the nominal GDP growth rate." The scenarios differ only in terms of the length of time taken for that convergence, projecting that the yield will remain at about 5% indefinitely thereafter.²⁷
81. Consequently, we submit that the long-run risk-free rate should be fixed to 5% in accordance with the RBA/Commonwealth Treasury projections set out in the 2021 Intergenerational Report.

3.5 Prevailing market risk premium

82. The prevailing market risk premium represents the return that investors would currently require, over and above the prevailing risk-free rate, to provide equity capital for an investment of

²⁶ See, for example, <https://www.aer.gov.au/system/files/AER%20-%20Final%20decision%20ActewAGL%20-%20Rate%20of%20return%20Risk%20free%20rate%20model%20-%20May%202016.XLSX>.

²⁷ Commonwealth of Australia, *2021 Intergenerational Report*, June 2021, Chart 6.5, p. 85.



average risk. It is a forward-looking estimate of the market risk premium to be paired with the prevailing risk-free rate.

83. The sum of the prevailing risk-free rate and the prevailing market risk premium provides an estimate of the prevailing total return on equity required for an investment of average risk. In the regulatory setting, this is frequently referred to as the prevailing 'total market return' (TMR). Thus:

$$\text{Total market return} = \text{Risk-free rate} + \text{Market risk premium.}$$

84. The standard approach to estimating the prevailing TMR is via a dividend growth model (DGM). A DGM estimates the TMR as the rate of return that equates the present value of forecasted dividends with the currently observable price for a broad stock market portfolio. The general mathematical specification of the DGM is as follows:

$$\text{Current price} = \frac{\text{Forecast Dividends in Year 1}}{(1 + \text{TMR})^{0.5}} + \frac{\text{Forecast Dividends in Year 2}}{(1 + \text{TMR})^{1.5}} + \dots$$

where:

- *Current price* represents the observable price for a broad stock market index such as the ASX 200 or All Ordinaries index;
 - *Forecast Dividends in Year 1* represents the dividends that an owner of the portfolio of stocks that make up the relevant index would expect to receive over the forthcoming year;
 - *Forecast Dividends in Year 2* represents the dividends that an owner of the portfolio of stocks that make up the relevant index would expect to receive over the subsequent year;
 - Dividends for each year are discounted back from the middle of that year – consistent with the assumption that dividends are paid uniformly throughout the year; and
 - *TMR* represents the total market return. It is the discount rate that equates the present value of forecasted dividends with the observed current price.
85. The DGM has a strong theoretical foundation in that it simply requires that the current asset value must equal the present value of the future cash flows that the asset owner would expect to receive. For example, the leading corporate finance textbook by Berk and DeMarzo refers to the DGM as the "fundamental approach," explaining that:²⁸

We can take a fundamental approach toward estimating the market risk premium. Given an assessment of firms' future cash flows, we can estimate the expected

²⁸ Berk, J. and P. DeMarzo, 2020, *Corporate Finance: Global* 5th edition, p. 449.



return of the market by solving for the discount rate that is consistent with the current level of the index.

86. In this regard, the AER has stated that:²⁹

DGMs are recognised financial models that are commonly used in practice,

and that:³⁰

DGM estimates have strong theoretical grounding and are more likely to reflect prevailing market conditions than other approaches,

and that:³¹

DGMs are suited to the estimation of the rate of return from current market information, as demonstrated by US regulators using them for this purpose.

87. In a recent report commissioned by the AER, Brattle noted that it was common for economic regulators to use the DGM approach to inform their estimates of the market risk premium.³² By way of example, the US Federal Energy Regulatory Commission (FERC) has identified the merits of the DGM approach (which is called the 'discounted cash flow' approach in the US) as follows:³³

The market risk premium, which is where most CAPM studies diverge, can be estimated either using a backward-looking approach, a forward-looking approach, or a survey of academics and investment professionals. A CAPM analysis is backward-looking if its market risk premium component is determined based on historical, realized returns. A CAPM analysis is forward-looking if its market risk

²⁹ AER, 2013, *Rate of Return Guideline, Explanatory Statement*, p. 96.

³⁰ AER, 2013, *Rate of Return Guideline, Explanatory Statement*, Appendices, p. 85.

³¹ AER, 2013, *Rate of Return Guideline, Explanatory Statement*, p. 96.

³² Brattle Group, *A Review of International Approaches to Regulated Rates of Return*, June 2020.

³³ FERC Opinion 531B, Paragraph 108.



premium component is based on a DCF study of a large segment of the market. In a forward-looking CAPM analysis, the market risk premium is calculated by subtracting the risk-free rate from the result produced by the DCF study.

88. The implementation of the DGM approach differs in terms of the methods used to forecast future dividends. This leads to the possibility that different specifications of the DGM might produce somewhat different estimates of the market risk premium at any point in time. IPART addresses this issue by estimating three well-established specifications to inform its estimate of the forward-looking market risk premium. IPART explains the rationale for using multiple specifications of the DGM as follows:³⁴

An implied [market risk premium] estimate is likely to be sensitive to the specific model chosen by us, since each model makes certain underlying assumptions. We consider that employing a number of models to estimate the implied [market risk premium] reduces these concerns and enhances the robustness of our implied [market risk premium] estimate, leading to a better and more robust estimate of the cost of equity using current market data.

89. The three DGM specifications adopted by IPART are:
- Damodaran (2013);³⁵
 - Bank of England (2002);³⁶ and
 - Bank of England (2010).³⁷
90. The formal mathematical specifications for these three approaches are set out in the Final Report from IPART's 2013 WACC Review.³⁸
91. We submit that these three approaches should be used to inform the estimate of the prevailing market risk premium.
92. We also submit that the 'calibrated DGM' approach recently proposed by Energy Networks Australia (ENA) should also be used. ENA has proposed an approach that is based on the AER's preferred specification of the DGM with one amendment – the assumed long-term dividend growth rate is selected to ensure that the average market risk premium estimate produced by

³⁴ IPART, *WACC methodology: Draft report*, September 2013, p. 15.

³⁵ Damodaran, A., *Equity risk premiums (ERP): Determinants, estimation and implications – The 2013 edition*, 2013, pp 63-73.

³⁶ Bank of England, *Analysts' earnings forecasts and equity valuations*, 2002.

³⁷ Bank of England, *Interpreting equity price movements since the start of the financial crisis*, 2010.

³⁸ IPART, *WACC methodology: Final report*, December 2013, pp. 33-35.



the model over an historical period equates with the average observed market risk premium over the same period. This specification of the DGM is set out in a recent submission to the AER.³⁹

93. In the AER's 2018 Rate of Return Instrument review, the AER identified two principal concerns with the DGM approach. The AER considered that:
- DGM estimates of the market risk premium could be systematically upwardly biased—for instance, due to the 'stickiness' of dividends, and because analysts' earnings forecasts (an input to the DGM) may be systematically over-optimistic; and
 - There is considerable uncertainty over the appropriate long-run growth rate estimate to apply in the DGM.
94. The calibrated DGM approach proposed by ENA seeks to address both of these concerns directly and simultaneously by calibrating (i.e., selecting) the long-run growth rate such that the average market risk premium estimate over a long historical period is equal to the observed average market risk premium over that same period (i.e., 6.5% below).

3.6 Long-run average market risk premium

95. The long-run average market risk premium can be estimated by taking the average excess market return over a long historical period. The excess market return for each year is computed by taking the total return on a broad stock market index (such as the ASX 200 or All Ordinaries Index) and subtracting the yield available on 10-year government bonds that year. The long-run average of these excess returns provides an indication of the market risk premium that investors might expect on average over the long run.⁴⁰
96. **Table 3** below presents long-run average historical excess returns over different averaging windows considered by the AER. Because the assumption on gamma also affects the estimates of historical excess returns, we present two estimates: (i) assuming a proposed gamma estimate of 0.25 (our estimate of gamma, see also Section 6) and (ii) the AER's current gamma estimate of 0.585. Based on these historical averages, we conclude that an estimate of 6.5% for the long-run average market risk premium is reasonable, although it is clear that the long run average market risk premium should also account for - and be consistent with - the value of gamma.

³⁹ Energy Networks Australia, *Estimating the cost of equity*, September 2021, available at <https://www.aer.gov.au/system/files/ENA%20-%20Submission%20-%20Equity%20-%203%20September%202021.pdf>.

⁴⁰ For clarity, both the prevailing and long run average approaches are estimates of a long-run MRP. The first is conditional on current market conditions and the second is the unconditional average.

**Table 3:** Historic Excess Returns based market risk premium estimates

Historic period	Gamma of 0.25	Gamma of 0.585
1883-2021	6.29%	6.41%
1937-2021	6.02%	6.21%
1958-2021	6.49%	6.74%
1980-2021	6.41%	6.80%
1988-2021	6.03%	6.51%
2000-2021	6.38%	6.78%

Source: S&P, RBA, AER data; Frontier Economics analysis.

3.7 Equity beta

3.7.1 Use of standard regression analysis applied to comparator firms

97. The standard approach to estimating equity beta involves a regression analysis to quantify the relationship between stock returns and market returns using a sample of comparator firms. For each comparator firm, a series of historical stock returns is regressed against a corresponding series of returns from a broad stock market index such as the ASX 200 index in Australia. The slope of the regression line is an estimate of the equity beta for that comparator. Estimates for a number of comparator firms are then used to inform the beta to be adopted for the particular regulated business in question.

3.7.2 Selection of comparator firms

98. The tables below consider three sets of comparator firms:
- The set of 22 comparators adopted by the ACCC in its 2015 Telstra FAD for fixed line services;
 - A set of 75 comparators that adds to the previous sample the companies used by the New Zealand Commerce Commission (NZCC) when setting allowed returns for the fixed line business of Chorus Ltd; and
 - A set of 86 comparators that adds to the previous sample the companies contained in a sample prepared for NBN Co by KPMG.

3.7.3 Selection of historical data periods

99. When performing regression analysis to estimate equity beta, there is no standard approach for determining the length of the historical data period to use or the frequency with which returns should be recorded. For this reason, it is common to report results for a number of different periods and frequencies. The tables below contain figures for:
- Daily, weekly and monthly stock returns – these being the three frequencies that are commonly used for the purpose of estimating betas.



- The beta estimates derived using weekly and monthly returns data are obtained by estimating beta for each stock using each possible reference day, and then averaging the estimates over all reference days. For instance, for the 'weekly' betas, we have derived for each company a beta using returns measured from Monday to Monday, Tuesday to Tuesday, and so on. Then, each of these five beta estimates are averaged to obtain an overall beta estimate for the firm, making use of information provided by all the returns data, rather than a subset of the data (selected by arbitrarily choosing one of five possible reference days to compute historical stock and market returns). We have adopted the approach of using all possible reference days to estimate beta to minimise the risk of introducing sampling error into the estimation process by relying on a single reference day, rather than making use of information provided by all available reference days.⁴¹ The approach of using all available reference days was recently adopted by IPART;⁴² and
- 5-year and 10-year historical periods. The ACCC considered 5-year historical periods in its 2015 Telstra FAD for fixed line services and the AER considers longer historical periods, noting that "we consider that placing most weight on the long-term estimates can lead to a more robust and statistically reliable equity beta estimate and better account for the cyclicity in factors affecting empirical equity beta estimates."⁴³ Consequently, the tables below set out estimates for two different historical periods.

3.7.4 Re-levering to ensure like-with-like comparisons

100. The equity beta reflects the systematic risk of an investment in the shares of the particular company. Thus, the equity beta reflects:
 - The systematic risk of the activities of the firm; and
 - The firm's gearing.
101. Other things being equal, the equity beta will be higher:
 - For firms whose activities are risky – in the sense that performance is highly correlated with the general state of the economy; and
 - For firms with high gearing – as relatively more debt finance, with a claim that ranks ahead of equity, increases the risk faced by residual equity holders.
102. Selecting a set of comparator firms is designed to control for the first component of risk – the nature of the activities of the firm. Comparable firms are selected to ensure that the systematic risk of the activities of the various firms are similar to that of the regulated firm in question.
103. However, some of these comparable firms may have gearing that differs from that adopted by the regulator for the regulated firm in question. For this reason, it is standard practice to 're-lever' the equity beta estimates for the comparator firms to match the gearing adopted for the regulated firm in question. For example, if the regulator adopts 40% gearing for the regulated firm but a comparator firm has gearing of 50%, the beta estimate of the comparator firm will be

⁴¹ This sampling error problem is referred to in the finance literature as the 'reference day risk' problem. See, for example, Acker, D., and N. W. Duck, 2007. "Reference-day risk and the use of monthly returns data," *Journal of Accounting, Auditing and Finance*, 22, 527–557.

⁴² IPART, *Estimating equity beta for the Weighted Average Cost of Capital*, Final Report, August 2020, p. 1.

⁴³ AER, *Rate of return information paper*, December 2021, p. 22.



re-levered (using an asset beta) to provide an estimate of what its beta estimate would have been if it had 40% gearing.

104. All Australian regulators perform this re-levering exercise as part of their task of determining the allowed equity beta. For example, the ACCC identified the need to re-lever equity beta estimates “in order to compute comparable estimates of the equity beta” in its 2015 Telstra FAD.⁴⁴
105. The process for re-levering is as follows:

$$\beta_{re-levered} = \beta_{raw} \frac{1 - gearing_{comparator}}{1 - gearing_{regulated\ firm}}$$

3.7.5 The ACCC’s estimate for Telstra’s fixed line business

106. The ACCC adopted an equity beta of 0.7, re-levered to gearing of 40% (asset beta = 0.42) in its 2015 Telstra FAD.⁴⁵

3.7.6 Current estimates

107. In **Table 4**, we summarise updated equity beta estimates for the various comparator sets, historical periods, and sampling frequencies set out above. We consider these gearing estimates support the previous value of 40%, noting there is variability across samples and across time periods but all values fit between 33% and 43%.
108. The beta estimates are first presented in **Table 4** as relevered using the comparator average gearing (so that they are presented on a consistent basis within each sample), and then in **Table 5**, we present these estimates when the comparators are re-levered at the benchmark 40% gearing.

⁴⁴ ACCC, *Public inquiry into fixed access determinations for fixed line services: Final decision*, October 2015, p. 81.

⁴⁵ ACCC, *Public inquiry into fixed access determinations for fixed line services: Final decision*, October 2015, p. 80.

**Table 4:** Equity beta and gearing estimates

Sample period	Comparator set	Gearing	Daily equity beta	Weekly equity beta	Monthly equity beta
2016-2021	ACCC	43%	0.65	0.62	0.56
2016-2021	ACCC + ComCom	34%	0.64	0.64	0.59
2016-2021	ACCC + ComCom + NBN Co	34%	0.62	0.62	0.60
2011-2021	ACCC	42%	0.72	0.68	0.64
2011-2021	ACCC + ComCom	33%	0.65	0.65	0.62
2011-2021	ACCC + ComCom + NBN Co	33%	0.63	0.63	0.62

Source: Bloomberg; Frontier Economics analysis.

Notes: Betas are first delevered using the comparator's actual gearing, then re-levered using the average gearing of the comparator sample.

Table 5: Equity beta estimates relevered at benchmark gearing

Sample period	Comparator set	Benchmark gearing	Daily equity beta	Weekly equity beta	Monthly equity beta
2016-2021	ACCC	40%	0.62	0.59	0.53
2016-2021	ACCC + ComCom	40%	0.70	0.70	0.65
2016-2021	ACCC + ComCom + NBN Co	40%	0.68	0.68	0.66
2011-2021	ACCC	40%	0.69	0.66	0.62
2011-2021	ACCC + ComCom	40%	0.72	0.72	0.69
2011-2021	ACCC + ComCom + NBN Co	40%	0.70	0.71	0.69

Source: Bloomberg; Frontier Economics analysis.

Notes: Betas are first delevered using the comparator's actual gearing, then re-levered using the benchmark gearing.

109. We submit that the updated estimates set out continue to support an equity beta of 0.7, re-levered at 40%, at this time.
110. The estimates presented in the Table above are calculated over two sample windows: the five years to 31 August 2021 and the ten years to 31 August 2021. Further, estimates are calculated



for three comparator samples comprising comparators identified by the ACCC,⁴⁶ the Commerce Commission,⁴⁷ and a set of comparators in the telecommunications sector identified by NBN Co.

111. Gearing of each comparator was calculated using total debt market cap as reported by Bloomberg, by taking the average value of total debt divided by total debt plus market cap over the sample window for each comparator. The figure in the Tables is the average of comparators included in the sample.
112. Raw equity betas were calculated for each comparator using total returns indices provided by Bloomberg over daily, weekly and monthly frequencies. To reduce the estimation error associated with reference day choice, we averaged over the five possible reference days for weekly beta, and 31 possible reference days for monthly beta. We also imposed a rule that a comparator must have at least 200 observations for daily estimates, 40 observations for weekly estimates and 10 observations for monthly estimates in order to be included in the final comparator sample. This requirement was added to ensure that sufficient data were available for each comparator in order to produce statistically robust beta estimates.

3.7.7 Updating estimates in subsequent Regulatory Cycles

113. Equity beta *estimates* can change over time for two reasons:
 - The true systematic risk of the firm changes; or
 - Random statistical estimation error. The estimation methods that are available provide an imprecise estimate that may differ from the true equity beta due to the random error that is inherent in statistical estimation exercises. That is, the estimation process does not identify or compute the true equity beta, it merely provides a probabilistic assessment of the range within which the true beta is likely to lie.
114. In the regulatory setting, it is important that the equity beta allowance is changed only to reflect changes in the true systematic risk of the firm, rather than by random statistical estimation error. Moreover, it is unlikely that the true systematic risk of a regulated firm will vary materially over short periods of time, given that the firm will be providing the same regulated services over time.
115. For these reasons, it is common regulatory practice to vary beta estimates only where the regulator has a high degree of confidence that the true systematic risk of the firm has changed. This generally requires significant and sustained evidence that the current beta allowance has become inconsistent with the available evidence.
116. For example, IPART has recently completed a review of its approach to beta estimation concluding that:⁴⁸

Noting that beta estimates are imprecise and volatile, and that small changes in beta can lead to large changes in prices, we are aware of the possibility that new

⁴⁶ ACCC, *Public inquiry into final access determinations for fixed line services*, October 2015.

⁴⁷ Commerce Commission, *Fibre Input Methodologies Determination 2020*, October 2020.

⁴⁸ IPART, *Estimating equity beta for the weighted-average cost of capital: Final report*, p. 6.



analysis could result in departures from the status quo beta that are driven by noisy data rather than genuine market trends.

In order to guard against that possibility, our draft report proposed that the following points be considered in any decision to depart from a prevailing beta estimate:

- Changing an established equity beta would only be contemplated if the established value was more than one standard deviation from the new mean estimate.*
- Stakeholder submissions and preference for stability would be taken into account.*
- Departure from the status quo would only be contemplated if the evidence supporting a different value was persistent over a long timeframe (ie, a regulatory period or longer).*

117. In this regard, we submit that:

- The equity beta (re-levered to 40%) should be initially set at 0.7, in line with the figure adopted by the ACCC in its 2015 Telstra FAD and as supported by the current empirical estimates; and
- In subsequent Regulatory Cycles, the equity beta would only be varied if new mean estimate was either:
 - One standard deviation higher than the established estimate; or
 - One standard deviation lower than the established estimate,for at least two consecutive Regulatory Cycles.



4 The return on debt

4.1 Proposed regulatory approach

118. The return on debt allowance represents the minimum cost of debt that would be incurred by a benchmark efficient business delivering the regulated services provided by NBN Co, if it were to manage its debt portfolio in an efficient and prudent manner.
119. Our proposed approach to determining the efficient return on debt allowance for NBN Co involves:
 - First identifying an efficient and prudent debt management strategy for a benchmark efficient business with characteristics similar to NBN Co; and
 - Then identifying the cost of debt commensurate with that efficient and prudent debt management strategy.

4.2 Rationale for the 'trailing average' approach

120. NBN Co notes that Australian economic regulators have generally adopted one of two approaches for setting the return on debt allowance:
 - The 'rate on the day' approach assumes that the firm would issue all of its debt in a single tranche at one point in time. All of that debt would then mature at a single point in time and be refinanced in another single tranche.
 - The 'trailing average' approach assumes that the firm would stagger the issuance of debt so that only a small proportion of debt falls due and has to be refinanced each year. Under this approach, each year one tranche of debt (representing a relatively small proportion of total debt) would mature and be refinanced.
121. We submit that, for any infrastructure business with a large debt portfolio, it would be prudent and efficient to issue fixed-rate debt on a staggered maturity basis. The on-the-day approach that has previously been used by some Australian regulators assumes implicitly that regulated businesses will refinance their entire debt portfolios at once (or within a very short timeframe) at the beginning of each regulatory period. This means that the entire debt portfolio will be subject to refinancing risk at the same time. Regulated businesses tend to have very large debt portfolios, which means that they face significant exposure to refinancing risk under the on-the-day approach.
122. To avoid this refinancing risk, infrastructure businesses tend to stagger their refinancing of debt by issuing debt such that only a portion of their total debt portfolio matures each year. The trailing average approach mimics this pattern of debt management because it assumes implicitly that only a portion of a regulated business's debt portfolio is refinanced each year rather than the entire portfolio all at once—thus minimising refinancing risk.
123. The key benefit of the trailing average approach is that it allows a regulated business that adopts an efficient staggered debt management approach to match its borrowing costs closely to the regulatory allowance. This, in turn, would prevent regulated businesses being over/undercompensated (and consumers over/underpaying the efficient cost) in each regulatory period.



124. This was recognised by the AER when it adopted the trailing average approach in 2013:⁴⁹

We propose to apply a trailing average portfolio approach to estimate the return on debt. This approach means that the allowed return on debt more closely aligns with the efficient debt financing practices of regulated businesses and means that prices are likely to be less volatile over time. The trailing average would be calculated over a ten year period. The annual updating of the trailing average should also reduce the potential for a mismatch between the allowed return on debt and the return on debt for a benchmark efficient entity. This should reduce cash flow volatility over the longer term.

125. The AER maintained its use of the trailing average approach in its 2018 WACC Review and has recently reiterated the benefits of the trailing average approach in its 2022 WACC Review.⁵⁰

126. ESCOSA made a similar observation when it adopted the trailing average approach in 2016:⁵¹

The 10 year trailing average cost of debt approach avoids over reliance on prevailing market rates, whereby the resultant cost of debt could be significantly different to the efficient costs that would form part of an ongoing business debt portfolio. The risk that the cost of debt is under or over stated during the regulatory period is reduced, providing a downward influence on the benchmark cost of equity.

127. The ESC in Victoria also noted that there were several benefits to the trailing average approach when it adopted the method in 2016:⁵²

We approve Melbourne Water's proposed WACC method with minor amendments. Moving to a trailing average approach to estimating the cost of debt and WACC reduces price volatility, aligns the regulatory allowance for financing costs with the actual costs faced by the water business, and reduces refinancing risks. We note that changing from the on-the-day approach to estimating the cost of debt, to a

⁴⁹ AER, *Rate of return guideline: Explanatory statement*, final decision, December 2013, p. 12.

⁵⁰ AER, *Draft debt omnibus paper*, July 2021, pp. 3-18 to 3-19.

⁵¹ ESCOSA, *SA Water Regulatory Determination 2016, Final determination*, June 2016, p. 117.

⁵² ESC, *Melbourne Water price review 2016*, Final decision, June 2016, p. XII.



trailing average approach, does not materially impact on Melbourne Water's prices.

128. More recently, the QCA clearly articulated the regulatory objective in relation to the return on debt allowance:⁵³

when reviewing the relevant debt management strategy, we need to consider the likely debt management behaviour of an unregulated 'efficient' firm operating in a competitive market for similar services. We consider it appropriate to use this reference point, as the debt management strategy benchmark we are developing is to serve as a proxy for this hypothetical unregulated competitor—and such a competitor would have no reason to utilise an on-the-day strategy. Rather, we consider that the trailing average approach is representative of the debt management strategy adopted by a benchmark efficient firm operating in a competitive market.

129. The QCA went on to note that it has become standard for Australian regulators to adopt a trailing average return on debt allowance, as better reflecting the costs that would be incurred under a prudent and efficient debt management approach:⁵⁴

it may be efficient for capital-intensive infrastructure firms to stagger their debt financing to avoid needing to refinance their entire debt portfolio over a relatively short window of time to manage refinancing risk. This has in part led many Australian regulators over the last decade to move to estimating the cost of debt using a form of trailing average debt management strategy. For example, the AER, ESC, ESCOSA and ICRC all have recently used a trailing average cost of debt approach.

130. There is now almost universal consensus between regulators in Australia that an efficient and prudent debt management strategy for regulated infrastructure businesses such as NBN Co is to stagger the issuance of debt so that only a small proportion of debt falls due and has to be refinanced each year. Consequently, it has become standard for Australian economic regulators to adopt the trailing average approach to setting the return on debt allowance. Under this approach, the regulated business is assumed to:

⁵³ QCA, *Rate of return review: Final report*, November 2021, p. 32.

⁵⁴ QCA, *Rate of return review: Final report*, November 2021, p. 30.



- Issue 10-year debt (which is the most common tenor of debt issuance by Australian corporates); and
 - Refinance 10% of its debt portfolio annually.
131. At any point in time, the cost of debt faced by a regulated business that followed such a debt management approach would be a 10-year average of the prevailing rates at which the business had refinanced in each of the previous 10 years.
132. NBN Co proposes to adopt the 10-year trailing average approach for determining the return on debt allowance. Under this approach:
- The business is assumed to issue 10-year BBB-rated corporate debt—which is broadly consistent with the assumption adopted by most regulators in Australia when setting the return on debt allowance;
 - The return on debt allowance for the first year of the Regulatory Cycle is derived by calculating an equal-weighted average of the prevailing 10-year yield on BBB-rated corporate debt in each of the 10 prior years.

4.3 Benchmark credit rating

The required return on debt will depend on the assumed credit rating – other things being equal, a higher rating implies a lower required return. The approach adopted by most Australian economic regulators is to adopt a standard benchmark credit rating for the firms they regulate.

For example, IPART adopts a BBB credit rating as the generic investment grade rating that it considers to be appropriate for the various infrastructure firms that it regulates. IPART explains this approach as follows:⁵⁵

A BBB credit rating is most appropriate. We consider that the BBB credit rating is most appropriate because we consider that the BBB rating will, on average, provide an efficient estimate of the WACC. We can adjust the gearing ratio for individual firms because the gearing ratio and the credit rating are endogenous. A credit rating higher than BBB would mean the benchmark firm would need to rely on a higher proportion of relatively expensive equity. Conversely, if the benchmark firm was sub-investment grade, the increase in the debt margin would likely more than offset the reduction in equity costs.

In its recent WACC Review, the QCA summarised the approach of Australian regulators as follows:⁵⁶

- AER – 10-year term; BBB+ rating;
- ESC – 10-year term; BBB rating;

⁵⁵ IPART, *Review of our WACC method: Final report*, December 2013, p. 46.

⁵⁶ QCA, *Rate of return review: Final report*, November 2021, Table 3, p. 33.



- IPART – 10-year term; BBB rating;
- ESCOSA – 10-year term; BBB rating;
- ERA – In-house methodology;
- OTTER – 10-year term; BBB rating;
- ICRC – 10-year term; BBB rating.

We submit that a benchmark investment grade credit rating of BBB should be adopted, consistent with the approach generally adopted for the purpose of setting regulatory allowances for Australian regulated infrastructure businesses.

4.4 Data source for return on debt

The RBA publishes estimates of the yield on 10-year BBB corporate bonds issued by Australian companies on a monthly basis.

In its recent WACC Review, the QCA noted that the RBA estimates are used by the vast majority of Australian regulators.⁵⁷ In particular:

- QCA, ESC, IPART, ESCOSA and OTTER use the RBA estimates exclusively;
- AER and ICRC use the RBA estimates in conjunction with estimates from other data providers; and
- ERA uses its own in-house methodology.

We submit that the RBA estimates should be used to determine the yield on 10-year BBB corporate bonds, as required.

4.5 Debt raising costs

It is common for Australian regulators to make an additional allowance for debt raising costs. Whereas the return on debt allowance provides compensation for the interest payments that must be made in relation to the regulated firm's (efficient) debt portfolio, there are additional costs incurred every time a tranche of debt is refinanced. These costs include arrangement fees charged by investment banks as compensation for the management of the debt issuance process as well as legal fees, credit rating fees, registry costs, and the costs of cross-currency hedging where required.

Some regulators (e.g., AER) make a cash flow allowance, treating these debt raising costs as part of the firms operating expenses. However, most Australian regulators accommodate these costs by increasing the allowed return on debt. The efficient debt issuance costs are estimated, amortised over the assumed life of each tranche of debt (10 years), and expressed as an allowance in terms of basis points per annum.

As part of its recent WACC Review, the QCA has summarised the debt raising costs of Australian regulators as follows:⁵⁸

⁵⁷ QCA, *Rate of return review: Final report*, November 2021, Table 3, p. 33.

⁵⁸ QCA, *Rate of return review: Final report*, November 2021, Table 11, p. 50.



- ESC – 15 basis points;
- IPART – 12.5 basis points;
- ESCOSA – 12.5 basis points;
- ERA – 10 basis points;
- OTTER – 10 basis points;
- ICRC – 12.5 basis points.

We submit that an allowance of 12.5 basis points per annum should be adopted, consistent with the average allowance made by other Australian regulators.

4.6 Return on debt true-up mechanism

Under the 10-year trailing average approach, the return on debt changes each year as one of the ten tranches of debt matures and is refinanced with a new tranche at a new rate of interest.

Some regulators manage these annual changes in the estimate of the required return on debt by updating the return on debt allowance, and consequently the WACC, each year. Under this approach, the return on debt allowance changes each year as yields on 10-year corporate bonds change. Thus, regulatory allowances, and consequently consumer prices, can rise or fall in each year of a regulatory period or cycle, depending on movements in interest rates.

The alternative approach is to fix the return on debt allowance for the duration of the regulatory period and apply a true-up at the time of each new regulatory determination. This approach has the benefit of the return on debt allowance being fixed and known at the start of the regulatory period. The true-up then ensures that the regulated firm does not over- or under-recover relative to the efficient cost.

NBN Co has indicated its preference for us for the ‘true-up’ approach as it produces more stable prices within each regulatory period. We therefore propose that it should be adopted as follows:

- The return on debt allowance for the first year of the regulatory period is determined as the 10-year trailing average, computed as follows:

$$r_1 = \frac{1}{10}(y_{-9}, y_{-8}, \dots, y_{-1}, y_0)$$

- where y_0 represents the yield at the time of the regulatory determination, y_{-1} represents the yield the previous year, and so on.
- The return on debt allowance for each subsequent year of the regulatory period assumes that the initial yield (y_0) remains fixed for the duration of the regulatory period. Thus, the regulatory allowance for the second year of the regulatory period would be computed as:

$$r_2 = \frac{1}{10}(y_{-8}, y_{-7}, \dots, y_{-1}, y_0, y_0),$$

- and the regulatory allowance for the third year of the regulatory period would be computed as:

$$r_3 = \frac{1}{10}(y_{-7}, y_{-6}, \dots, y_{-1}, y_0, y_0, y_0),$$

- and so on.



- At the end of the regulatory period, an NPV-neutral true-up would be applied in relation to each of years 2 to 5 of the regulatory period. This would involve computing the difference between the *allowed* return on debt and the *efficient* return on debt for each payment made in relation to the return on debt. For example, all return on debt payments made during year 2 would be made on the basis of an interest rate computed as:

$$r_2 = \frac{1}{10}(y_{-8}, y_{-7}, \dots, y_{-1}, y_0, y_1)$$

as shown above. The first step is to determine what that payment would have been if it had been computed using the efficient return on debt, computed as:

$$r_2^a = \frac{1}{10}(y_{-8}, y_{-7}, \dots, y_{-1}, y_0, y_1)$$

- where y_1 represents the actual yield observed at the end of the first year of the regulatory period. The difference between the payment that was made on the basis of the allowed return on debt, and the payment that would have been made if the efficient return on debt had been used, represents the amount of over- or under-recovery – relative to the efficient benchmark.
- The amount to be trued-up over a Regulatory Cycle will be calculated as:

$$TU_y = \sum_{t=x+1}^{y-1} (1 + R_x)^{y-t} (RAB_t \times G)(r_t^a - r_t)$$

where:

- RAB_t refers to the opening RAB or Core Services RAB, as applicable, for Financial Year (t) in the immediately preceding Regulatory Cycle.
- R_x refers to the allowed nominal rate of return that applied to the first Financial Year of the immediately preceding Regulatory Cycle commencing in Financial Year (x).
- G refers to the benchmark level of gearing.
- r_t refers to the forecast return on debt for each Financial Year of the immediately preceding Regulatory Cycle.
- y refers to the first Financial Year of the Regulatory Cycle.
- r_t^a refers to the actual return on debt for each Financial Year of the immediately preceding Regulatory Cycle, calculated as:

$$r_t^a = \frac{1}{10} \left(\sum_{j=t-9}^t D_j \right)$$

where:

- D_j is the on-the-day rate of return on debt in Financial Year (j), which can be any year from $(t - 9)$ to y .
- The true-up amount TU_y is to be converted, in an NPV-neutral way, to an annual amount Z_t to be included in the Forecast Nominal ABBRR and Forecast Nominal Core Services ABBRR for each Financial Year of the Regulatory Cycle as follows:



$$Z_t = \frac{R_y \times TU_y}{1 - (1 + R_y)^{-L}}$$

where:

- R_y refers to the nominal rate of return applicable to Financial Year (y), being the first Financial Year of the Regulatory Cycle.
- L is the expected length (measured in Financial Years) of the Regulatory Cycle.



5 Gearing

5.1 Benchmark gearing estimated in market value terms

133. Gearing represents the proportion of the regulatory asset basis that is assumed to be financed with debt. The standard regulatory approach, adopted by all Australian regulators, is to determine a benchmark efficient level of gearing rather than adopting the actual gearing put in place by the regulated firm. That is, the regulator seeks an estimate of the prudent and efficient proportion of debt financing for a benchmark efficient entity, not an estimate of the actual financing structure put in place by the regulated firm.
134. For the purposes of estimating the WACC, gearing must be estimated in market value terms. The standard regulatory approach is to estimate market value gearing using the book value of debt (as a reasonable and easy to obtain proxy for the market value of debt) and the market value of equity (which is easy to obtain for any firm listed on a stock exchange). In particular, gearing is measured as:

$$\text{Gearing} = \frac{\text{Book value of debt}}{\text{Book value of debt} + \text{Market value of equity}}$$

5.2 Benchmark gearing estimated using same beta sample data

135. It is also standard regulatory practice to estimate gearing using the same sample of firms that is used to estimate equity beta. The tables and figures below establish that the ACCC's estimate of 40% in its 2015 Telstra FAD continues to be supported by the current evidence.
136. As set out in Section 3.7, gearing estimates were derived over two sample windows,⁵⁹ and for three comparator samples comprising comparators identified by the ACCC, the Commerce Commission, and a set of comparators in the telecommunications sector identified by NBN Co.
137. Gearing of each comparator was calculated using total debt market cap as reported by Bloomberg, by taking the average value of total debt divided by total debt plus market cap over the sample window for each comparator. The figure in **Table 6** is the average of comparators included in the sample.

⁵⁹ Five years and ten years to 31 August 2021.

**Table 6:** Gearing estimates

Sample period	Comparator set	Gearing
2016-2021	ACCC	43%
2016-2021	ACCC + ComCom	34%
2016-2021	ACCC + ComCom + NBN Co	34%
2011-2021	ACCC	42%
2011-2021	ACCC + ComCom	33%
2011-2021	ACCC + ComCom + NBN Co	33%

Source: Bloomberg; Frontier Economics analysis.



6 Gamma

6.1 The role of gamma in the regulatory framework

138. In Australia, equity investors receive returns in three forms: dividends, capital gains, and dividend imputation franking credits. Dividends that are paid out of profits that have been taxed in Australia have franking credits attached to them. These franking credits can be used by resident investors to reduce personal taxes that they would otherwise be required to pay, so have some value to resident investors.
139. In this context, within standard Australian regulatory frameworks, the regulator:
- First estimates the total required return on equity; and then
 - Deducts the regulator's estimate of the value of the dividend imputation franking credits that investors are expected to receive; and then
 - Sets the regulatory allowance such that the firm is able to provide the balance to investors in the form of dividends and capital gains.
140. For example, if the regulator determines that equity investors should receive a total return of \$100 and that they will receive franking credits that have a value of \$10, the regulatory allowance will be set to enable the firm to provide \$90 to its investors in the form of dividends and capital gains.
141. Franking credits are created by the payment of tax within Australia. Every dollar of corporate tax paid to the Australian government creates a one-dollar franking credit that is available to be distributed to shareholders. The gamma parameter represents the extent to which investors value each dollar of franking credits that are created. There are two reasons why this value would be expected to be less than 100%:
- Some of the credits that are created are not distributed to investors. Under Australian taxation law, a company can only distribute 100% of the credits that it creates by distributing (as dividends) 100% of the profits that have been taxed in Australia. To the extent that a company does not distribute 100% of such profits, some credits will remain 'locked up' having no value to investors; and
 - Investors are unlikely to value a dollar of franking credits as much as they value a dollar of dividends or capital gains. For example, credits distributed to non-resident investors have no value because they cannot be used to reduce their tax obligations.
142. Thus, within standard Australian regulatory frameworks:
- The regulator will estimate the amount of corporate tax to be paid by the regulated firm. This is also an estimate of the quantum of franking credits created;
 - The quantum of franking credits is then multiplied by the regulator's estimate of gamma to provide an estimate of the value of those credits to investors;
 - The regulator will then deduct that value from its estimate of the total required return on equity; and



- The regulatory allowance is then set such that the firm is able to provide the balance to investors in the form of dividends and capital gains.

6.2 The components of gamma

143. As noted above, there are two reasons why gamma is expected to be less than 100% (i.e., why investors would not value franking credits at the full face value when they are created):
- Some credits are not distributed to investors and remain locked-up within the firm; and
 - Investors are unlikely to value a dollar of franking credits as much as they value a dollar of dividends or capital gains.
144. This has led all Australian regulators to estimate gamma as the product of two parameters:
- The first parameter is the distribution rate, representing the proportion of created imputation credits that are attached to dividends and distributed to shareholders; and
 - The second parameter ('theta') is variously defined as "the value of distributed imputation credits" or as "the utilisation rate." This parameter represents the extent to which a dollar of distributed franking credits will be valued at less than a dollar of dividends or capital gains.
145. Thus: $\text{Gamma} = \text{distribution rate} \times \text{theta}$.

6.3 Competing approaches for interpreting and estimating gamma

146. Two methods for interpreting and estimating gamma have been proposed in the regulatory setting:
- a The **market value approach** posits that gamma should be estimated from the observed prices of traded securities in the same way that other WACC parameters are estimated. This approach produces an estimate of the extent to which investors value franking credits relative to the dividends and capital gains that those credits will replace. It is an estimate of the amount of dividends and capital gains that investors would be prepared to give up in order to receive a dollar of franking credits.
 - b The **redemption or utilisation approach** posits that gamma should be estimated as the proportion of credits that are distributed to investors who might be able to redeem them. This approach has no regard to why it might be that investors might value credits less than the dividends and capital gains that they are replacing.
147. The distinction between these two approaches may be illustrated using an analogy. Suppose a traveller, by means of an airline loyalty program, has accumulated 10,000 frequent flyer points. The fact that the traveller has 10,000 points available to redeem with their airline, on its own, provides no information about the economic value of those points to the traveller, since each point could be worth \$0.10, \$0.20, or \$0.50. In order to determine the economic value of those points, one needs to know the amount by which the traveller is able to reduce their next fare if those 10,000 points were to be utilised. That, in turn, requires an understanding of the exchange rate between one point and one dollar of fare.
148. The redemption or utilisation rate approach would simply count up the number of frequent flyer points available to the traveller. By contrast, the market value approach would seek to determine



the amount by which the traveller may reduce their next fare by redeeming the points accumulated.

149. Within the regulatory framework, what is required is an estimate of the extent to which allowed dividends and capital gains can be reduced in relation to each dollar of imputation credits. That is the role of gamma – it is an estimate of the amount of dividends and capital gains that investors would be prepared to give up in order to receive a dollar of imputation credits. This implies that a market value estimate is required – what is the market value of franking credits relative to dividends and capital gains.
150. In this regard, IPART has concluded that:⁶⁰

the value of gamma should be interpreted as the market value of dividends and capital gains that investors would be willing to forgo in exchange for imputation credits.

151. We submit that gamma should be interpreted as the market value of franking credits (relative to the value of dividends and capital gains), and that a market value estimate should be used.

6.4 Gamma for the first replacement module

152. In the Australian regulatory setting, dividend drop-off analysis is the approach used to estimate the market value of franking credits. Dividend drop-off analysis is a form of regression analysis that is designed to estimate the market value of franking credits relative to dividends and capital gains.
153. Dividend drop-off analyses performed over the last 10 years have consistently concluded that the best market value estimate of gamma is 0.25. Australian regulators that have adopted the market value interpretation of gamma have consistently adopted the value of 0.25. For example, IPART has re-affirmed its adoption of a gamma parameter of 0.25 as follows:⁶¹

Further, we maintain our view that dividend drop-off studies are currently the best method to estimate the market value of gamma. Its advantage is that it measures the observed value of dividends and imputation credits by examining share price changes on ex-dividend days.

Since the 2011 SFG study that we relied upon in our 2013 method, Frontier updated its analysis in 2013 and again in 2017. The latter study employed a large sample and improved econometric techniques to estimate the value of both cash dividends

⁶⁰ IPART, *Review of our WACC methodology*, February 2018, p. 83.

⁶¹ IPART, *Review of our WACC methodology*, February 2018, p. 83.



and distributed imputation credits using dividend drop-off analysis. Both of these studies reconfirmed that the best estimate of the market value of gamma was 0.25.

154. We have recommended and NBN Co has accepted that gamma should be set to 0.25 in the first replacement module, noting that it is not expected to be relevant to tax allowances in that period.
155. As a final matter, we have also noted that estimates of the historic excess returns, which are input into the MRP, depend on gamma. That is, in **Table 3** we presented estimates of historic excess returns with two different gamma estimates. Lower (Higher) values of gamma are associated with lower (higher) excess returns. We submit that the approach to both parameters should be internally consistent, and we therefore note that the final selection of the gamma in further replacement modules should have regard to the estimate of historic excess returns and, in turn, the long run average MRP.



7 Estimates for the first replacement module

7.1 WACC for the first replacement module

The following Table presents the individual rate for return parameter estimates, and overall rate of return estimates, to be applied for the first replacement cycle.

Note that these estimates have been produced as at December 2021, and will continue to be updated up until the commencement of the regulatory cycle. Updates to reflect the latest available data relating to risk-free rates, market risk premiums, inflation forecasts and the cost of debt will occur, and these are marked as 'placeholder parameters' in **Table 7**.

Table 7: Estimates for first replacement module, 2023-24 - 2024-25

Approach	'Current' estimate	'Long-term' estimate	Midpoint estimate	Placeholder parameter
Risk-free rate	1.7%	5.0%	3.4%	*
Equity beta	0.7	0.7	0.7	
Market risk premium	9.0%	6.5%	7.8%	*
Return on Equity (nominal, post-tax)	8.0%	9.6%	8.8%	*
Return on Debt (nominal, pre-tax; incl. allowance for debt raising costs; FY 2024)	4.9%	4.9%	4.9%	*
Return on Debt (nominal, pre-tax; incl. allowance for debt raising costs; FY 2025)	4.6%	4.6%	4.6%	*
Gearing	40%	40%	40%	
Nominal vanilla WACC (FY 2024)	6.8%	7.7%	7.2%	*
Nominal vanilla WACC (FY 2025)	6.7%	7.6%	7.1%	*
Inflation (3-year regulatory period)	2.4%	2.4%	2.4%	*
Gamma [^]	0.25	0.25	0.25	

Source: Frontier Economics

Notes: ^ not likely to be relevant in the first replacement module.



8 Inflation forecasting

8.1 The role of inflation forecasts

156. In the Australian regulatory framework, the regulator's inflation forecast plays an important role in determining the allowed return on capital over a regulatory period. The relevant steps in the regulatory process are as follows:
- The regulator first determines the total required return on capital;
 - The regulator then reduces the allowed return each year by the expected amount of RAB indexation that year, computed as the product of expected inflation and the value of the RAB at the beginning of the year; and
 - The regulator then indexes the RAB according to actual inflation observed each year.
157. The process describe above is consistent with the framework for determining the ABBRR for Core Services proposed by NBN Co in the SAU variation.
158. Thus:
- The regulator 'takes out' expected RAB indexation based on forecast inflation; and
 - Then 'adds back' actual RAB indexation based on observed inflation.
159. The AER has recently concluded that it is important to 'take out' what it expects to 'put back in' so that the deduction equals what is expected to be added back:⁶²

It is appropriate to target an approach where 'we take out what we expect to put back in'.

160. This concept of taking out what is expected to be put back in has been adopted by a number of Australian regulators that have conducted regulatory inflation reviews over the last two years.
161. Since the regulator will 'put back in' (via RAB indexation) amounts that are based on actual inflation over the term of the regulatory period, what is required is the best possible estimate of inflation be in each year of the regulatory period.

8.2 Regulatory methods for forecasting inflation

162. Prior to the recent round of regulatory reviews into inflation forecasting methods, it was common for Australian regulators to use a 10-year geometric mean approach to setting the regulatory inflation parameter. This approach involves taking the geometric mean of 10 numbers where the

⁶² AER, *Regulatory treatment of inflation*, December 2020, p. 45.



first is the RBA 1-year forecast of inflation, the second is the RBA 2-year forecast of inflation and the other eight are set to 2.5%, being the mid-point of the RBA target band of 2-3%.

163. The recent round of regulatory reviews has highlighted the fact that this method violates the ‘take out what you expect to put back in’ principle. In no sense can the above 10-year geometric mean be considered to be the best, or even a reasonable, forecast of the average inflation over the 5-year term of a regulatory period that will be ‘put back in.’ Consequently, nearly all Australian regulators have now abandoned exclusive reliance on this 10-year geometric mean estimate in favour of approaches that provide better forecasts of average inflation over the term of the regulatory period.
164. In this regard, the AER has adopted a 5-year glide path approach whereby RBA forecasts are used for years 1 and 2, the mid-point 2.5% figure is used for year 5, and linear interpolation is used to determine the figures for years 3 and 4.⁶³
165. The more recent QCA review has proposed a small improvement to the AER approach. The QCA’s analysis indicates that the assumption of inflation always returning to 2.5% by year 5 is a strong one. During periods of persistently high or low inflation outside the RBA target band of 2-3%, it may take longer for the RBA to guide inflation back to 2.5%. This has led the QCA to adopt the following modified 5-year glide path approach:⁶⁴

Our position is to use short-term RBA forecasts for the first two years of the regulatory period and derive forecasts up to the fifth year ahead, using a linear glide path—from the RBA’s short-term forecast in year 2 to a rules-based anchor-point forecast in the fifth year ahead. Specifically, if the second-year forecast of headline inflation is:

- *less than or equal to 2 per cent, the anchor point would be set at 2.25 per cent*
- *between 2 per cent and 3 per cent, the anchor point would be set at 2.5 per cent*
- *greater than or equal to 3 per cent, the anchor point would be set at 2.75 per cent.*

166. The QCA explains that:⁶⁵

The lower-range anchor point is consistent with recent economic conditions where the second-year forecast has repeatedly been less than or equal to 2 per cent.

⁶³ AER, *Regulatory treatment of inflation*, December 2020, Section 9.

⁶⁴ QCA, *Inflation forecasting: Final position paper*, October 2021, p. 41.

⁶⁵ QCA, *Inflation forecasting: Final position paper*, October 2021, p. 37.



Noting that RBA forecasts are rounded to the nearest quarter-percent, it is likely that a second-year forecast that is clearly within the target range (i.e. 2.25, 2.5 or 2.75%) would be consistent with expectations converging to the midpoint of the target range by the fifth year ahead. A second-year forecast that was not clearly within the target range could signal persistently low or high inflation, with a corresponding effect on expectations. This rules-based approach would apply symmetrically during periods of persistently low or high inflation.

167. We submit that the QCA approach is the best available method for determining the regulatory inflation parameter and that approach should be used throughout the SAU.

8.3 Inflation for the first replacement module

168. The most recent Reserve Bank of Australia Statement of Monetary Policy provides forecasts of CPI inflation out to June 2024, although we have prepared the WACC estimates for December 2021.⁶⁶ We have used as placeholder estimates:

- The year one inflation forecast was provided as 2.25% as the RBA forecast for the year ended December 2022.⁶⁷
- The year two inflation forecast was provided as 2.5% as the RBA forecast for the year ended December 2023.⁶⁸

169. The inflation forecast over the period July 2023 to June 2025 is therefore calculated as:

$$\pi = ((1 + 2.25\%)(1 + 2.5\%))^{\frac{1}{2}} - 1 = 2.37\%.$$

170. These forecasts will be updated to reflect the most recent forecasts prior to the commencement of the first replacement module in July 2024.⁶⁹

⁶⁶ RBA, *Statement on Monetary Policy*, February 2022, p. 56.

⁶⁷ RBA, *Statement on Monetary Policy*, November 2021, p. 64.

⁶⁸ RBA, *Statement on Monetary Policy*, November 2021, p. 64.

⁶⁹ For example, the February 2022 Monetary Policy statement uses forecasts of 2.75% for the year to June 2024.



9 A financeability test

9.1 The purpose of a financeability test

171. We propose that the adequacy of any ABBRR amount proposed by NBN Co and/or approved by the ACCC be tested by means of a 'regulatory financeability test', akin to the 'benchmark financeability test' applied by IPART and other regulators in Australia.
172. To determine the ABBRR, an assumption is made about the benchmark level of gearing, cost of debt and credit rating of the hypothetical, efficient (i.e., 'benchmark') business in NBN Co's circumstances. The purpose of the benchmark financeability test is to test the internal consistency of the ABBRR determination. That is, the test assesses whether a notional efficient business that receive a revenue allowance in line with the forecast ABBRR (and that adopted the benchmark gearing and cost of debt assumed when determining the ABBRR) would be able to maintain the benchmark credit rating used to determine the ABBRR, all else being equal. We consider the application of a regulatory financeability test is consistent with sound regulatory practice.
173. If the ABBRR is insufficient for the hypothetical efficient firm to service its efficient debt obligations and maintain the benchmark credit rating used to set the allowance (here, BBB or the Moody's equivalent Baa2), that would suggest there is an internal inconsistency (i.e., an error) in the regulatory decision that needs to be addressed by adjusting the ABBRR.
174. The essential features of the proposed regulatory financeability test are the following:
 - the test would apply symmetrically to NBN Co when proposing its ABBRR, and to the ACCC when making a determination on NBN Co's ABBRR;
 - the test would not be applied to test the financeability of NBN Co's actual business (i.e., using NBN Co's actual gearing, interest expenses and other cash flows related to the actual business). Rather, the test would be conducted using only the information on a benchmark efficient business in NBN Co's circumstances, derived from the BBM used to set the ABBRR;
 - the test would exclude revenues related to recovery of the ICRA, since a business without access to these revenues could not rely on those revenues to address a financeability problem caused by the ABBRR being set too low; and
 - the test would be purely quantitative in nature, focussing on the quantitative financial metrics, metric weighting factors, and approach to converting weighted average financial metrics into an overall credit rating set out in Moody's Rating Methodology for Communications Infrastructure.
175. The benchmark efficient business would be deemed to have failed the regulatory financeability test in any given year within a Regulatory Cycle if the credit rating of the benchmark efficient business implied by ABBRR is lower than the benchmark credit rating assumed when setting the ABBRR.



9.2 Regulatory financeability test to be applied only to test the adequacy of the ABBRR

176. For the avoidance of doubt, the regulatory financeability test would apply only to assess the adequacy of the ABBRR, not the total revenue cap (which would include some allowance for recovery of a portion of the Recoverable ICRA). This is because the ABBRR should be set to a sufficient level in its own right; a regulated business should not rely on revenues related to the recovery of past losses in order to address a financeability problem, the source of which is an inadequacy of the ABBRR. A regulated business that had no access to ICRA revenues could not rely on any such revenues to address a financeability problem arising from an insufficient ABBRR.

9.3 Form of the proposed benchmark test

9.3.1 Focus on quantitative rather than qualitative considerations

177. The financeability tests conducted by credit rating agencies involve considering a number of qualitative 'rating factors' (e.g., scale, business model, competitive environment, financial policy) as well as quantitative rating factors (e.g., key financial metrics).
178. Regulatory financeability tests, while modelled on certain aspects of the financeability tests performed by rating agencies, do not seek to replicate the tests conducted by rating agencies. Regulatory financeability tests are focussed exclusively on whether the key financial metrics of the hypothetical efficient firm meet certain rating thresholds (i.e., target ratios); no consideration is given to the qualitative rating factors considered by rating agencies because (a) some of those qualitative factors are not relevant to the regulatory task, and (b) the way in which rating agencies apply their judgment when assessing those factors is usually not transparent or replicable.
179. Consistent with standard regulatory practice, NBN Co's proposed regulatory financeability test focusses only on the quantitative assessment of key credit metrics.

9.3.2 Financial metrics and weights to be given to each metric

180. The financial metrics used in the benchmark tests applied by regulators are typically drawn from the rating methodologies published by rating agencies. Of the three main rating agencies, the methodology published by Moody's is the most transparent and comprehensive. Therefore, many regulators use the Moody's methodology as the basis for their regulatory financeability test. NBN Co's proposed regulatory financeability test is similarly based on the rating methodology published by Moody's.
181. The rating methodologies (and the financial metrics used by rating agencies) varies by industry. The most applicable Moody's methodology for a business such as NBN Co's is Moody's global Communications Infrastructure Methodology (the 'Moody's methodology').⁷⁰ Indeed, Moody's has applied that methodology when conducting previous rating assessments for NBN Co.
182. The key financial metrics used in the Moody's methodology are summarised in **Table 8** below.

⁷⁰ Moody's, *Communications Infrastructure Methodology*, Rating Methodology, 13 August 2021.

**Table 8:** Financial metrics and weightings considered by Moody's

Financial metric	Weighting in the Moody's methodology	Weighting if sole consideration given to financial metrics
FFO margin	20%	36.36%
(EBITDA – Capex)/Interest expense	15%	27.27%
FCF/Debt	5%	9.09%
Debt/EBITDA	15%	27.27%
Total	55%	100%

Source: Moody's, *Communications Infrastructure Methodology, Rating Methodology*, 13 August 2021; Frontier Economics analysis.

183. The second column in the Table above shows that the four financial metrics considered by Moody's receive a combined weighting of 55% of all the rating factors considered in the Moody's methodology. If, instead, Moody's were to give *sole* consideration to the four metrics above (i.e., ignoring all the qualitative rating factors), then the proportional weights that would be assigned to each metric would be those presented in the third column of the Table above.
184. NBN Co's proposed regulatory financeability adopts the four metrics specified in the Moody's methodology, and the weights in the third column of **Table 8**.
185. The regulatory financeability test proposed by NBN Co will involve the following steps.
- Calculate each of the four financial metrics for the benchmark business, for each year. The inputs required for these calculations (revenue allowance, costs, tax, total debt, etc.) would be obtained entirely from the BBM used to determine the ABBRR, not NBN Co's actual metrics. Hence, all of the cash flows and financial information used in the calculations would relate to the benchmark efficient business, not NBN Co's actual business.
 - For each metric and for each year, use the rating thresholds specified in the Moody's methodology (reproduced in **Table 9** below) to determine the implied credit rating of the benchmark efficient business.
 - Convert the implied rating for the benchmark business under each financial metric, for each year, to a numeric score between 0.5 to 20.5 using linear interpolation and the score mapping specified by Moody's reproduced in **Table 10** below. For instance, an FCF/Debt ratio of 15% is equivalent to the midpoint of the Baa band in **Table 9**. This would be associated with a numeric score of 9—i.e., the interpolated midpoint of the Baa band in **Table 10**.
 - Weight the numeric scores for each metric derived in the previous step according to the weights in the third column of **Table 8** to determine an overall numeric score for the benchmark business for each year.



- e Convert the weighted average numeric score for the benchmark business in each year to an overall credit rating using the mapping specified by Moody's reproduced below in **Table 11**.
- If the implied credit rating for the business is at least as high as the benchmark credit rating used to set the ABBRR, the benchmark business will face no financeability concerns under that level of ABBRR.
 - If the implied credit rating for the business is lower than the benchmark credit rating used to set the ABBRR, the benchmark business will face financeability concerns under that level of ABBRR (i.e. the ABBRR is insufficient) and the ABBRR should be adjusted.

Table 9. Rating thresholds specified in the Moody's methodology

Rating band	FFO margin	(EBITDA - Capex)/ Interest expense	FCF/Debt	Debt/EBITDA
Aaa	≥ 95%	≥ 12x	≥ 45%	≤ 0.5x
Aa	75%-95%	7x - 12x	30% - 45%	0.5x - 1x
A	60% - 75%	4x - 7x	20% - 30%	1x - 1.5x
Baa	50% - 60%	3x - 4x	10% - 20%	1.5x - 3x
Ba	40% - 50%	2x - 3x	5% - 10%	3x - 5x
B	30% - 40%	1x - 2x	0% - 5%	5x - 7x
Caa	20% - 30%	0.5x - 1x	-5% - 0%	7x - 9x
Ca	< 20%	< 0.5x	< -5%	> 9x
Weight	36.36%	27.27%	9.09%	27.27%

Source: Moody's, *Communications Infrastructure Methodology, Rating Methodology*, 13 August 2021, pp. 9-11.

**Table 10.** Moody's mapping of implied rating to numeric score

Rating band	Moody's numeric score
Aaa	0.5-1.5
Aa	1.5-4.5
A	4.5-7.5
Baa	7.5-10.5
Ba	10.5-13.5
B	13.5-16.5
Caa	16.5-19.5
Ca	19.5-20.5

Source: Moody's, *Communications Infrastructure Methodology, Rating Methodology*, 13 August 2021, p. 20.

**Table 11.** Moody's mapping of overall numeric score to overall credit rating

Overall rating	Overall numeric score
Aaa	$x \leq 1.5$
Aa1	$1.5 < x \leq 2.5$
Aa2	$2.5 < x \leq 3.5$
Aa3	$3.5 < x \leq 4.5$
A1	$4.5 < x \leq 5.5$
A2	$5.5 < x \leq 6.5$
A3	$6.5 < x \leq 7.5$
Baa1	$7.5 < x \leq 8.5$
Baa2	$8.5 < x \leq 9.5$
Baa3	$9.5 < x \leq 10.5$
Ba1	$10.5 < x \leq 11.5$
Ba2	$11.5 < x \leq 12.5$
Ba3	$12.5 < x \leq 13.5$
B1	$13.5 < x \leq 14.5$
B2	$14.5 < x \leq 15.5$
B3	$15.5 < x \leq 16.5$
Caa1	$16.5 < x \leq 17.5$
Caa2	$17.5 < x \leq 18.5$
Caa3	$18.5 < x \leq 19.5$
Ca	$19.5 < x \leq 20.5$
C	$x > 20.5$

Source: Moody's, Communications Infrastructure Methodology, Rating Methodology, 13 August 2021, p. 20.

186. This proposed approach differs from the standard approach used by regulators when implementing a regulatory financeability test. The conventional approach would involve:

- computing each of the financial metrics;



- comparing those computed metrics to the rating thresholds commensurate with the target credit rating (e.g., the threshold ratios consistent with a Baa2 rating); and
 - using regulatory judgment to determine if a financeability problem is likely to exist.
187. One problem with this approach is that the overall outcome / rating of the financeability test may be ambiguous as the test will involve the assessment of multiple financial metrics at once. It is common for businesses to 'pass' on some metrics (i.e., the computed metric exceeds the rating threshold) but 'fail' on others (i.e., the computed metric falls short of the rating threshold). It is therefore unclear whether, when considering the overall outcome / rating of the financeability test, a business has passed or failed. In such circumstances, we submit that the ensuing exercise of regulatory judgment over the outcome of the test may result in genuine financeability problems being overlooked.
188. In contrast, under the approach proposed, an overall implied rating for the benchmark business would be derived using the same weighting scheme applied by Moody's to each of the key metrics. This would produce a single overall implied rating that would be used to determine more clearly if the benchmark business has passed or failed the test. This would also approximate the way in which rating agencies assess the quantitative factors that inform their financeability tests.

9.4 Interpretation of regulatory financeability test results and remedial action

189. As explained above, if the implied overall rating is lower than the benchmark credit rating in any given year, that would imply that the ABBRR is too low to maintain the benchmark rating assumption used to set the ABBRR. This, in turn, would imply a need to increase the ABBRR in that year until the overall rating for the benchmark business (for that year) is just equal to the benchmark rating.
190. The two variables that can be utilised in the benchmark test in order to achieve this are the:
- allowed return on equity; and/or
 - regulatory depreciation allowance.
191. We have proposed and NBN Co has adopted the following approach to adjusting the ABBRR in order to address a financeability concern for any given year identified by the regulatory financeability test:
- a First, seek to determine if the cause of the financeability concern is either due too low an allowance for the return on equity or the regulatory depreciation or both.
 - b Second, once the cause of the concern has been taken into account, seek to address the cause by:
 - i Increasing the allowed return on equity up to the upper bound of the return on equity range. The proposed NBN Co WACC methodology expresses the WACC allowance in terms of a range, with the default setting being the midpoint of the range. However, in the event of a financeability problem being identified, the return on equity allowance could be adjusted to the upper limit of the estimated range; and/or
 - ii Increasing the depreciation allowance in an NPV-neutral way. There would be no need to shorten the assumed asset lives for the purposes of setting the depreciation



allowance. The depreciation amount for the Regulatory Cycle in question would be increased to the extent required to address the financeability problem. This would accelerate the recovery of the RAB, leaving less asset value to be recovered over the remaining asset life. The acceleration of cash flows in this way would be NPV-neutral; NBN Co would not recover more than the RAB. Some revenues would simply be brought forward from future Regulatory Cycles to ensure that the benchmark efficient business would have sufficient cash flows to meet its assumed debt obligations and maintain the target credit rating used to set the ABBRR.

192. We note that under NBN Co's proposed rate of return methodology, the return on equity allowance is designed to be relatively stable across time for most market conditions. That is, we consider it would only be in very unusual circumstances that the cause of a failed regulatory financeability test would be because the return on equity allowance is 'too low'. Therefore, under NBN Co's proposed WACC method, the cause of any failure of the regulatory financeability test is much more likely to be an insufficient regulatory depreciation allowance.
193. However, if the commonly-used WACC method of estimating the return on equity by adding a fixed risk premium to the 'rate on the day' risk free rate were adopted, the likelihood of the cause of financeability concern being the return on equity being 'too low' is likely to vary depending on particular circumstances at the time of a regulatory decision.
194. For example, in a low interest rate environment (such as the one that has persisted since about 2013), the fixed-premium WACC approach has, in our view, produced very low return on equity allowances, and would almost certainly be the cause of a failure of a financeability test for recent historical periods. In these circumstances, the appropriate remedy for a failure of the regulatory financeability test would be to increase the allowed return on equity rather than to increase regulatory depreciation.
195. We recognise that the approach to correcting a failure of the financeability test invariably involves the exercise of some judgement, and, for this reason, we have proposed that remedial action should involve a clear choice and justification between adjustments to the return on equity or to depreciation, taking account of the factors above.

Frontier Economics

Brisbane | Melbourne | Singapore | Sydney

Frontier Economics Pty Ltd
395 Collins Street Melbourne Victoria 3000

Tel: +61 3 9620 4488

<https://www.frontier-economics.com.au>

ACN: 087 553 124 ABN: 13 087 553 124