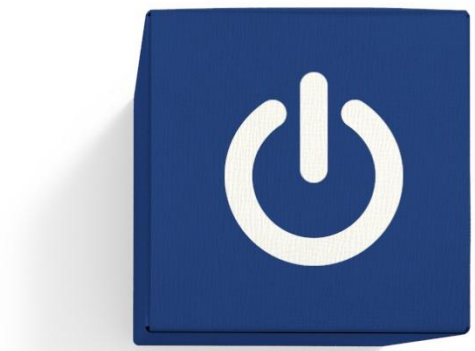
WACC Methodology

ACCC

1 August 2025



DRAFT REPORT

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Contents

1. EXECUTIVE SUMMARY

We have been commissioned by the Australian Competition and Consumer Commission (ACCC) to provide advice on an approach to estimate the weighted average cost of capital (WACC) suitable for regulated firms in the telecommunications sector and other relevant industries that are subject to ACCC's regulation and/or oversight. This advice is sought in the context of three specific services where the ACCC has a role in considering the appropriate WACC – the National Broadband Network (NBN) special access undertaking (SAU), Regional Broadband Scheme (RBS) levy and voice interconnection services. This is our draft WACC methodology report.

We understand that ACCC is seeking to develop a general approach to WACC that is suitable for the other regimes they are responsible for. This includes price notifications and access undertakings. In this report we focus specifically on telecommunications and by extension some of the considerations, in particular for beta, may not have relevance for other sectors. Nonetheless, the process by which we construct the sector-specific estimates and the considerations on market-wide parameters are likely to be useful in informing a more general framework.

It is well recognised that "*setting the expected rate of return is not a precise science and involves uncertainty and judgement*".[1] Setting the cost of capital can be one of the most contested parts of a regulatory process. Furthermore, there is disagreement even amongst Australian regulators about the correct methodology. Regulators in Australia such as the Australian Energy Regulator (AER) and Independent Pricing and Regulatory Tribunal (IPART) devote substantial resources to examining these issues. We have not started from first principles, but rather aim to build on the substantial body of existing material.

In this report we set out:

- What well-accepted Australian regulatory practice looks like. We observe that for many parameters there is broad agreement amongst other Australian regulators on the approach. Where broad consensus can be observed, we have presented a 'lighter touch' discussion of the issues.
- Where there are significant disagreements between Australian regulators on the most appropriate approach. In these cases, we set out the competing approaches proposed by each regulator and the rationale behind their approach. We also recommend an approach for the ACCC, while noting that in some cases given currently available evidence it can be challenging to reach a definitive position.

Where there are competing approaches, we consider which approach could best meet the ACCC's statutory criteria in the context of the NBN SAU and voice interconnection. For the RBS levy historical practice has been to align with the WACC applied for the NBN SAU.

Market-wide parameters

The market-wide parameters include the risk-free rate, market risk premium (MRP), tax rate and gamma.

Risk-free rate

There is almost universal agreement amongst Australian regulators that the risk-free rate should be estimated using yields on ten-year Commonwealth Government Securities averaged over a short (20-60 working days) period prior to the estimation date.

We see no reason not to align with this consensus view and observe that adopting a near-term average of 10-year CGS has several desirable properties for estimating a risk-free rate. These include that: CGS provide a plausible proxy for a risk-free asset; a 10-year horizon is likely to be aligned to equity investors' investment horizons for long-lived assets; the prevailing risk-free rate provides a basis for estimating the market cost of capital close to the start of the regulatory period; and a short averaging period strikes a reasonable balance between (i) selecting a near-

[1] AER (2021), Rate of return – Assessing the long term interests of consumers.

term estimate that is close to the start of the regulatory period and (ii) avoiding excessive sensitivity to day-to-day fluctuations in observed yields.

Market-risk premium

There is unanimous support amongst Australian regulators that the market risk premium should be informed by estimates of the MRP using the historical excess returns (HER) methodology. The amount of weight that Australian regulators place on HER estimates varies. The majority of regulators place the most weight on the HER approach with some, such as the Australian Energy Regulator (AER) and the ACCC in the past, placing 100% weight on the HER approach.

There is debate regarding the role that "*conditional*" estimates of the MRP should have on regulatory WACC determinations. Estimates are considered conditional when they take account of current financial conditions with the recognition that the market risk premium is not static. Models that produce such estimates include Dividend Discount Models (DDMs) or Dividend Growth Models (DGMs). Although some Australian regulators place limited weight on DDM evidence, it is recognised that these models are highly sensitive to the underlying input assumptions which are challenging to estimate satisfactorily. We consider that a more detailed review of the available DDM specifications and the performance of these models over time would be needed to form a view on whether this evidence should be included in the approach we recommend to the ACCC.

The other major debate is how to interpret the historical evidence, in particular if there is an inverse relationship between the risk-free rate and the market risk premium. The HER method assumes that the risk-free rate and the MRP are not related. In contrast, the total market return (TMR) or Wright method assumes that there is a perfect inverse relationship between the two parameters. We consider that the question of the relationship between the RfR and MRP remains open, both on theoretical and empirical grounds. At the same time, no Australian regulatory decision has placed weight on the TMR/Wright approach.

With these considerations in mind, we recommend that the ACCC continue to apply the HER methodology to estimate the MRP. In the absence of robust methods to estimate a conditional MRP estimate, long-term realised returns can provide a reasonable guide to forward-looking expectations. HER is an unconditional estimation method, that provides a way to capture long-term realised returns in the MRP estimate. At the same time, the TMR (or Wright) method also achieves this outcome. We have not identified clear empirical or conceptual grounds to prefer HER to the TMR approach. However, without a more detailed investigation of the implications of placing some weight on the TMR approach, maintaining the HER method can promote regulatory consistency and avoid the risk of creating windfall gains or losses.

Gamma

Gamma represents the value that investors receive from imputation credits. If investors value imputation credits, they will require a lower rate of return than would otherwise be the case. There are two overall methodologies that are applied by Australian regulators to estimate gamma – the utilisation approach and the market value approach. The market value approach is only applied by IPART while the utilisation approach is used by all other regulators. We consider the reasoning put forward for the utilisation approach to be sound and recommend it be applied here.

Sector specific parameters

The sector-specific parameters include beta, gearing and cost of debt. These values will change depending on the sector and potentially service being regulated. The two services that we are interested in setting a WACC for are NBN SAU and voice interconnection.

Asset beta

Estimation of beta requires several methodological choices – including the identification of relevant listed comparators and selection of estimation techniques – with significant differences in approach between Australian regulators. In the face of a dwindling supply of domestic pure-play comparators, some Australian regulators have turned to foreign comparators for inference on beta. This raises practical and conceptual questions around what

kind of inference can appropriately be drawn from international comparators. There is also less agreement by regulators on how to ensure that comparator firms have liquidly traded shares.

Our approach has been to cast a wide net initially by identifying a longlist of potentially comparable firms in the telecommunications sector using relevant Bloomberg industry classifications. We then apply a sequence of filters designed to ensure that the comparator set captures the systematic risk for an Australian telecommunications operator, including a geographical filter that focuses on developed economies and a liquidity filter based on bid-ask spreads. We consider that our other proposed methodological choices (around estimation window length, return interval, market index, and others) are broadly consistent with the consensus among Australian regulators.

We observe that the various estimation methods produce an asset beta range between 0.35-0.40 for our overall proposed comparator sample.

The overall proposed comparator sample is not a perfect fit for the two services we are setting a WACC for. This is particularly the case for NBN SAU. In this report we consider how the comparator sample may vary in terms of the drivers of systematic risk relative to these two services. We use this qualitative assessment to select a beta value from our range.

Gearing

When estimating gearing, there are two key methodological choices, including a) whether gross debt or net debt is more suitable, and b) whether it is appropriate to pair a book-value debt measurement with a market value equity measurement. There is no regulatory consensus on the first of these points, which reflects differing judgements on the relative importance of capturing:

1. that firms retain cash balances that are not used to fund debt payments (captured better by gross debt)
2. that firms' cash balances have a direct impact on systematic risk exposure which should be reflected in the asset beta (captured better by net debt).

On the other hand, Australian regulators agree that the practical challenges involved in robustly estimating the fair value of a regulated firm's debt outweigh the potential costs of using the book value of debt as a proxy. We proceed with an approach to gearing based on the book value of net debt.

Cost of debt

For cost of debt, a material decision is whether to apply an on-the-day estimate or some version of a trailing average. There has been a concerted shift by Australian regulators to a trailing average approach, and this is now applied by the vast majority of Australian regulators. We consider these two approaches in terms of the ACCC's statutory criteria. We conclude that it is possible to interpret ACCC's statutory criteria in line with a trailing average approach. However, this is only one plausible reading of the criteria and comes with risks. Our understanding is that the regulatory framework for NBN would allow the required within regulatory period indexation to apply the trailing average approach. This is however not the case for voice interconnection, and by extension an on-the-day approach is a practical option.

Our credit rating is informed by Australian regulatory practice of selecting a credit rating above investment grade informed by comparator credit ratings. Comparator telecommunication company credit ratings seem to more strongly support a credit rating in the broad BBB rather than the broad A range. Our debt issuance cost estimate is informed by estimates of debt issuance costs by various Australian regulators.

WACC estimates

The table below provides our WACC estimates for NBN SAU and voice interconnection. Our estimation date is 31st March 2025. We understand the ACCC requires a vanilla WACC for the NBN while for voice interconnection services the ACCC requires a pre-tax WACC. We present both forms of WACC.

Table 1: WACC estimates

Parameter	NBN SAU	Voice Interconnection
Gearing	**35%**	**35%**
Risk-free rate	4.47%	4.47%
Market risk premium	6.40%	6.40%
Asset beta	0.35	0.40
Equity beta	0.54	0.62
Cost of equity (post-tax nominal)	**7.92%**	**8.41%**
Credit rating	BBB	BBB
Debt yield*	4.87%	5.71%
Debt raising costs	0.10%	0.10%
Cost of debt (pre-tax nominal)	**4.97%**	**5.81%**
Tax rate	30%	30%
Gamma	0.57	0.57
Cost of equity (pre-tax nominal)	**9.09%**	**9.65%**
Nominal vanilla WACC	**6.89%**	**7.50%**
Nominal pre-tax WACC	**7.65%**	**8.31%**

Source: CEPA analysis

** NBN SAU estimated using a ten-year trailing average and voice interconnection on-the-day.*

2. INTRODUCTION

We have been commissioned by the ACCC to provide advice on an approach to the weighted average cost of capital (WACC) which is suitable for regulated firms in the telecommunications sector and other relevant industries that are subject to ACCC's regulation and/or oversight This advice is sought in the context of three specific services where the ACCC has a role in considering the appropriate WACC – the NBN special access undertaking (SAU), Regional Broadband Scheme levy and voice interconnection services.

This draft report sets out the WACC methodology we propose and applies this to provide specific numerical estimates for NBN SAU and voice interconnection.

2.1. REGULATED SERVICES

We have been commissioned to provide numerical WACC estimates for three specific services:

- Services covered by the NBN SAU which includes the NBN Access Service, Ancillary Services and Facilities Access Service.[2] NBN is primarily a wholesale communications service provider and sells access to its infrastructure to retailers. NBN provides these services using a range of technologies including fibre to the premises, fibre to the node, fibre to the building, fibre to the curb, hybrid fibre-coaxial, fixed wireless and Sky Muster satellite.
- Services covered by the Regional Broadband Scheme (RBS) levy which is intended to offset NBN's losses for providing services using fixed wireless and satellite technology.
- Declared voice interconnection services including mobile terminating access service (MTAS), fixed terminating access service (FTAS) and fixed originating access service (FOAS).[3] These are wholesale services provided by network operators. For example, MTAS is provided by mobile network operators to other network operators to connect a call on its mobile network.

While we have been commissioned to develop specific estimates for these three services, the ACCC are seeking to develop a general WACC methodology which is likely to meet the statutory requirements across the range of frameworks they are responsible for. This work will feed into that process.

2.2. STATUTORY CRITERIA

The statutory criteria that the ACCC must apply varies by framework.

Statutory criteria for regulated telecommunications services

The relevant statutory requirements under the price notifications, access undertakings and telecommunications regimes are all set out in the Competition and Consumer Act (CCA). The focus of this report is on the telecommunications sector, and we have been told by the ACCC that the clauses relevant to WACC for the telecommunications regime are set out in Section 152BCA and Section 152AB of the CCA.

Section 152BCA states that:

"The Commission must take the following matters into account in making an access determination:

a) whether the determination will promote the long-term interests of end-users (LTIE) of carriage services or services supplied by means of carriage services,

[2] NBN Co Special Access Undertaking.

[3] ACCC (2024), Public inquiry on the access determinations for the voice interconnection services.

b) the legitimate business interests of a carrier or carriage service provider (CSP) who supplies, or is capable of supplying, the declared service, and the carrier or CSP's investment in facilities used to supply the declared service,

c) the interests of all persons who have rights to use the declared service,

d) the direct costs of providing access to the declared service,

e) the value to a person of extensions, or enhancement of capability, whose cost is borne by someone else,

f) the operational and technical requirements necessary for the safe and reliable operation of a carriage service, a telecommunications network or a facility, and

g) the economically efficient operation of a carriage service, a telecommunications network or a facility."

Section 152AB provides additional guidance on the meaning of promoting the long-term interests of end-users:

"(2) …in determining whether a particular thing promotes the long - term interests of end - users… regard must be had to the extent to which the thing is likely to result in the achievement of the following objectives:

c) the objective of promoting competition in markets for listed services;

d) the objective of achieving any - to - any connectivity in relation to carriage services that involve communication between end - users;

e) the objective of encouraging the economically efficient use of, and the economically efficient investment in:

(i) the infrastructure by which listed services are supplied; and

(ii) any other infrastructure by which listed services are, or are likely to become, capable of being supplied."

Further wording is also provided on the meaning of encouraging the efficient use of and investment in infrastructure:

(6) In determining the extent to which a particular thing is likely to result in the achievement of the objective referred to in paragraph (2)(e), regard must be had to the following matters:

a) whether it is, or is likely to become, technically feasible for the services to be supplied and charged for, having regard to:

(i) the technology that is in use, available or likely to become available; and

(ii) whether the costs that would be involved in supplying, and charging for, the services are reasonable or likely to become reasonable; and

(iii) the effects, or likely effects, that supplying, and charging for, the services would have on the operation or performance of telecommunications networks;

b) the legitimate commercial interests of the supplier or suppliers of the services, including the ability of the supplier or suppliers to exploit economies of scale and scope;

c) the incentives for investment in:

(i) the infrastructure by which the services are supplied; and

(ii) any other infrastructure by which the services are, or are likely to become, capable of being supplied.

We have been informed by the ACCC that the above quoted sections are applicable for making the voice interconnection decision.

When making the WACC decision for NBN SAU the ACCC has informed us that their approach is to first give appropriate weight to the objectives set out in clause 2G.2.4(d) of the NBN SAU:

"the rate of return will be…commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to NBN Co…having regard to:

(A) The objective of producing reliable estimates of the market cost of capital in a wide range of plausible market conditions; and

(B) the objective of promoting stability in the rate of return over time".

The ACCC will then consider clause 5.8 of the NBN SAU which makes reference to Section 152BCA as set out above. We have identified three key areas that have particular relevance for considering the appropriate WACC:

- Firstly, the ACCC must have "*regard*" to "*whether the terms and conditions promote the long-term interests of end-users*" and "*the economically efficient operation of a carriage service, a telecommunications network or a facility*".
- Secondly, in determining "*whether a particular thing promotes the long-term interests of end-users…regard must be had to…the objective of promoting competition in markets for listed services…the objective of encouraging the economically efficient use of, and the economically efficient investment in: the infrastructure*".
- Thirdly, on economic efficient use of and investment in regard must be had for the incentives for investment.

We also understand from the ACCC that the form of WACC that is used as an input varies by service. For the NBN SAU the ACCC requires a vanilla WACC while for voice interconnection services the ACCC requires a pre-tax WACC.

Regarding the RBS levy, a discounted cash-flow model rather than a building block model has been used previously to calculate the RBS levy.[4] In previous iterations of the RBS levy process the NBN SAU WACC has been applied as the discount rate for this calculation. Our understanding from the ACCC is for its 2025 advice on the levy it will adopt a discount rate based on a nominal vanilla WACC for a generic Australian telecommunications provider This simplifies our task as we need not consider whether the relative riskiness of the services funded by the RBS levy are different from those covered by the NBN SAU. An estimate for a generic telecommunications provider was provided to the ACCC as part of a preliminary report.

Statutory criteria for other regulated services

As outlined above, as part of this process the ACCC is also seeking to develop a general WACC methodology that could also plausibly meet the requirements under the price notifications and access undertakings regimes. The proposed overarching methodology described in this report may be applied.

The relevant sections of the CCA for price notifications and access undertakings are not the same as for the NBN SAU and voice interconnection.

Part IIIA of the CCA describes the regime applying to access to services. There are several sections of this part which may influence the appropriate methodology for setting WACC. These include Section 44AA which states:

"The objects of this Part are to:

(a) Promote the economically efficient operation of, use of, and investment in the infrastructure by which services are provided, thereby promoting effective competition in upstream and downstream markets; and
(b) Provide a framework and guiding principles to encourage a consistent approach to access regulation in each industry"

Section 44X states:

"The Commission must take the following matters into account in making a final determination:

…

[4] ACCC (2024), Regional Broadband Scheme levy – approach to future costing.

(d) the direct costs of providing access to the service…

(g) the economically efficient operation of the facility"

Section 44ZZCA states:

"that regulated access prices should:

(i) Be set so as to generate expected revenue for a regulated service or services that is at least sufficient to meet the efficient costs of providing access to the regulated service or services; and

(ii) Include a return on investment commensurate with the regulatory and commercial risks involved;

Part VIIA of the CCA describes the regime applying to price notifications. We were unable to identify specific sections in Part VIIA which have direct bearing on developing a WACC methodology.

Our focus in this report is on telecommunications, as we have been requested to produce numerical estimates of WACC for two telecommunications services. The WACC issues in other sectors are likely to be different and care must be taken when applying these methods in other sectors.

There are however potential crossovers, for example if there is an agreed upon approach for determining the market wide parameters it may seem unreasonable for these not be applied simply because the sector is different. Regarding the sector specific parameters, the overall process is likely to be informative (comparator selection driven by systematic risk considerations). However, the specifics of the sector are likely to limit applicability to other sectors. For example, a key consideration in this report is wholesale versus retail demand which may not be a relevant issue for other determinations

We also observe that the statutory criteria need to be read in the specific context of the existing pricing approach. For example, we observe that it can be difficult to implement a trailing average cost of debt with a pricing approach that does not allow debt indexation. We have taken the regulatory framework and resulting pricing methodology as a given in our advice. If the regulatory framework that applies to other sectors is different (or if indeed the frameworks that apply to regulated telecommunications services change) the same statutory criteria may produce a different result.

2.3. OUR METHODOLOGY

To develop a methodology which potentially meets the statutory requirements described above, our starting point is well-accepted regulatory practice in Australia. Australian regulators have in the past spent significant effort on examining the various WACC issues and while they have sometimes landed in different places this work is a valuable source to draw on. Clearly, wide acceptance of a single approach is no guarantee that the method will best meet the ACCC's statutory criteria. However, when several independent regulators have considered the evidence before them and come to the same judgement on a particular issue, this can provide an indication that the method is reasonable.

There are a range of methods that can be used to estimate WACC, and new methods are presently being developed by academics and financial practitioners. Any review of this issue will necessarily need to be bounded in some way. For this report, we have drawn the bounds around the methods that have been applied or have been recently actively considered by Australian regulators. The methods that have been considered by Australian regulators have in turn been informed by academic research and financial practice.

It is important to acknowledge that the statutory criteria of other regulators are not the same. However, we consider there to be significant read across. For example, we observe that the statutory criteria described above are incredibly similar to that which the AER considers as part of its rate of return process. This includes a focus on economic "*efficiency*" and the "*long term interest*" of end-users.[5]

[5] National Electricity Objective.

In addition, the consequences of regulators getting the estimate wrong are generally the same. The AER explains that if the:[6]

- **Estimate is biased upwards**: Investors will be overcompensated for the risks involved in supplying capital to networks, networks will have an incentive to over-invest in regulated assets above the efficient level and customers will pay inefficiently higher prices.
- **Estimate is biased downwards**: Investors will be undercompensated for the risk involved in supplying capital to networks, networks will not be able to attract sufficient funds to make the required investments in the network and consumers will pay lower prices but wear the risk of adverse outcomes for quality, reliability, safety and/or security of supply.

It is also worth acknowledging that "*setting the expected rate of return is not a precise science and involves uncertainty and judgement*".[7] In this report we have tried to be as clear as possible regarding the currently active debates in Australian regulation and our view on the balance of evidence. Ultimately reasonable individuals may make a different judgement regarding where the balance of evidence lies. Furthermore, this is our present assessment and as the evidence base evolves, we leave it open to change our view.

Finally, regulatory decisions do not exist in a vacuum. What has come before is relevant for a decision that a regulator must make now. This is because a shift in methodology can produce windfall gains or losses for the regulated company. Unpredictable decision making over time will impact the incentives for investment and could potentially conflict with the statutory criteria. By extension where there is uncertainty regarding the most appropriate methodology, we consider it prudent to have some level of status-quo bias.

2.4. REPORT STRUCTURE

The report is structured as follows:

- In Section 3 we set out our assessment of market-wide parameters which includes the **risk-free rate**, **market risk premium** and **gamma**. In theory, the estimation methodologies used for market-wide parameters can be equally applied to any Australian regulated service.
- In Section 4 we set out our assessment of sector-specific parameters which includes **beta**, **gearing** and **cost of debt**. As these are sector specific these estimates apply only apply to the telecommunications sector and the specific services we are examining.
- In Section 5 we provide our **overall WACC estimate**.

[6] AER (2021), Rate of Return – Assessing the long term interests of consumers.

[7] AER (2021), Rate of Return – Assessing the long term interests of consumers.

3. MARKET-WIDE PARAMETERS

This section sets out our approach to estimating market-wide parameters which include the risk-free rate, market risk premium and gamma, all three of which are used in the calculation of the cost of equity. These parameters are market wide in that they apply to any investment in Australia. This means that the methods used to estimate them are likely to have general applicability across the various industries that are subject to ACCC regulation and/or oversight.

3.1. RISK-FREE RATE

The risk-free rate represents the rate of return that an investor would expect from a risk-free asset. It characterises the investor's time value of money. That is, it reflects how the investors value a unit of money at the end of a given period relative to the beginning of the same period.[8] In regulatory settings, long-term government securities are conventionally used as a proxy for the risk-free asset, reflecting the long-term nature of infrastructure asset investments. Australian regulators estimate the risk-free rate using the yield on 10-year Commonwealth Government Securities (CGS), owing to their low default risk and high liquidity.

3.1.1. Assessment of options

Table 3.1 shows that most Australian regulators estimate the risk-free rate as the average yield of Commonwealth Government Securities over a period of 20, 40 and 60 days (depending on the regulator) leading up to the WACC estimation date, i.e. 31st March 2025 in this case.[9] The short averaging period is primarily to capture effects of current market conditions and simultaneously to avoid reliance on a single observation at given point in time which would reflect short-term volatility.[10]

Table 3.1 Summary of decisions on risk-free rates by Australian Regulators

Regulator	Term and instrument	Averaging Period
AER	10-year CGS	20-60 days
ACCC	10-year CGS	20 days[11]
ERA	10-year CGS	20 days
ESC	10-year CGS	20 days
ESCOSA	10-year CGS	20 days
ICRC	10-year CGS	40 days
IPART	10-year CGS	IPART gives equal weight to: • a 'historical' estimate – the average of 10 risk-free rate observations, one for each year over a period of 10 years leading up to the target date; and • a 'current' estimate – the average of N risk-free rate observations over a period of N years, where N is the length of the regulatory period.

[8] AER (2023), Rate of Return Instrument, Explanatory Statement, p. 109

[9] For this report we reviewed the regulatory decisions outlined in Appendix A.

[10] Queensland Competition Authority (2024), Rate of Return Review (Version 3), p. 96-98

[11] A 40-day averaging period has been used in NBN Co's previous method. Other ACCC decisions including decisions on the fixed line services and domestic mobile terminating access services use a 20-day averaging period.

Regulator	Term and instrument	Averaging Period
		Each of the yearly observations is itself a 40-day average of CGS yields.
OTTER	10-year CGS	40 days
QCA	10-year CGS	20-60 days

Source: See Appendix A

As outlined above, all Australian regulators consider that 10-year CGS are a suitable proxy for the risk-free asset. Further, there is near consensus on the period over which CGS yields should be measured to estimate the risk-free rate. Aside from IPART, all Australian regulators adopt an averaging period of between 20 and 60 days.[12] This reflects their view that estimating the risk-free rate close to the start of the regulatory period provides the best forward-looking estimate for that period. We examine IPART's unique approach in the market risk premium section below, because IPART consider the risk-free rate and market risk premium together.

There are also some more minor implementation decisions that need to be made to estimate the risk-free rate. These include:

- A decision on the data source for 10-year CGS yields, for example using the dataset that the Reserve Bank of Australia (RBA) publishes.
- Any manipulations to the dataset required to achieve an annualised 10-year yield, for example conversion of quoted rates from semi-annual to annual effective rates and potentially interpolation/extrapolation of the data where exact 10-year rates are not published.

We propose to use the RBA data table F16 and apply linear interpolation and then convert to annual effective rates to achieve an exact 10-year yield. This is consistent with the AER's approach as specified in the AER's 2022 Rate of Return Instrument.

3.1.2. Recommendation

There is near consensus among Australian regulators that the risk-free rate should be estimated based on a short-term averaging of yields on 10-year CGS. We see no reason not to align with this consensus view and observe that 10-year CGS has several desirable properties for a risk-free rate:

- Using CGS as a proxy for the risk-free rate requires an assumption that the Commonwealth will not default. This is a plausible assumption.[13]
- A 10-year horizon is likely to be well aligned to equity investors' investment horizons for long-lived assets.[14]

[12] There are some relatively minor differences in implementation – for example, the AER allows regulated network businesses to choose (in advance) an averaging period of between 20 and 60 days. The intention is to provide flexibility for network businesses to select a slightly longer period to smooth out volatility. AER (2023), Rate of Return Instrument, Explanatory Statement, p.125

[13] We are aware that internationally, there are examples of alternative risk-free proxies being considered. For example, in its redetermination of the water sector regulator Ofwat's PR19 decision, the UK Competition and Market Authority (CMA) considered that a convenience yield should be incorporated when estimating the risk-free rate. This refers to an argument that yields on government bonds are biased downwards, for example due to their widespread use in interest rate hedging strategies. However, this issue has been considered and rejected by Australian regulators and to our knowledge is not incorporated in any Australian precedent. CEPA's July 2024 report to Ofwat in the PR24 regulatory determination process provides a more detailed overview on this issue and outlines our view that, even in the UK context, a convenience yield adjustment is not appropriate. See CEPA (2024), PR24 Cost of Equity, 11 July 2024, Section 6.1.5.

[14] We note that in the AER's 2022 Rate of Return Instrument consultation process, there was significant debate around the appropriate term of the risk-free rate (i.e., 10 years, or a shorter period to match the term of the regulatory decision). We have not explored that issue in detail through this report, because ultimately the AER concluded on a 10-year term, which is aligned with the position taken by other Australian regulators.

- The prevailing risk-free rate provides a basis for estimating the market cost of capital close to the start of the regulatory period. To the extent that interest rates are expected to change over the regulatory period, other options are potentially available such as considering evidence from forward curves or potentially indexing the risk-free rate over the course of the regulatory period. However, none of these options are applied in Australian regulatory contexts.[15] Accordingly, the development on an appropriate method would be a significant exercise and beyond the scope of our current engagement.
- A short averaging period strikes a reasonable balance between (i) selecting a near-term estimate that is close to the start of the regulatory period and (ii) avoiding excessive sensitivity to day-to-day fluctuations in observed yields.

In light of the factors above, our recommended approach is to estimate the risk-free rate based on 10-year CGS yields measured over a 40-day averaging period. Averaging periods between 20 and 60 days may also be considered well-accepted, and we have not identified a strong theoretical or practical rationale for selecting any particular near-term average. However, using 20 or 60 days instead of 40 is likely to have a very small impact on the WACC estimate at a given point in time in most cases. We also do not expect that the choice of a short-term averaging period would lead to systematically lower or higher estimates over time. In this context, we consider it is reasonable to align with the short-term averaging periods that have been adopted by Australian regulators, as this promotes consistency and comparability.

We have aligned the detailed implementation (i.e., data source and adjustment to derive an effective annual rate) to the AER's methodology as set out in the 2022 Rate of Return Instrument.

3.1.3. Estimate

We use a 40-day average on CGS with a 10-year tenor, using the F16 data series published by the Reserve Bank of Australia (RBA). This produces an estimate of 4.47% as on 31st March 2025.

[15] Although there are examples of both approaches being applied internationally.

3.2. MARKET RISK PREMIUM

The market risk premium (MRP) represents the expected additional compensation that an investor requires above the risk-free rate to make them indifferent between a risk-free investment and an investment in a diversified portfolio of equities. Unlike the risk-free rate there is currently no directly observable proxy for the MRP and this must instead be estimated.

Regulators in Australia have considered a range of methods to derive this parameter – these include: [16,17]

- the historical excess returns (HER) method, also known as the Ibbotson method;
- dividend growth models (DGMs) or dividend discount models (DDMs);
- the total market returns (TMR) approach, also known as the Wright method; and
- industry surveys.

While a range of evidence has been considered, currently two approaches are most commonly applied by Australian regulators:

- The **HER** method calculates the MRP as the historical average of the differences between the total market return (i.e., shareholders' gains including both dividends and share prices) and the risk-free rate, observed over long periods of time.
- **DDMs** are forward-looking models that assume that the current stock market value is equal to the present value of future dividend payments[18], discounted using the total market return. Using information on the current value of a relevant stock market index, together with forecasts and assumptions on future dividends from that index, the DDM can be solved to find an estimate of the total market return. Then, the MRP can be obtained as the difference between the total market return and the current risk-free rate.

Similar to HER, the TMR (or Wright approach) is another method which uses historical market returns. This estimates the average historic real market return and deducts the contemporaneous real risk-free rate. The TMR method is common practice amongst regulators in the United Kingdom, including Ofgem and Ofwat. The AER actively considered the Wright approach as part of its last rate of return review process, but concluded that there is "*no theoretical basis for the TMR approach in Australia, and it is not used by market practitioners* [in Australia]".[19]

3.2.1. Assessment of options

The table below (Table 3.2) summarises the various methods used by regulators in Australia to estimate MRP. These are either combined in a weighted MRP estimate or used for cross checks. Current Australian regulatory precedent is largely in favour of primarily, if not exclusively, adopting the HER methodology. A notable exception is IPART, who place 50% weight on the HER estimate and the remaining weight on DDM and other market indicators.[20]

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[16] For example, a majority of regulators in the UK and US rely on a combination of the Wright and DDM/DGM models. The New Zealand Commerce Commission use HER, DD and the Wright approach.

[17] AER (2023), Rate of Return Instrument, Explanatory Statement, p.279

[18] As the name suggests DDMs discount the dividend yields, however, in practice other cash items are also considered (for example, new share issuance or share buybacks). Regulators have different methods take account of this. For example, the AER and the ERA deal with such items by adjusting their long-term growth rate, whereas IPART uses earnings yield instead of dividend yield.

[19] AER (2023), Rate of Return Instrument, Explanatory Note, p. 155

[20] Perth Airport (PAPL) also adopted IPART's methodology for estimating the MRP. This was endorsed by the Supreme Court of Western Australia in Perth Airport Pty Ltd v Qantas Airways Ltd [No 3] [2022] WASC 51 [114].

Table 3.2 MRP methods in Australian regulatory decisions

Regulator	HER	DDM	Surveys / export reports	Market indicators	Regulatory precedent	MRP estimate
AER (2023)	100%[21]	-	-	-	-	6.20%
ACCC (2024)[22]	100%	-	-	-	-	6.00-6.20%[23]
ERA (2022)	80%	20%*	-	-	-	5.90%
ESC (2023)	85%	15%	-	-	-	6.31%
ESCOSA (2024)	50%	-	-	-	50%	6.30%
ICRC (2023)	-	-	-	-	100% (AER, ERA, QCA)	6.30%
IPART (2024)	50%	50% on 'short term' estimates[24]				Current: 6.20% Historic: 6.00%[25][26]
OTTER (2022)	100%	-	Cross check	-	-	6.00%
QCA (2024)	100%	Note: While QCA relies on the HER approach, at the same time it also reserves discretion to consider market-specific conditions, DDM estimates and the total market return required by investors.				6.55%**[27]

*Source: See Appendix A for detailed references. Notes: *The ERA does not state these weights explicitly, but over time their MRP estimates have been consistently in line with this assumed weighting. ** The QCA's 2024 WACC review does not set out an estimate of MRP. The figure in the table is based on an estimate of HER as of 2024, in line with the QCA's stated approach.*

[21] In this table we summarise the AER's approach as 100% HER. We consider this to be an accurate reflection of the AER's approach though the AER states that "*We have considered all relevant evidence available to us including evidence from historical excess return (HER) data and other methods of estimating a forward looking MRP. In reaching this conclusion, we have reviewed various of sources of evidence. We note the evidence before us is incomplete and some pieces of evidence have greater explanatory power than others. We have therefore exercised judgment to determine the value of the MRP. Our decision is more strongly influenced by evidence we consider more persuasive. In our discussion of our reasons, we tend to use the short-hand terminology of 'weighting'. When we use this terminology, we are not implying a mathematical or quantitative weighting, but rather a process of identifying the evidence that is most important to us. We have determined that the best course available to us is to estimate an unconditional MRP. We do not currently consider it is possible to model a conditional MRP accurately over time*." AER (2023), Rate of Return Instrument, Explanatory Note, p. 130-131.

[22] In its 2015 decision for fixed line services, ACCC placed the most reliance on the HER approach whilst also considering survey evidence, conditioning variables (dividend yields, credit spreads, implied volatility) analysed by the AER, and other decisions by Australian Competition Tribunal. There was no weight on DDMs due to several concerns linked to these forward-looking models discussed in the AER's 2013 WACC guidelines and decisions for NSW and ACT energy businesses.

[23] Based on ACCC's recent decisions the MRP ranges between 6.00% to 6.20%. The Australia Post Mar 2024 price notification considers it to be 6.20%, ACCC's final determination on fixed line services and domestic mobile terminating access services uses an estimate of 6.00% and 6.10% respectively.

[24] This includes six DDM methods used by IPART – Damodaran (2013), Bank of England (2002), Bank of England (2010), Bloomberg (Refinitiv) method, SFG (now Frontier Economics) analysts forecast method and SFG market indicator method.

[25] As of 30 January 2025, from IPART's biannual WACC update published for February 2025.

[26] The historical MRP estimate of 6.00% is the midpoint of the long-term averages range estimated by IPART. This range was estimated to be 5.5% to 6.5% in its 2013 WACC review. IPART continued to use 6.00% as the estimate in the 2018 review.

[27] Although, the ACCC and the QCA both rely 100% on the HER method, there is a slight difference between the two. This could be because of the difference in averaging periods – the averaging period for the ACCC starts in 1988 and the QCA in 1958.

The different approaches reflect the regulators' assessments of the evidence supporting the various MRP estimation methods. The table below summarises each regulator's rationale.

Table 3.3 Summary of rationale of regulatory approaches to estimating MRP

Regulator	Preferred approach	Rationale
AER	HER	The AER acknowledges that MRP varies over time, and in principle it would be desirable to estimate a "conditional" MRP, i.e., in a way that varies to reflect market conditions at the time. However, the AER expressed doubt that a conditional MRP could be modelled accurately – e.g., using DDMs. The AER concluded that an "unconditional MRP" (i.e., estimated in a way that is relatively stable over time, in this case relying primarily on HER) is most relevant to the AER's regulatory task of setting a rate of return that applies to long-lived assets.[28,]
ACCC	HER	The ACCC has previously favoured using HER, as there is difficulty in estimating the conditional MRP. The ACCC has considered that HER provides the better estimate of MRP, because it is directly observable, easily replicable and transparent.[29]
ERA	Most weight on HER	While DDMs have the benefit of taking the current economic outlook into account, the ERA consider that this method is unreliable on its own, due to its upward bias[30], and its sensitivity to the form of the model. Consequently, the ERA does not place a large reliance on DDMs.[31]
ESC	Most weight on HER	The ESC assesses the MRP for the Port of Melbourne based on what it considers to be "well-accepted" approaches among Australian regulators. The ESC considers that current regulatory precedent warrants placing only limited weight on DDMs.[32]
ESCOSA	HER and regulatory precedent	ESCOSA regards HER as a transparent and objective method, but notes concerns with this approach (including HER being backward-looking, volatile, and potentially upward biased due to technology change and the liberalisation of financial markets).[33] ESCOSA places some reliance on investor surveys but note limitations with their transparency. ESCOSA did not place weight on DDMs due to their sensitivity to underlying assumptions.[34]

[28] AER (2023) Rate of Return Instrument, Explanatory Note, p. 138-139.

[29] ACCC (2024) Australia Post's Letter Pricing 2024, p. 63.

[30] The ERA's reasoning behind the presence of such an upward bias is not explicit however, the Consumer Reference Group established by the AER as a part of its RORI 2022 process suggested that DDMs tend to be upward biased due to analyst optimism and because the AER's model uses the ASX 200 which is likely to overestimate returns to the overall stock market. It is possible that the ERA is referring to this.

[31] ERA (2022), Explanatory statement for the 2022 final gas rate of return instrument, p. 146.

[32] The Port of Melbourne is required to determine a rate of return on capital using one or a combination of well accepted approaches that estimate the cost of equity and debt to derive a weighted average cost of capital. See clause 4.3.1 of the Pricing Order regulating the Port of Melbourne,

[33] ESCOSA expressed its view that the upward bias might be due to a survivorship bias and structural shifts in the financial markets. The discussion was based on the findings discussed in Aswath Damodaran's work - Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2012 Edition, Stern School of Business, see page 29-39 and 76.

[34] ESCOSA (2024), SA Water Regulatory Determination 2024 – Final Determination: Statement of reasons, p. 307-310.

Regulator	Preferred approach	Rationale
ICRC	Most weight on HER	The ICRC exercise judgement to determine a value of MRP based on Australian regulatory precedent. In interpreting the precedent, ICRC consider that most weight should be placed on HER, as there are concerns with the DDM's sensitivity to input assumptions and variability of outputs.[35]
IPART	Equal weight on HER and "current" estimates	IPART sets the WACC as the midpoint of a 'current' and a 'historical' estimate.[36] IPART considers that this is appropriate because investors take into account both long- and short-term values when making their investment decisions.[37]
OTTER	HER	In its 2022 review of TasWater, OTTER considered other regulators' decisions and their supporting evidence, and concluded that most weight should be placed on HER.
QCA	HER	Consider that the HER method is likely to provide a plausible indication of the risk premium an investor requires on average for investing in the market. In their view, the DDMs' sensitivity to different assumptions and inputs makes them unsuitable to be directly used to estimate the MRP. However, the QCA considers that DDMs may have a qualitative role in informing a forward-looking cost of equity.[38]

Source: See Appendix A for detailed references.

Amongst Australian regulators IPART has a unique approach to setting market-wide parameters (risk-free rate, MRP, and cost of debt). For each parameter, IPART calculates a 'current' and a 'historical' estimate, then combines current estimates into a current WACC and historical estimates into a historical WACC. IPART then takes the midpoint of the two estimates. IPART considers that equal weight should be given to historical and current information because in its view investors rely on both.

In explaining its rationale for this approach, IPART places great emphasis on internal consistency between WACC parameters. IPART argues that consistency is required because WACC parameters are correlated; in particular, IPART considers that the MRP and risk-free rate are inversely related. Therefore, mixing a current estimate of the risk-free rate and a historical estimate of the MRP would distort the WACC estimate.[39] Our observation is that the Wright approach also embeds this inverse relationship, without the counter-intuitive conclusion that the expected return on a zero-beta asset is not the prevailing risk-free rate (see Box 1 below). Accordingly, if one were to accept that this inverse relationship exists (noting that it is not universally apparent in the returns data), adopting the Wright approach instead of HER, or placing some weight on both, might be a preferable course of action.

[35] ICRC (2023), Regulated water and sewerage services 2023-28: Report 3 of 2023, p. 82.

[36] Under IPART's methodology, the historic MRP is an estimate based on data over a long period of time and the current MRP estimate is derived using DDMs and assumptions about future growth rates. IPART believes it is only valid to use an MRP estimate which is time-consistent, meaning an MRP estimate which is derived using a combination of historic and current risk-free rate and a historic and current MRP.

[37] IPART (2018), Review of our WACC method, p. 50.

[38] QCA (2024), Rate of return review – Version 4 p. 76.

[39] IPART (2018), Review of our WACC method p. 51.

Box 1: Wright approach relative to IPART's long-term methodology

The 'Wright' or TMR approach treats investors' expected total market return as constant (and the MRP fluctuates in line with movements in the risk-free rate). This contrasts to the HER approach, which assumes that the market risk premium is constant (and TMR fluctuates in line with movements in the risk-free rate).

Both the IPART long-term approach and the Wright approach rely on an estimate of total market returns that was achieved using historical data. However, the input for the risk-free rate is not the same. Wright relies on an estimate of the prevailing risk-free rate, while IPART relies on a historical estimate of the risk-free rate. In the CAPM formula when beta is 1 the risk-free rate drops out of the calculation, which means that both methods yield an identical result.

As beta moves downwards away from 1, the CAPM formula places more weight on the risk-free rate input. Once beta is 0 the output of the formula is equal to the risk-free rate. This means that as beta moves downwards, the Wright approach places more weight on the prevailing risk-free rate while IPART's long-term method places more weight on the historical average risk-free rate.

IPART's formulation seems to imply an assumption that the appropriate forward-looking risk-free rate is stable, or at least mean reverting. Given the historical path of risk-free rates, this assumption is questionable.[40] Furthermore, the IPART long-term approach has unintuitive implications for 0 beta assets. Under IPART's long-term approach the expected return on a zero-beta asset is not the prevailing risk-free rate, but instead an average of history.

The differences between IPART's approach and that of other Australian regulators reflect some fundamental differences in the way IPART and other regulators interpret the evidence before them:

- While the debate on whether the risk-free rate and MRP are inversely related is not settled, unlike IPART most Australian regulators do not consider that evidence of this relationship is strong enough to move away from the HER approach.
- More fundamentally, other Australian regulators do not consider that the risk-free rate and MRP must be calculated over the same estimation windows. Instead, they seek to combine what they regard as the most accurate forward-looking estimate of both parameters. For the risk-free rate, most regulators consider that current CGS yields provide the best estimate. Similarly, regulators use HER because they regard these as the best available *forward-looking* estimate of MRP. Therefore, regulators that rely on HER do not consider that these are inconsistent with a current risk-free rate.[41]

Implementation of HER

There are two key issues in the implementation of HER in the Australian context:

- **Time period** – Most Australian regulators estimate MRP over five partly overlapping time periods, with different start dates (1883, 1937, 1958, 1980, and 1988) which coincide with significant events in Australian financial markets.[42] The ERA also considers a shorter averaging period starting in 2000. However, the AER, the ACCC, ESCOSA, and the QCA place more or exclusive reliance on specific periods, which they consider provide advantages in terms of data quality or robustness of the estimates.

[40] As noted in Section 3.1, we suggest that if there is a concern that the prevailing risk-free rate will apply over the term of the regulatory period, there may be better methods available to account for this then adopting a longer-term average as the forward-looking estimate.

[41] AER (2022), Draft 2022 Rate of Return Instrument, June, p. 16-17; QCA (2018), Aurizon Network's 2017 draft access undertaking, Final Decision, December, p. 54.

[42] 1883 is the earliest available year of Australian market returns data. Increases in data quality have become available in 1937 and 1958. More recent sampling periods, while more vulnerable to influence by the current stage of the business cycle or one-off events, may reflect more closely the current financial environment, particularly since financial deregulation (1980) and the introduction of the imputation credit taxation system (1988). See AER (2013), *Better Regulation - Explanatory Statement: Rate of Return Guideline*, December, p. 82.

- **Averaging** – The average historical MRP can be calculated using arithmetic or geometric averaging. Both approaches are regarded as having advantages and disadvantages.[43] Regulatory precedent is largely in favour of arithmetic averages.

The table below summarises the current regulatory approaches to HER implementation.

Table 3.4: HER implementation

Regulator	Period (start)[44]	Averaging	Point estimate[45]
AER	1883, 1937, 1958, 1980, 1988	Arithmetic	While the AER calculates estimates over five periods, it relies mostly on data from 1988.
ACCC	1988	Arithmetic	Arithmetic average from 1988.
ERA	1958, 1980, 1988, 2000	Arithmetic and geometric	Weighted average of arithmetic (60%) and geometric mean (40%), each derived as the average of the estimates over different time periods.
ESC	1883, 1937, 1958, 1980, 1988	Arithmetic	Median of the five periods.
ESCOSA	1883, 1937, 1958, 1988	Arithmetic	Most weight on the data from 1958.
IPART	1883, 1937, 1958, 1980, 1988	Arithmetic	Point estimate of 6%.
QCA	1958	Arithmetic	Arithmetic average from 1958.

Sources: See Appendix A for detailed references. ICRC estimate is based on regulatory precedent. OTTER does not provide details of their HER calculation.

An alternative source of stock accumulation index has been considered by regulators - NERA instead of the currently used Brailsford, Handley and Maheswaran (BHM) data. The NERA and BHM data differ only till 1958. However, Australian regulators no longer use the NERA data.

Implementation of DDM/DGM

DDMs assume that the value of a security, or the overall stock market, is the discounted value of its future dividends. There are a range of detailed assumptions that are typically required to implement DDMs: the sources of estimates of future dividends, how injections and withdrawals of equity in listed firms are taken account of when valuing the stock market, and the relationship between dividend growth and long-term economic growth – i.e., the manner in which short-term forecast dividend growth converges to a long-term growth assumption. The range of possible assumptions means that the implementation of DDMs can produce a wide range of estimates for the total market return and the MRP.

There is no consensus in Australia or internationally on the "best" specification of the DDM. The following DDM specifications (or other forward-looking methods) are currently used to set MRP in Australian regulatory determinations:

- IPART reaches a point estimate from multiple DDMs or other similar techniques:
    - Damodaran (2013) DDM

[43] See AER (2023), Rate of Return Instrument, Explanatory Note, p. 143.

[44] Early Australian stock market returns series (1883-1961) constructed retrospectively by Lamberton and the Sydney Stock Exchange are considered to overestimate returns. To correct the bias, Australian regulators have traditionally used adjusted datasets from two sources: Brailsford, Handley, and Maheswaran (BHM) and NERA. Most regulators now use only BHM data.

[45] Post the introduction of the imputation credit system, HER estimates calculated from 1988 onwards embed a gamma estimate.

- Bank of England (2002) DDM
- Bank of England (2010) DDM
- Refinitiv DDM
- SFG[46] analyst forecast method
- SFG market indicators method

- The ERA uses its own DDM specification.

In addition to the specification of the models, ERA and IPART differ on almost every possible aspect, including the stock market index used, the long-term growth assumption, and the source of data for short-term growth assumptions. Equations and other parameters used to derive estimates from the above method have been included in **Appendix B.**

Summarising the debates

The various deliberations by Australian regulators point to two key debates in estimating the market risk premium:

- Firstly, the role of conditional estimates in setting the market risk premium.
- Secondly, how historical data should be applied to produce an unconditional estimate.

A conditional MRP estimate takes account of current market conditions. It appears to be recognised, even amongst those regulators that place limited weight on conditional approaches, that the MRP does "*vary thorough time and [this conditional MRP] is in principle desirable to estimate"*.[47] For example, in conditions of financial uncertainty risk-free rates have in the past been driven to extremely low levels, while investing in stocks may have been seen intuitively as riskier. This could point to the wedge between risk-free rates and the MRP being wider under certain market conditions, and narrower under others. However, these regulators have also concluded that the disadvantages of the currently proposed set of conditional approaches mean that significant weight cannot be placed upon them.

The conditional estimation approaches that have been actively considered by Australian regulators are primarily variations of DDMs. Several issues have been raised with these methods, and it is not clear if the "*conditional MRP can be accurately modelled*".[48] Different DDM specifications give different results and as outlined above there is no agreement on how to derive the various inputs required. DDM results in turn are very sensitive to these inputs. One input in particular, the long run growth rate of dividends, is a crucial driver of the output but this can only be estimated with uncertainty.

Unconditional estimates will not incorporate the impact of short-term economic events. However, an argument could be mounted that it is inappropriate to attempt to adjust for short-term fluctuations in any case. The AER make such an argument, stating that "*the unconditional MRP is most relevant to [their] regulatory task as [they] are setting a return that applies to long lived assets*." This appears to point to a view that even if the limitations of DDMs can be overcome, it may still be more appropriate to apply an unconditional estimate.

However, if given the disadvantages of DDMs an unconditional estimate is preferred, this does not automatically point to using the HER approach. There are different ways of using historical returns information to set an unconditional estimate. The TMR method embeds one assumption regarding the relationship between the risk-free rate and MRP (perfect inverse correlation) and the HER method another (perfect independence). It is also possible

[46] Now Frontier Economics

[47] AER (2023), Rate of Return Instrument – Explanatory Statement.

[48] AER (2023), Rate of Return Instrument – Explanatory Statement.

to construct hybrids of these two positions – although regulators in Australia and internationally have generally constrained themselves to HER or TMR.[49]

CEPA examined this issue for the AER as part of their 2022 Rate of Return Instrument process (see Box 2 below). We concluded that theory does not provide a clear answer on the RFR-MRP relationship. The empirical work we undertook provided some evidence for an inverse relationship between RfR and MRP especially in the post-1993 period. However, this relationship is not a perfect inverse correlation as assumed in the TMR approach. At the same time, our findings also did not support the perfect independence assumption of the HER approach.

Following this work, the AER decided not to place any weight on the TMR approach and concluded that "*any relationship that may exist is not sufficiently well established to form the basis for regulatory adjustment to the MRP*" though acknowledging that "*the question of a relationship between the MRP and the risk-free rate is still open*".[50]

Box 2: Relationship between risk-free rate and the MRP: CEPA's previous advice to the AER[51]

CEPA was previously commissioned by the AER to advise on their approach to estimating the MRP. The AER asked whether there is a relationship between the risk-free rate and the MRP to be used when estimating the cost of equity. To examine this issue, CEPA:

- Undertook detailed case studies of regulatory practice by the New Zealand Commerce Commission, Ofgem (UK) and FERC (USA). This examined the evidence and reasoning applied by these regulators for their assumed relationship between RfR and MRP.
- Examined financial practice by looking at survey data and methods applied in independent expert reports.
- Undertook data analysis looking at the relationship over time in Australia through a series of different MRP models including earnings yield and DDMs.

CEPA's advice to the AER on the relationship concluded that:

- Firstly, there is a possible inverse relationship between the two parameters. The data analysis CEPA undertook indicated a weak negative relationship between the implied MRP and RfR in the period from 1936 and a stronger negative relationship between the implied MRP and RfR in the period since 1993.
- Secondly, there was no good evidence to assume that the MRP is independent of the risk-free rate.
- Thirdly, from a theoretical perspective, there was no conclusive evidence in support of either an assumption of independence or dependence.

CEPA noted that the AER's regulatory processes and data availability could both accommodate:

- a fixed MRP approach (i.e. HER),
- a total market returns (TMR/Wright) approach, or
- a hybrid method – averaging or otherwise combining the two.

CEPA concluded that the TMR approach could not be ruled out on the evidence and may provide a better estimate of the forward looking MRP.

In its 2022 RORI, the AER considered CEPA's advice but ultimately recommended retaining the fixed MRP approach. The AER cited several reasons for not adopting the TMR approach, including the lack of a strong theoretical foundation, insufficient empirical evidence demonstrating a consistent and ongoing relationship between the relevant parameters, and the limited support for these methods among market practitioners.[52] The AER also referenced other expert evidence. In particular Partington and Satchell advised the AER that in their

[49] It is possible that such hybrids may reflect features of conditional approaches depending on how they are constructed.

[50] AER (2023), Rate of Return Instrument – Explanatory Statement.

[51] CEPA's 2021 report to the AER - Relationship between RFR and MRP.

[52] AER (2023), Rate of Return Instrument, Explanatory Note, p. 155-159

view, the TMR approach can deliver implausible assumptions – for example, that at times when the risk-free rate is above the historic average market return, it produces a negative market risk premium.[53]

In summary:

- Conditional approaches (DDMs) result in an MRP estimate which can reflect prevailing market conditions or sudden impacts. However, these approaches are highly reliant on and sensitive to the assumptions used for estimation. Some of these parameters, such as the long run growth rate of dividends, can only be estimated with uncertainty. Given these uncertainties the limited weight placed on these models by Australian regulators appears reasonable.
- Unconditional approaches (HER) result in an MRP estimate which is stable. However, as a result it might not fully incorporate the impact of short-term economic events. The HER model also assumes that the risk-free rate and the MRP are not related. We consider that the question of the relationship between the RfR and MRP remains open, both on theoretical and empirical grounds. At the same time, we recognise that the evidence for adopting an alternative unconditional approach (i.e., the Wright approach) is equally inconclusive.

Consideration of the ACCC's statutory criteria

Given that there is debate regarding the appropriate methodology, we have considered the various options alongside the ACCC's statutory criteria.

In the case of NBN the ACCC is to first give appropriate weight to the objectives set out in clause 2G.2.4(d) of the SAU. This includes having regard to producing reliable estimates of the market cost of capital in a wide range of plausible market conditions and the objective of promoting stability in the rate of return over time.

Conditional approaches (such as DDMs) could in principle provide a more reliable estimate of the market cost of capital, by reflecting the impact of a wider range of plausible market conditions on the MRP. For example, the HER model assumes that the risk-free rate and the MRP are not related. However, as discussed above this may not be a reasonable assumption.

Nonetheless, there is an open question regarding whether a DDM estimate at one point in time provides a more reliable estimate of the market cost of capital relative to an unconditional approach when this point-in-time estimate is held constant for a five-year regulatory period. In a framework where the MRP is estimated once and then applied for five years, it is not clear whether DDMs do provide a more reliable estimate of the relevant market cost of capital over that horizon. As we have noted above, if there is a concern that the HER's assumption regarding the relationship between the risk-free rate and MRP is not realistic, it does not necessarily follow that placing more weight on DDM-based estimates is the best solution. For example, an alternative would be to combine HER with the Wright approach, which takes the opposite position on how the risk-free rate and market risk premium moves in relation to each other.

With regards to the second objective of stability over time, DDM estimates are far more volatile than adopting one of the unconditional approaches. If significant weight were placed on DDMs, then the ACCC would need to expect that the market risk premium could shift materially between decisions, even if these are made a short time apart. This means that DDM estimates may be less supportive of stability over time, compared to an unconditional approach.

In the case of voice interconnection, these additional objectives do not apply. Instead, we understand that the overriding factor is the "*objective of encouraging the economically efficient use of, and the economically efficient investment in… [infrastructure]*". As outlined in the methodology section 2.3 above, the consequences of setting a cost of capital estimate that is too high or too low relative to the 'true value' is the key driver of economic efficiency.

[53] AER (2023), Rate of Return Instrument, Explanatory Note, p.155. Citing Partington and Satchell (2020), Report to the AER: Alternative Asset Pricing Models, June 2020, p.23.

While the conditional approaches could potentially mitigate the risk of setting an estimate that is too high or too low at a particular point in time, any benefit needs to be considered alongside the robustness of the models themselves. We summarise in the next section the potential difficulties with applying DDMs.

3.2.2. Recommendation

Overarching methodology

Our recommendation is that the ACCC continue to apply the HER methodology to estimate the MRP. In the absence of robust methods to estimate a conditional MRP estimate, long-term realised returns can provide a reasonable guide to forward-looking expectations. HER provides a way to capture long-term realised returns in the MRP estimate. At the same time, the TMR (or Wright) method also achieves this outcome. We have not identified clear empirical or conceptual grounds to prefer HER to the TMR approach. However, without a more detailed investigation of the consequences of placing some weight on the TMR approach, maintaining the HER method can promote regulatory consistency and avoid the risk of creating windfall gains or losses. We expand on these points below.

In principle, we understand that it may be desirable to utilise a conditional MRP estimate that reflects prevailing market conditions. But this relies on a robust and implementable estimator of the conditional MRP being available. The most widely applied conditional estimation approaches are DDMs, which have disadvantages:

- The results of DDMs are highly dependent on model specification and assumptions. It remains unclear whether these can be determined with sufficient confidence to place significant weight upon them.
- There are many expressions of DDMs and our review identifies no consensus regarding the most appropriate specification.
- Although some Australian regulators do have limited regard to DDM evidence, we have not identified a clear rationale that could guide us in determining how much weight is appropriate.

Overall, we consider that a more detailed review of the available DDM specifications and the performance of these models over time would be needed to form a view on whether this evidence should be included in the approach we recommend to the ACCC.

This conclusion points to adopting an unconditional approach or approaches. Unconditional approaches embed an assumption that the best available guide to forward-looking expectations are the returns that investors have realised over the long-term. Long-term realised returns can provide a reasonable forward-looking estimate in the absence of a robust way to directly observe a conditional MRP. For example, this is consistent with the prevailing approach to setting the asset beta, which is also estimated with reference to historic evidence.

Giving preference to an unconditional MRP methodology does not necessarily point to adopting the HER method, given that the TMR or Wright approach provides an alternative. The debate on the relationship between the MRP and risk-free rate is not settled and the HER assumption that the MRP is stable is not necessarily correct. At the same time, the evidence in support of the TMR approach is also inconclusive.

However, HER is the method that has been applied by the ACCC in past decisions. Given the uncertainty and lack of overwhelming evidence for either of the unconditional methods, we consider that a more fulsome exploration would be needed before concluding that it is reasonable for the ACCC to change its methodology to place some weight on the TMR approach in addition to HER.[54] This reflects our view that regulatory consistency and stability are relevant considerations for the methodology, to avoid windfall gains and losses from changes in methodology where the supporting evidence is not conclusive. In particular:

- As the MRP is unobservable, there is inherently a degree of uncertainty in its estimation. Adopting a methodology allocates the risk associated with this uncertainty between customers and the regulated firm.

[54] For example, to fully explore the issues highlighted in Box 1 above.

Once a risk allocation has been made, it may be desirable to maintain this consistently over time, unless there is compelling evidence of a need for change.

- We have not identified reasons to think that either the HER or TMR approach will produce a biased estimate over time. In this context, switching between methods may create the greater risk of introducing bias and the scope for gaming into the regulatory process.

Implementation approach

In addition to the overarching decision on which methodology to adopt, there are a range of detailed implementation choices that need to be considered for HER. These include the data series applied, the historic data periods that are considered, the averaging approach (arithmetic or geometric, or both) and the approach to selecting a point estimate. All Australian regulators adopt the BHM data series, and accordingly our estimation follows the same approach. However, Table 3.4 indicates that there is a diversity of approaches on the other elements.

In Table 3.5 below, we reproduce MRP estimates taken from different time periods and under different averaging methods. In Table 3.6 we use these estimates to illustrate the range of HER estimates that the different regulatory methodologies imply.[55]

Table 3.5: Alternative HER MRP estimates (31 March 2025)

Estimation period	Arithmetic average	Geometric average
1883-2024	6.37	5.08
1937-2024	6.17	4.45
1958-2024	6.66	4.55
1980-2024	6.67	4.74
1988-2024	6.37	5.05
2000-2024	6.55	5.20

Source: CEPA analysis.

Table 3.6: HER estimates derived from alternative regulatory approaches

Regulator	Point estimate	Implied HER estimate (31 March 2025)
AER	Places most weight on an arithmetic average over the period starting 1988.	6.37
ACCC	Arithmetic average from 1988.	6.37
ERA	Weighted average of arithmetic (60%) and geometric mean (40%), each derived as the average of the estimates over different time periods (1958, 1980, 1988, 2000).	5.89
ESC	Median of the arithmetic average from five periods (1883, 1937, 1958, 1980, 1988).	6.38
ESCOSA	Most weight on arithmetic average from 1958.	6.66
IPART	Point estimate of 6%.	6.00
QCA	Arithmetic average from 1958.	6.66

[55] This does not imply that these are the HER estimates these regulators would adopt now or in future. Rather, it reflects our replication of their most recent decision as at 31 March 2025.

Source: CEPA analysis. Note: Refer to Table 3.4 for more information on how each regulator derived a point estimate in their most recent decision.

We consider that it is reasonable to adopt the AER's HER implementation methodology (i.e., to place most weight on data from the period starting in 1988), as this in terms of the estimation value this reflects a 'middle ground' among the various approaches.

3.2.3. Estimates

In the table below we set out our HER estimates. We have proposed an estimate of 6.4%, which places most weight on data from the period 1988 to 2024.

We also provide estimates for a range of other methods, including:

- The Wright method. At the estimation date used in this report, placing some reliance on this method would result in a higher MRP estimate, compared to relying solely on HER.
- The ERA's 2-stage DDM model and IPART's three non-proprietary DDMs.[56] We observe that these DDM approaches lead to estimates both above and below the long run average estimate provided by the HER method. The ERA 2-stage DDM estimate is materially lower than the other DDM estimates. This is because the ERA averages 6 estimates, each estimated 6 months apart. The ERA 2-stage estimate as at 31st of March 2025 is 6.82% which is close to the IPART estimates. This also demonstrates the significant variability in DDM estimates, even when they are estimated close together in time. As noted above, the six DDMs presented here are not the only specifications that could be considered.

Table 3.7: MRP estimates

Method	Estimate
Historical Excess Returns (HER)	Average of 1988-2024 period: **6.37%** Average of historical periods (1883, 1937, 1958, 1980, 1988): **6.45%**
Wright Method (TMR Approach)[57]	Average of 1988-2024 period: **7.09%** Average of historical periods (1883, 1937, 1958, 1988): **6.83%**
Dividend Discount Model (DDM)	ERA 2-Stage Model**: 5.18%** Average of IPART's three non-proprietary DDMs: **6.96%**[58] Estimates from IPART's three non-proprietary DDMs: Bank of England (2002): **7.17%** Bank of England (2010): **6.84%** Damodaran (2013): **6.87%**

Source: CEPA analysis

Note: Data from Bloomberg extracted on the 7th of April 2025.

[56] The other methods (SFG (Frontier Economics) analyst forecast method and market indicator method) used by IPART are proprietary methods and hence, we have only estimated the MRP using the non-proprietary models.

[57] Estimated based on the AER's method. Described here. This estimates the Wright approach assuming real returns are stable and then applies an inflation rate assumption of 2.5% to convert back to nominal. If we instead assume nominal market returns are stable instead of real returns the average of the period 1988-2024 results in a market risk premium of 7.53%.

[58] The DDM estimate is the average of the 3 non-proprietary approaches used by IPART – this is different from IPART's standard since the remaining models have not been used for estimation. IPART combines different DDM estimates (proprietary and non-proprietary) using a median approach. Within these DDMs, it estimates a point approach using a weighted average method with a one-third weight to the market indicators MRP and two-thirds weight to the median DDM MRP.

3.3. GAMMA

Australia operates an imputation tax system. This means that investors receive imputation credits for tax paid, on Australian income, at the company level. These credits can then be used by eligible shareholders (Australian taxpayers) to offset their tax liabilities.

The adjustment to the pre-tax WACC for imputation credits is commonly referred to as gamma. The value of gamma lies within a range of zero to one. A zero value implies that investors receive no benefit from imputation credits, while a value of one assumes that investors receive the full benefit of all credits generated by the company. A non-zero value for gamma reduces the pre-tax WACC. This reflects that if equity investors receive value from the imputation credits, they will require a lower rate of return than would otherwise be the case.

It is reasonable to consider that investors would value imputation credits and hence accept a lower rate of return compared to a business with a similar risk profile but no imputation credits. By extension we consider that gamma should be a positive value.

In contrast there have been various arguments put forward in regulatory processes for a zero gamma.

One example is the case made for setting gamma to zero based on ownership – that is, where owners of the company do not value imputation credits. For government-owned entities, imputation credits might offer no value, making it reasonable in some cases to consider the value of gamma as zero. However, this rationale has generally not been accepted by regulatory authorities. For example, in TasWater's 2018 investigation report, TasWater contended that by not considering gamma to be zero and by extension not acknowledging the actual ownership of the entity, the regulator would 'effectively dictating' who should own the entity. To that the Office of the Tasmanian Economic Regulator (OTTER) replied:

"*Economic regulators attempt to simulate the returns that an efficiently managed business would generate in an efficient, competitive market. By referring to a notional benchmark efficient privately owned business the advantages of public ownership are eliminated. The corollary of unknown ownership is that the tax status of the owners is also unknown. Therefore, contrary to TasWater's assertion, the Economic Regulator is not determining the ownership structure of a regulated business. Furthermore, gamma is not specific to any particular market or individual business and applies to the overall Australian market*."[59]

Assessing Australia Post's draft price notification in 2022, the ACCC stated that it has historically set gamma with reference to a benchmark for an efficient firm operating in Australia rather than the regulated business' actual financial statements. This is on the premise that the cost of capital should be independent of the regulated firm's ownership structure, and it should instead reflect a competitive capital market that is supporting investment in real assets. Accordingly, the ACCC rejected Australia Posts' proposal of using a gamma assumption of zero.[60]

In both these examples there is a focus on the 'notional' firm which must raise financing from a competitive private capital market. This focus appears appropriate in the context of the ACCC's statutory duties. Furthermore, the idea that the value of the firm should change based on ownership seems counter-intuitive, in particular when comparing the impact of government and private ownership.

It is also worth considering the specific context of NBN Co, whose extended non-taxable status could support the argument for a gamma of zero. Nonetheless, this raises a broader concern that investors may be reluctant to support a business that intends to remain unprofitable for an extended period, especially when they could instead invest in a similarly risky, but profitable, alternative. A focus on a 'notional' firm that is required to raise financing from a competitive private capital market also points to adopting a positive value for gamma.

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[59] OTTER (2018), TasWater Water and Sewerage Price Determination Investigation Final Report, p.171

[60] Further, the ACCC also considered that that this approach allows the firm to earn a competitive rate of return to encourage investment but not lead to monopolistic pricing while providing an incentive to improve overall performance.

3.3.1. Estimating gamma

Gamma is commonly estimated through the utilisation approach as the product of a distribution rate and a utilisation rate ($\gamma = F \times \theta$):

- The **distribution rate** (F) is the proportion of imputation credits generated by a company that are distributed to investors. Companies may attach imputation credits to their dividends but can also choose to retain them in a franking account balance.
- The **utilisation rate** (θ or theta) is the value of $1 of imputation credits distributed to investors

Assessment of options

Australian regulators use different approaches to estimating the distribution and utilisation rate.

The following data is used for estimating the distribution rate:

- selected companies' financial accounts (e.g., from the top 50 ASX-listed firms) to estimate the changes in their franking account balances relative to dividends paid out; or
- Australian Tax Office (ATO) data on tax returns of payers of Australian tax.

Theta can also be estimated in several different ways:

- Equity ownership estimates, which reflect the proportion of domestic ownership of Australian equity, based on Australian Bureau of Statistics (ABS) wealth data. This requires an underlying assumption that domestic investors value imputation credits at their face value (i.e., for domestic investors, the value of theta is one), whereas imputation credits have no value for foreign investors.
- Market value studies, such as dividend drop-off studies. Dividend drop-off studies compare share prices with and without dividend entitlements – i.e., prices between the cum-dividend date (the last day on which investors are eligible to receive dividends and associated imputation credits) and the ex-dividend date (the first day on which investors will not be eligible to receive dividends and associated imputation credits).

As shown in the table below, the majority of Australian regulators, with the exception of IPART, estimate the distribution rate using financial accounts and theta using the equity ownership approach.

Table 3.8 Regulatory precedent for gamma

Regulator	Methodology	Distribution Rate (F)	Utilisation Rate (θ)	Gamma
AER	Utilisation approach • F – Financial accounts (top-50 ASX firms) • θ– Equity ownership (ABS data)	0.88	0.65	0.57
ACCC	Follows AER	0.88	0.65	0.57
ERA	Utilisation approach • F – Financial accounts (top-50 ASX firms) • θ– Equity ownership (ABS data)	0.9	0.6	0.5
ESC	Refers to the utilisation approach	0.8	0.625	0.5
ESCOSA	Regulatory precedent	-	-	0.5
ICRC	Regulatory precedent (supporting the utilisation approach)	-	-	0.5
IPART	Market Value approach • F – ATO statistics • θ– Implied market value (dividend drop-off)	0.7	0.35	0.25

QCA	Utilisation approach • F – Financial accounts (top-50 ASX firms) • θ– Equity ownership (ABS data)	0.88	0.55	0.484[61]

Source: Appendix A. Note: OTTER have not established an approach to gamma in their last WACC review and previously relied on decisions by the AER.

IPART considers that market value studies provide better evidence, despite IPART acknowledging that the share price data they are based on is "noisy". This because IPART consider that the data reflects information about the value investors place on dividends in practice – thus taking account of the investor's tax position and ability to use imputation credits. In contrast, the equity ownership method assumes that domestic investors take full advantage of imputation credits. IPART considers that this assumption is imprecise, considering that observed domestic ownership ratios vary over time across countries.[62]

The AER considered the market approach in past rate of return decisions, but decided to maintain their existing approach to estimating the utilisation rate and gamma.[63] In particular, the AER considered the merits of implied market value studies (specifically dividend drop-off studies), which involved comparing the share price between the cum-dividend date and ex-dividend date)[64], to estimate the utilisation rate. However, on examining several of these studies, they identified multiple shortcomings, for example:

- The results from these studies could be influenced by factors such as differential personal taxes and risk.
- The results reflected the perspective of the marginal investor who trades around the ex-dividend dates. This is not representative of a 'typical' investor.
- They also found practical issues of how to separate the value of dividend and the value of imputation credits.

Prior to this, in the 2013 Rate of Return Instrument, the AER expressed its concerns regarding the appropriateness of the market valuation approach by broadly dividing the problems encountered into two baskets – allocation issues and econometric issues:

- The allocation problem was that market value studies required an assumption to isolate the difference in stock prices which was solely attributable to imputation credits. The basis to derive these assumptions was uncertain.
- The econometric methods used led to multiple challenges – for example differences in trading prices between the cum-dividend and ex-dividend dates may reflect changes unrelated to dividends (although studies typically attempt to correct for this), or may not fully capture the effect of dividend distributions; such studies can be highly sensitive to the input data; results may be affected by thin trading in particular securities; and estimates from these studies have high standard errors. The method results in difficulties in

[61] To calculate the utilisation rate, the QCA uses only listed equities, while the AER includes both listed and unlisted equities. Including both types leads to a higher utilisation rate estimate. Therefore, although both the AER and QCA use ABS data, the AER's estimate is higher due to the use of both types of equity.

[62] IPART (2018), Review of our WACC method, p. 81

[63] The AER previously discussed this issue in detail in their 2013 and 2018 Instruments. It reiterated the findings in the 2022 Instrument.

[64] The cum-dividend date is the last day on which investors owning shares will be eligible to receive dividends and the attached imputation credits and the ex-dividend date is the first day on which investors owning shares will not be eligible to receive dividends and attached imputation credits.

establishing the 'true' market value of imputation credits.[65] The AER also expressed reservations around reliance on data that related only to specific firms and on analysis of certain events which do not occur frequently or for all firms in the market. Furthermore, there was also disagreement regarding the interpretation of the regression co-efficient produced by these studies.[66]

For the above reasons explained above, the AER places no weight on gamma estimates derived from a market value approach.[67]

The ERA also relies on the equity ownership method to estimate the utilisation rate. In its 2015 review of the method for estimating WACC for the Regulated Railway Networks, the ERA stated that using dividend-drop off studies might result in an incorrect estimate of the utilisation rate. It stated that:

- Dividend drop off studies only estimate the value weighted utilisation rate around two days, the cum-dividend and ex-dividend dates. This means that the estimate focusses only on investors around those days, and not the average across the year. This links to the AER's argument about marginal investors.
- There are significant econometric challenges when using dividend-drop off studies. For example, one issue is that these studies may not accurately separate out the effect of taxation incentives associated with imputation credits on the share price change.[68]

The ERA maintained its position on using the equity ownership method in the 2022 Final gas rate of return instrument.

The QCA considers that the interpretation of the utilisation rate as a market value is not consistent with the conceptual framework they are applying (the Officer CAPM framework). The market value is not a direct measure of the proportion of imputation credits distributed to shareholders. Furthermore, the QCA noted that the value of imputation credits cannot be directly observed in such studies, and any estimate will reflect a range of other effects – such as varying tax rates, transaction costs, tax arbitrage activity, and risk – making it a complex and challenging task to isolate these individual effects.[69]

These considerations do not provide strong evidence to deviate from the equity ownership method. Accordingly, we consider that the equity ownership method is a reasonable approach to estimating the utilisation rate – which has also been the ACCC's approach previously.

3.3.2. Recommendation

We recommend adopting a gamma value derived from estimating the distribution rate using financial accounts and theta using the equity ownership approach. [70] For this draft report, we have not sought to re-estimate gamma but rather propose to adopt a value from recent regulatory precedent. The AER's 2022 Rate of Return Instrument

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[65] In the AER's 2013 Rate of Return instrument, the market value studies do not align with the conceptual definition of utilisation rates – primarily because it reflects only those investors holding the shares around the time the dividend is distributed meaning the sample of investors holding imputation credits around the ex-dividend date differs systematically from the relevant population and the price behaviour around the dividend date may reflect a number of incentives separate from the taxation incentive.

[66] This alternative interpretation presented by Professor Lally was discussed by the AER in the 2013 Rate of Return Instrument. See p.175

[67] AER (2023), Rate of Return Instrument, Explanatory Note, p. 240-243

[68] ERA (2015), Review of the method for estimating the Weighted Average Cost of Capital for the Regulated Railway Networks – Final Decision, p. 180

[69] QCA (2024), Rate of return review – Version 4 p. 106

[70] Clause 2G.7.4 of the NBN SAU stipulates a gamma of zero be used for NBN's tax building block under certain circumstances. We understand that this relates only to the tax building block and have adopted a positive gamma value for calculation of MRP for NBN's WACC.

provides a recent gamma estimate following the approach that we recommend. For the final report we will consider updating gamma for new data.

3.3.3. Estimate

Consistent with the recommended approach, we adopt a gamma of 0.57 that reflects:

- A distribution rate of 0.88 which is informed by the top 50 ASX listed firms.
- A utilisation rate of 0.65 which is informed by the percentage of domestic equity ownership, calculated using ABS data.[71]

[71] Currently rounded off to 2 decimal places. In practice, the AER recommends using the full unrounded figures – i.e., 0.878670689 for the distribution rate and 0.647450918 utilisation rate.

4. SECTOR-SPECIFIC PARAMETERS

This section sets out the sector-specific estimates that we propose to apply to the ACCC's NBN SAU and voice interconnection decisions. The sector-specific parameters are:

- Beta
- Gearing
- Cost of debt

While we have been asked to produce numerical estimates for two specific services, the ACCC is seeking to develop a general WACC methodology which could be applicable to other industries that are subject to ACCC regulation and/or oversight. As these parameters are specific to the sector being examined, the numerical estimates themselves will have limited relevance to other industries that the ACCC has a role in. However, in each case the overall approach can be implemented with another sector in mind. For example:

- For beta we set out a five-step process which can be replicated for another sector. Nonetheless, the relevance of comparators is a clear area of judgement, and this will need to be informed by the circumstances of the sector and decision being made.
- For gearing we place emphasis on the average gearing of the comparator set. This is a methodological decision that can be applied to other sectors.

For the cost of debt, we focus on first establishing an appropriate credit rating and then consider how to produce a numerical estimate at this credit rating. This high-level approach and parts of the implementation methodology (such as which data providers to use) has applicability to other sectors.

4.1. BETA

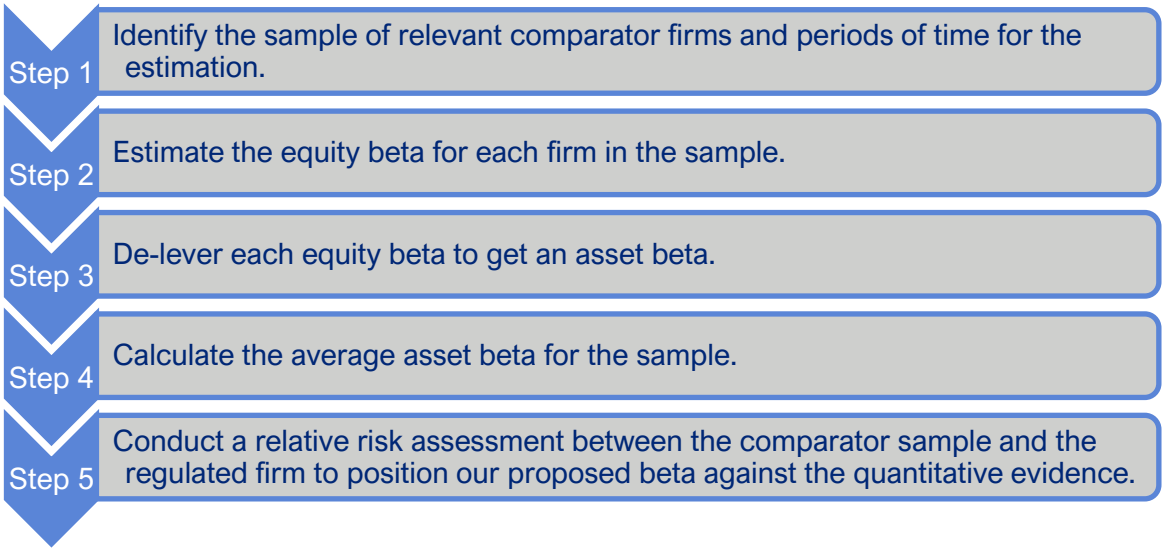
A stock's equity beta is a measurement of its exposure to systematic risk. This refers to risks that cannot be diversified away by holding a broader portfolio of assets. In the capital asset price model (CAPM - the model most commonly used by regulators for pricing the equity of regulated firms) the equity beta captures all systematic risk exposures that are relevant for pricing the firm's equity.[72]

The asset beta controls for the equity risk impact of the firm's capital structure – this makes it possible to compare systematic risk exposure across companies with differing levels of gearing.

In this report we provide asset beta estimates applicable to two regulated services – NBN SAU and voice interconnection. For each service we propose to apply a five-step process to determine our recommended asset beta as shown in the figure below.

[72] See Section 5 on cost of equity.

Figure 4.1: Steps in estimating beta



Source: CEPA

Where appropriate, we refer to recent regulatory precedent from Australian and New Zealand regulators when coming to our recommended approach. We have considered the New Zealand Commerce Commission as regulatory precedent in this section, as they have had to make cost of capital decisions recently for a telecommunications company with features similar to NBN (Chorus). While their decision-making may not be considered well-accepted in Australia, they are a regulator that has had to consider the appropriate steps to creating a comparator sample for a telecommunications service provider with NBN like features. We consider this informative.

Implementing the CAPM requires an estimate of a forward-looking beta. However, we are only able to observe historical data on company stock and market returns. As is common in both regulatory and financial practice we use this historical data to develop our estimate. This embeds an implicit assumption that the past will be the same as the future - in other words, that beta is stable.

A key challenge in assessing beta for regulatory purposes is the interpretation of historical beta estimates that inevitably fluctuate over time, due to outlier observations, macroeconomic developments, and the revelation of company-specific information that impacts on pricing, and therefore estimates of beta. A robust assessment of regulatory beta must assess not just which companies are relevant comparators, but also which time periods provide the most relevant evidence on the market pricing of forward-looking systematic risk exposure.

In our experience, this means that highly mechanistic approaches to estimating beta – such as reliance solely on cross-company averages of spot estimates – may miss relevant nuance. Our approach seeks to capture this nuance by collecting quantitative evidence on a wide array of potentially relevant comparators for NBN Co and its regulated services, and then using a qualitative relative risk assessment to triangulate our proposals within the quantitative range.

4.1.1. Assessment of options

This subsection sets out the key methodological decisions needed to estimate an asset beta for regulatory purposes. We begin by describing our proposed comparator selection process, including collating a shortlist of comparable firms, as well as options for further refining the comparator set by geography and liquidity. We present a range of potential options for filtering by liquidity and geography.

Shortlist and comparator selection approach

Typically implementation of the CAPM for regulatory purposes requires the collection of historical share price data for a sample of listed comparator companies with a similar systematic risk profile to that of the regulated company. The betas estimated for these listed companies can then be used to inform what the regulated company's true beta

might plausibly be. This procedure is especially important in the event that the regulated company does not have listed shares.

General principles of comparator selection

In practice, 'pure-play' regulated businesses are seldom listed. When providers of a regulated service are listed, their equity valuations frequently reflect expected cashflows from other, non-regulated business lines.

In the absence of ideal pure-play comparators, other comparators must be selected that as closely as possible approximate the systematic risk profile of the regulated business.

In Table 4.1 below, we present a selection of potential systematic risk factors that are frequently considered when selecting a comparator set. This list consists of those risk factors identified by Frontier Economics in its recent advice to NBN Co[73], as well as an additional relevant risk factor. We do not consider all of these risk factors to be relevant in this context, and discuss the relevant considerations as part of our relative risk assessment below.

Table 4.1: Commonly-cited systematic risk factors and how they may impact systematic risk exposure.

Risk Factor	Systematic risk exposure
Demand	Services with relatively higher income elasticity of demand are expected to have higher asset betas, as their demand is more sensitive to fluctuations in overall economic conditions.
Growth opportunities	Companies for which future growth opportunities account for a higher share of value – such as new entrants to the market – may face greater systematic risk and have higher asset betas.
Operating leverage	Operating leverage represents the ratio of fixed costs to variable costs. Companies with a higher proportion of variable costs to fixed costs are better able to adjust their variable costs as economic conditions change – this reduces the volatility of profits in the face of systematic shocks, and is therefore beta-reducing.
Asset stranding	Asset stranding risk refers to the risk that a change in market conditions may result in an asset becoming economically unviable.
Company size	Company size is frequently cited as a determinant of beta, insofar as small companies with fewer resources and weaker overall cashflows may be more susceptible to systematic downturns, leading investors to demand a 'small-company premium' to hold their equity. Nonetheless, the evidence that company size does drive beta remains limited.
Long-lived investments	Companies that are expected to recover large investments over a longer period of time may face greater uncertainty over future cash flows in the face of systematic shocks.
Mix effects and cross-country differences	Companies with a wide geographic footprint may have different systematic risk exposures and challenges to interpretation: • Companies operating in countries other than Australia may be exposed to different systematic shocks than an Australian company. • Companies that earn a large share of revenues outside of their home countries may be subject to different systematic shocks than a company operating wholly within their domestic markets, driving lower return covariances and beta estimates..

Source: CEPA Analysis

Many of these risk factors are unobservable, making it difficult to explicitly select companies on this basis. As a result, regulators and practitioners tend to select companies on the basis of more observable characteristics which, in principle, are correlated with or can proxy for these risk factors.

[73] Frontier Economics (2022), "Return on capital and inflation", available here

Commonly-used observable characteristics used to select relevant companies include:

- **Country of domicile and geographical share of revenues** – firms which operate in similar markets to the regulated service are likely to have similar demand compositions, regulatory structures, macroeconomic and investment environment characteristics, and exposure to systematic shocks.
- **Industry share of revenues** – firms which operate in similar industries to the regulated service are likely to have similar profiles for operating leverage, company size, contracting arrangements, asset stranding risks and operational growth outlooks.
- **Company size –** as measured by enterprise value, total assets, or other metrics.

Australian regulators have tended to agree on this broad approach, but differ widely in their overall approach to finding a list of comparable companies – see the subsection below which provides a review of what we classify as 'narrow' and 'broad' approaches to filtering for the above characteristics.

Filters for observable characteristics like geographic footprint and sector are imperfect proxies for the underlying systematic risk drivers. Regulators also frequently apply filters for liquidity and overall data robustness at this stage, though this relates less to underlying systematic risk factors than to the robustness of the firm's share pricing data. We discuss this in greater detail later in this section.

Regulatory approaches to comparator selection

We can classify the approaches used by regulators and practitioners in Australia and other jurisdictions as either "narrow" or "broad."

Narrow approaches to comparator selection embed the view that companies from other countries and sectors are inappropriate for inferring the beta of Australian regulated firms. Regulators that support this view (in particular the AER) argue that inference regarding foreign betas is distorted by cross-country differences in a) equity market indices, and b) the operational and systematic risk profile of international firms. AER also views evidence from other sectors as being inappropriate, while both ESCOSA and OTTER have, in previous water sector determinations, chosen to rely on AER energy sector beta estimates rather than consider foreign water company evidence.

Broader approaches to comparator selection have become more popular among Australian regulators, acknowledging the progressively declining number of listed domestic pure-play comparators in most regulated sectors. These approaches commonly rely on comparators from other sectors and jurisdictions, and often involve applying filters to a broad long-list of global comparators to identify a list of companies with similar systematic risk exposure to the regulated firm. IPART and QCA have in particular advocated for this approach.

We present in Table 4.2 below a review of recent precedent on approaches to comparator selection, including the characteristics used by the different regulators to assess 'comparability' to the regulated service in question.

Table 4.2: Regulatory approaches to comparator selection

Regulator	Regulated Service	Broad or Narrow?	International Companies included?	Similar Sectors included?	Other Considerations
AER	Energy	Narrow	✗	✗	Includes de-listed Australian energy firms rather than foreign or other-sector comparators.
ACCC	Postal Services	Broad	✓	✓	Comparators weighted according to their sector's share in the regulated service's cost structure.
ERA	Transport (rail)	Broad	✓	✓	Includes recently de-listed comparators.

Regulator	Regulated Service	Broad or Narrow?	International Companies included?	Similar Sectors included?	Other Considerations
ESC	Transport (ports)	Broad	✓	✓	None listed.
ESCOSA	Water	Narrow	✗	✓	Relies on AER's beta estimates for domestic energy firms.
IPART	General	Broad	✓	✓	50% revenue share for nominated industry, liquidity filters, potential to include de-listed companies.
OTTER	Water	Narrow	✗	✓	Relies on AER's beta estimates for domestic energy firms.
QCA	General	Broad	✓	✓	70% revenue share for regulated activity. Market power and vertical integration, regulation, customer base, contracting arrangements, growth options, operating leverage, liquidity filters.
NZCC	Telecoms	Broad	✓	✓	50% revenue share for telecoms industry, liquidity filters.

Source: CEPA Analysis

We observe a notable lack of consensus among Australian and New Zealand regulators, but note that, on balance, regulators have opted for broader comparator samples that incorporate evidence from a range of countries and sectors.

Summary of our proposed approach to comparator selection

In this report we are aiming to produce estimates of beta for NBN SAU and voice interconnection – these services may have different systematic risk profiles, as discussed in the relative risk assessment below.

Given that NBN Co itself is not listed, and no 'pure-play' domestic comparators exist, we consider adopting a broad approach has several advantages, including expanding the set of comparators, increasing the robustness of the estimated betas (in other words, reducing the impact of outlying beta estimates), and potentially capturing the wide variety of factors that drive the correlation of stock and market returns, including not just broad industry classification and geographical footprint, but also characteristics such as contracting profiles and demand composition.

While a broad approach will inevitably capture some risk pricing that is not directly relevant to the regulated firm in question, it may more effectively capture the relevant risk characteristics than a narrow approach and will not be overly sensitive to the less relevant risk characteristics. Finally, these factors should be considered as part of a relative risk assessment – where there is good reason to suspect a material difference in risk profile between the comparators and the regulated firm, this can factor into the positioning of the regulatory beta against the range of quantitative evidence.

We propose the following approach:

- Identify the broadest possible set of telecommunications sector comparators on the basis of broad Level 3 Bloomberg Industry Classifications (BICS) categories.
- Identify telecoms service lines that most closely approximate the services offered by NBN SAU and voice interconnection services, (on the basis of more granular BICS categories).

- Apply a conservative filter for firm size.
- Apply other filters intended to ensure a minimum level of robustness within the comparator set, including for liquidity and the removal of comparators with characteristics that would be considered unrepresentative of NBN Co and voice interconnection service providers.
- In principle, both regulated and unregulated companies may be suitable as comparators, as the goal of most forms of economic regulation is to expose regulated companies to risks commensurate with competition. However, regulated companies may be closer comparators on balance. The extent of any relative risk differential will depend on the precise form of regulation and associated risk-sharing mechanisms. This can be considered as part of the relative risk assessment.

This approach, which we discuss in greater detail below, is in line with the "broad" approaches to comparator selection described in Table 4.2 above, including those applied or accepted by IPART, NZCC, QCA, and the ACCC.

We first produce a shortlist of 123 global companies. We then present options for further filtering this shortlist on the basis of geography and liquidity. The four-step shortlist selection process is summarised in Table 4.3 below

Table 4.3: Core comparator selection filters

Filter applied	Number of companies in the sample
Step 1: Bloomberg sample of telecommunications companies (including tower owners, cable, and satellite operators.)	605
Step 2: Exclude companies that: • Are over-the-counter (OTC) listed • Primarily operate data centres or sell mobile handsets and devices.	382
Step 3: Exclude companies with market cap below US$150m at 31 March 2025.	242
Step 4: Exclude companies that: • Have implausibly high or low 5-year gearing[74] • Have fewer than five years of trading history • Primarily operate mobile satellite networks, or otherwise do not operate a telecommunications network • Earn a low share of revenue from telecoms or are largely-owned[75] by another company in the sample • Frequently have zero traded volume[76] • Are under sanctions of any kind • Are involved in a significant M&A action that appears to distort the firms' estimated beta.	123

Source: CEPA Analysis

[74] We exclude companies with 5-year average gearing above 200% or below -200%, on a net-debt basis.

[75] Where there are significant ownership relationships between sample companies, we exercise judgement when deciding which to retain for the sample. In cases where a large conglomerate owns a subsidiary network operator (and other non-telecoms businesses) we prefer to retain the telecoms subsidiary. In cases where the owning company is also a telecoms network operator, we prefer to retain the owning company.

[76] We remove companies whose shares trade at zero volume on over 20% of sample days during the last five years.

Under **Step 1**, we used Bloomberg Industry Classifications (BICS) to identify a large sample of potential telecommunication sector comparators from around the world.[77]

We consider the following telecommunication sector comparators to be potentially informative for NBN SAU and voice interconnection services:

- We consider **mobile tower companies** to be relevant comparators – these companies own communications network infrastructure and on-sell services provided over this infrastructure to telecommunications service providers. In this sense, we consider the nature of their business to be similar to (wholesale) fibre providers, making them appropriate for inclusion within the comparator set, especially for NBN SAU.
- Previous CEPA analysis[78] has indicated that **satellite operators** can be divided into "fixed" and "mobile" classifications, with the former operating large, typically stationary or fixed ground terminals, and the latter primarily offering voice and data services in regions where terrestrial services are not available. We consider that fixed satellite operators (i.e. operators that offer wholesale access to satellite networks based on large fixed ground terminals) are most likely to approximate the characteristics of a wholesale telecommunications network in this regard – we therefore include fixed satellite operators and exclude mobile satellite operators, on the basis of high-level desk research.
- As a provider of wholesale fibre services, the two **wholesale fibre operators** (Chorus Fibre Ltd. In New Zealand and Netlink NBN Trust in Singapore) are a relevant reference point for NBN Co.
- There are a large number of global **vertically-integrated telecoms network operators** that own their own networks and sell services on both a wholesale basis to resellers and on a retail basis directly to consumers. We classify these as either **fixed-line telecoms** comparators or **mobile telecoms** comparators on the basis of BICS classifications[79], though these appear to be imperfect classifications – it is common for these vertically-integrated comparators to offer both fixed-line and mobile services, as well as other telecoms-related services. Relatedly, there are very few vertically-integrated companies that are 'pure-play' in terms of either fixed-line or mobile network provision, and we have not at this stage sought to identify those companies.

While NBN Co may bear some resemblance to regulated network utility providers of energy and water services, we consider that NBN is likely to have materially higher exposure to systematic demand risk than these companies, which is a key driver of beta risk for regulated firms. At the same time, its operating leverage and exposure to systematic asset stranding risk may be slightly higher. On balance, it is likely that regulated utility networks have a materially lower systematic risk exposure than NBN Co, and we do not propose to include these companies in the comparator sample. We discuss these issues in greater detail as part of the relative risk analysis below. We do, however, consider network utility betas to be a sensible cross-check for our final results.

On the basis of high-level desk research into company financial disclosures, we have made some adjustments to the BICS categories. Many fixed-line network operators are classified as cable companies by Bloomberg. We have applied judgement and high-level desk research to distinguish between companies offering fixed-line cable networks (which we classify as fixed-line operators for purposes of this note) and satellite operators. We have also

[77] This consists of all companies with the BICS Level 3 codes "Telecommunications" and "Cable & Satellite". To identify tower operators, we include relevant companies with the BICS codes "Infrastructure Construction", "Infrastructure REIT," and "Telecommunications" whose Bloomberg company descriptions contain the word "tower", as well as tower companies included in previous CEPA telecoms comparator samples for the NZCC. This approach yields a longlist of 605 listed companies.

[78] CEPA (2019) *"Cost of capital for regulated fibre telecommunication services in New Zealand: Asset beta, leverage, and credit rating"*, available here.

[79] We classify the BICS categories "Wireline Telecommunications" and "Wireless Telecommunications" as fixed-line and mobile, respectively.

classified Gamma Communications PLC as a mobile telecommunications provider, rather than a satellite provider, despite its BICS classification.

Step 2 removes OTC-listed shares[80], which are likely to be highly illiquid. We have also removed firms with insufficient trading data using a 5-year cutoff. As outlined in Table 4.6 below we observe that in Australia it is common for regulators to estimate 5-year and 10-year betas and therefore we have used 5-years as a cut-off.[81]

For **Step 3,** we establish a conservative lower-bound for the value of comparators' market caps, noting that higher market cap thresholds may be justifiable in this context. This is done as a proxy to efficiently create a shortlist with companies of a similar scale to NBN and firms providing voice interconnection services (see Box 3 below).

Box 3: Market cap of regulated firms

Company size has been raised in various regulatory processes as an efficient proxy for characteristics that may be correlated with differences in the underlying systematic profile.[82] The two types of service provider we are specifically interested in are NBN Co. and telecommunications providers in Australia that provide voice interconnection services. Aligning the market cap filter with the relative scale of these providers may be advantageous. We observe that:

- NBN's closing nominal RAB in 2022/23 was $AUD 30.4 billion.[83] The equity portion of this RAB depends on the assumed gearing, but any plausible value is well in excess of $USD 150 million.
- Telstra's market cap is approximately $AUD 50 billion and TPG's is approximately $AUD 10 billion.

These suggest that a $USD 150 million market cap is very conservative relative to the scale of these companies. It is also consistent with the market cap threshold applied by the QCA[84].

On the basis of high-level desktop research and BICS classifications, for **Step 4** we have removed sample companies with implausible levels of gearing, that earn a low share of revenue from telecoms, or that are largely-owned by another sample company. We assume that for both NBN SAU and voice interconnection the benchmark provider is likely to earn a large share of revenues from the telecoms business, and is unlikely to adopt extreme levels of gearing in the long term. We therefore consider companies with implausibly high or low levels of gearing (greater than 200% or less than -200% on a net debt basis) and companies that earn less than 70% of total revenues from telecoms are likely to be unsuitable comparators. In particular, some of the companies identified in the longlist are large conglomerates, which may earn only a share of their revenues from the provision of telecoms network services. A telecoms revenue threshold of 70% ensures that the predominant source of our comparators' revenue is earned from the services of interest, without being so restrictive that it becomes difficult to construct an adequate sample.

In situations where one company is largely-owned by another sample company, the subsidiary's business is reflected in its own beta as well as that of its owner. To avoid double-counting, where longlisted companies have a significant stake (in excess of 20% of shares) in another sample company, we exercise judgement as to whether the owner or the subsidiary more closely resembles the regulated activity[85].

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[80] Instead of being traded on a centralised market, OTC shares are typically traded bilaterally. OTC-listed shares are therefore unlikely to be a robust comparator for more liquidly-traded stocks.

[81] TPG, a listed Australian telecommunications service provider, just fails the 5-year cut-off requirement and has not been included.

[82] For example, Frontier on behalf of NBN lists company size as a risk factor Frontier (2022), Return on capital and inflation.

[83] NBN (2023), Public version: NBN Co 2009-2023 core services building block model.xlsx.

[84] Queensland Competition Authority (2024), *"Rate of return review, Version 3"*, Available here

[85] Where the ultimate parent company is a conglomerate that earns its telecoms revenue solely through the subsidiary, we would retain the subsidiary as long as enough of their shares are floated (for example, we retain 1&1 AG instead of United Internet AG

We also apply a conservative liquidity filter as we consider a 20% non-trading day filter to be a low bar for inclusion. We consider further stricter liquidity filters below. Finally, we have removed companies that do not operate telecommunications network infrastructure, including data centres, mobile device sellers, mobile satellite operators, and other telecoms resellers.

The above filtering steps result in a shortlist of 123 companies, spanning several geographies and business activities. In particular, our sample includes tower operators, fixed and mobile telecoms network operators, and fixed satellite operators [86].

The sample includes three companies from Australia and New Zealand – these are Chorus Ltd. (a wholesale fibre provider), Superloop Ltd. (classified by Bloomberg as a fixed telecoms provider), and Telstra Group Ltd. (classified by Bloomberg as a mobile telecoms provider).

The table below presents how this shortlist is broken down by geography and comparator subgroup.

Table 4.4: Shortlist breakdown by comparator and sub-industry classification

Count	Towers	Fixed Telecoms	Fixed Satellite	Mobile Telecoms	Wholesale Fibre	Total
North America	4	10	-	6	-	20
Asia Pacific (Emerging)	8	14	-	17	-	39
Western Europe	4	6	2	16	-	28
Asia Pacific (Developed)	-	4	-	9	2	15
Middle East & Africa	-	2	-	9	-	11
Eastern Europe	-	2	-	3	-	5
Latin America & Caribbean	-	2	-	3	-	5
Total	16	40	2	63	2	123

Source: CEPA analysis

This shortlist features 20 wholesale[87] comparators, including 16 tower operators, two fixed satellite operators, and two wholesale fibre operators.[88]

because 1&1 is United Internet's only source of network telecoms revenue). If the ultimate parent is a sufficiently 'pure-play' telecoms service provider, which has multiple sources of revenue related to telecoms network provision, we will retain the parent instead of the subsidiary (for example, we retain Orange SA rather than its subsidiaries Orange Belgium and Orange Polska).

[87] Wholesale communication service providers own communications network infrastructure, deploying these assets to provide wholesale service to third parties, who in turn serve end users. These operators may feature lower exposure to fluctuations in retail demand, relative to vertically-integrated service providers.

[88] The wholesale fibre operators are Chorus Fibre in New Zealand, and NetLink Trust in Singapore.

Bloomberg's BICS categories are an imperfect classification for the activities of a business. This is especially true in the context of telecoms, in which many vertically-integrated network operators provide a variety of telecoms technologies and services. Firms that are classified as "fixed" may have substantial mobile networks and vice-versa, and it is therefore difficult to robustly distinguish between the risk profile of these activities based on the evidence available. That said, BICS classifications appear to broadly reflect the majority of a firm's revenues, and we therefore consider there to be value in high-level application of these categories.

Liquidity filtering options

We consider it important to screen candidate comparators for sufficient liquidity, by testing that the shares of the comparators are traded frequently and in sufficiently high volumes that the observed prices are likely to incorporate all relevant information on the trading date. If shares are illiquid, they may react more slowly to new information than the market index, which might result in downward-biased estimates of beta.

Our methodology has already mitigated this risk in two ways. Firstly, by placing weight on lower-frequency beta estimates (weekly and four-weekly) we reduce the likelihood that day-to-day illiquidity biases our estimates. Second, we include a conservative liquidity filter in the construction of the shortlist that removes companies that trade with zero volume on 20% or more of sample dates.

However, it may be that adoption of a stricter liquidity filter can improve the robustness of our estimates. We consider results under two further liquidity screening tests, both of which look at liquidity over the 5 years preceding 31 March 2025:

- A test based on bid-ask spreads[89], which removes companies whose average bid-ask spread is higher than 1%.
- A test based on the share of free float, which removes companies whose average share of free float is less than 30%.

A breakdown of the number of comparators by subgroup implied by the above filters are shown in Table 4.5 below, in comparison with the full shortlist.

Table 4.5: Number of comparators by liquidity filtering option

Liquidity Filter	Total	Towers	Fixed Telecoms	Fixed Satellite	Mobile Telecoms	Wholesale Fibre
Full shortlist	123	16	40	2	63	2
Bid-ask Spread	105	14	31	2	56	2
Free float	93	15	31	1	44	2

Source: CEPA analysis of Bloomberg data

We find that, for the most part, liquidity filtering serves to reduce the number of vertically-integrated comparators in the sample.

Comparison with regulatory precedent

Liquidity filters are less commonly applied by Australian and New Zealand regulators. IPART and the QCA have both applied liquidity filters in recent determinations. In particular, they screen out observations with high Amihud

[89] The bid-ask spread is the percentage difference between the asset's bid and ask prices. It is a commonly-used indicator for market liquidity, and 1% is a common "rule of thumb" for deciding whether or not a market is liquid.

measures[90,91,92] However, we note that the QCA concludes that a market cap threshold similar to the one we apply is sufficient to ensure liquid trading.

Recommendation

Our preferred approach is to adopt a liquidity filter based on bid-ask spreads. While bid-ask spreads are directly interpretable as a transaction cost faced by traders, the Amihud measure is more abstract, and captures a stock's price sensitivity to trading volume. We consider that a filter based on bid-ask spreads is conceptually well-founded and based on a liquidity threshold that is widely applied and understood by financial practitioners. Furthermore, while companies with a very low share of free float may suffer from liquidity issues, it is less clear what free-float threshold distinguishes liquid and illiquid shares.

We do however observe that a 1% threshold (or indeed any such threshold) may be arbitrary. Nonetheless, there are examples of 1% being applied[93] and this may be considered a reasonable cut-off.

Geographical filtering options

Australian regulatory precedent is split on the question of applying geographic filters to narrow the list of beta comparators.

Our view is that, while there can be substantial conceptual difficulties with comparing beta across countries on a like-for-like basis, the lack of sufficient domestic comparators necessitates broadening the sample to foreign comparators.

Conceptually, betas do not require an adjustment for country-specific risk premia, as in the CAPM the market beta is 1 by definition. Whether beta estimates from other jurisdictions can be applied hinges on whether there are cross-country differences in how risky telecoms firms are relative to the broader domestic market. On balance, we consider that betas for foreign companies estimated against foreign markets can be relevant as long as these cross-country differences are considered carefully within the comparator selection process and relative risk assessment.

In the context of a geographic filter relevant to the telecommunications sector we have identified four key channels through which relative risk differentials may impact estimated betas:

- **Growth options and operating leverage**: The telecoms industry in recent years is characterised by rapid change. Roll-out of the most cutting-edge technologies (Fibre-to-the-Premises, or FTTP) is at varying stages of development in different countries around the world. Companies in countries undergoing a significant investment programme to improve their domestic telecoms networks may have a different systematic risk profile than in countries that are earlier in the process of fibre roll-out.
- **Demand**: Companies operating networks in countries with different levels of aggregate income may face a different composition (and elasticity) of demand, which may impact the exposure to systematic risk.
- **Regulatory arrangements and risk sharing:** Differences in domestic policies such as subsidies, risk-sharing mechanisms, and economic regulation arrangements may also increase the challenge in comparing Australian companies to international comparators.

[90] The Amihud measure is a liquidity measure that calculates the ratio of a stock's return to its dollar trading value on a given day. A higher value suggests a greater price movement per unit of trading volume and by extension low liquidity and vice versa.

[91] IPART (2020), *Estimating Equity Beta,* Available here

[92] QCA (2024), *Rate of Return Review Version 3.* Available here

[93] For example, the NZCC has previously accepted a liquidity filter based on a 1% bid-ask spread threshold – see NZCC (2020), available here and CEPA (2019), available here. Ofcom in the UK has also previously relied on a 1% threshold for bid-ask spreads – see Brattle (2021), "*Cost of Capital: Beta and Gearing for WFTMR 2021"* (available here)

- **Composition of the local market index:** If market indices in certain countries place greater weight on utility-like companies, estimated betas for a utility in those markets might be higher. All else equal, markets with similar compositions to the Australian market will be better comparators.

These factors motivate the consideration of a geographic filter to improve the relevance of our comparator set. We elaborate further on each channel in the sub-sections below.

We assess four different filtering options:

- No geographic filter
- A filter that uses Bloomberg region classifications to include companies that earn a majority of their revenues and are domiciled in developed economies[94] (the "BICS Developed economies filter")
- The filter applied by Frontier economics for NBN's last beta proposal and by the NZCC for Chorus Fibre[95] (the "NZCC/NBN filter")
- A filter that includes only companies domiciled in Australia and New Zealand

We present the number of comparators for different sub-industry groups by geographic filter in the table below.

Table 4.6: Number of comparators by geographic filter

Geographic filter	Number of firms	Towers	Fixed Telecoms	Fixed Satellite	Mobile Telecoms	Wholesale Fibre
All shortlist (after liquidity filtering)	105	14	31	2	56	2
BICS developed economies filter	54	7	15	2	28	2
NZCC/NBN	51	7	13	2	27	2
Australia/NZ	3	0	1	0	1	1

Source: CEPA analysis of Bloomberg data

Both the BICs developed economy filter and the filter applied by the NZCC exclude companies whose Bloomberg domiciles are in a) the emerging Asia Pacific, b) Latin America and the Caribbean, and c) the Middle East and Africa. The main difference between the two is that the NZCC/NBN filter omits comparators from Hong Kong and Taiwan.

We consider that our assessment using these criteria supports the BICS developed economy filter, though the indicators we present below are not intended to be exhaustive.

For reference, we have included average asset beta estimates by country in Table 6.5 in Appendix C.

Demand composition

A higher share of pre-paid customers in emerging regions might drive higher exposure to systematic risk relative to the market for telecoms firms in these regions. This is due to the relatively less contracted nature of pre-paid

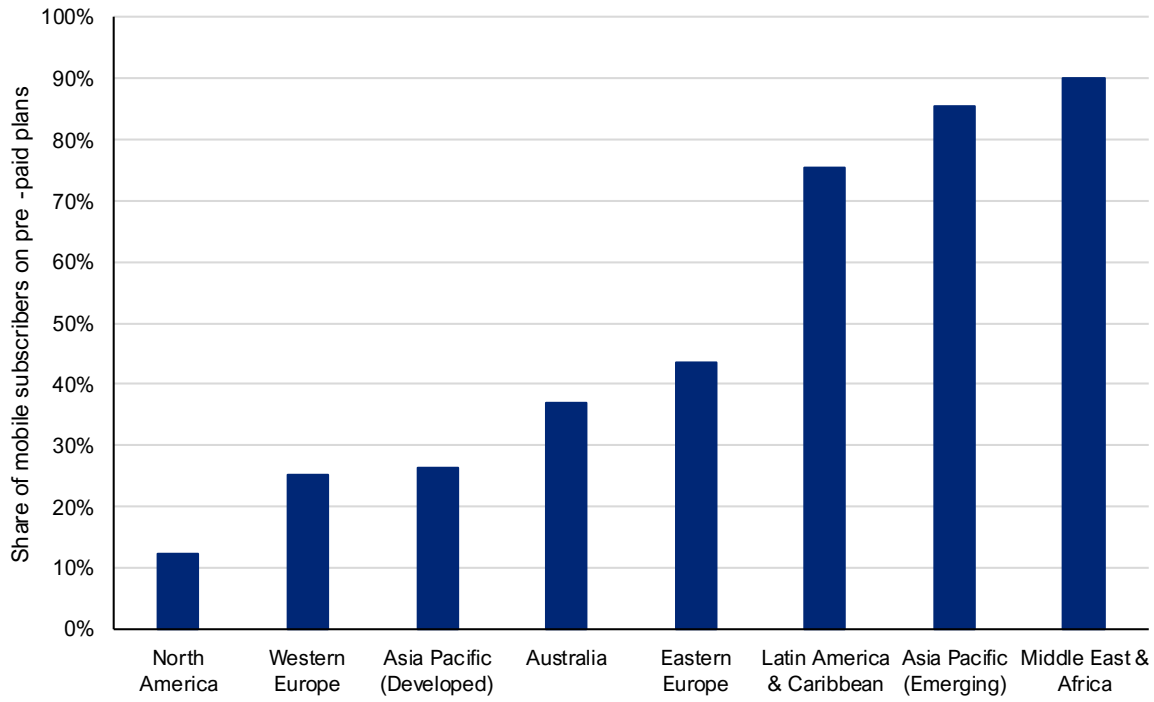
[94] Specifically, this filter includes the Bloomberg classifications for North America, Western Europe, Eastern Europe, and Asia Pacific (Developed). The latter consists of Australia, Hong Kong, Japan, New Zealand, Singapore, South Korea, and Taiwan.

[95] This filter includes New Zealand, Australia, Japan, Singapore, South Korea, North America, Western Europe, and Eastern Europe.

revenues, which offers pre-paid consumers greater flexibility to reduce or stop their service in the face of income fluctuations.

In the figure below, we present the share of mobile subscribers on pre-paid subscriptions:

Figure 4.2: Share of mobile subscribers on pre-paid plans



Source: CEPA analysis of International Telecommunication Union data[96].

This analysis suggests that networks in emerging regions are exposed to significantly higher numbers of pre-paid than post-paid subscribers. Pre-paid subscribers may have a higher price elasticity of demand, and have greater contractual flexibility to reduce consumption of telecoms services in the event of an economic downturn.

This may contribute to the material reduction in the mobile operator asset beta we see after excluding companies in emerging regions.

Network roll-out progress, growth options and operating leverage

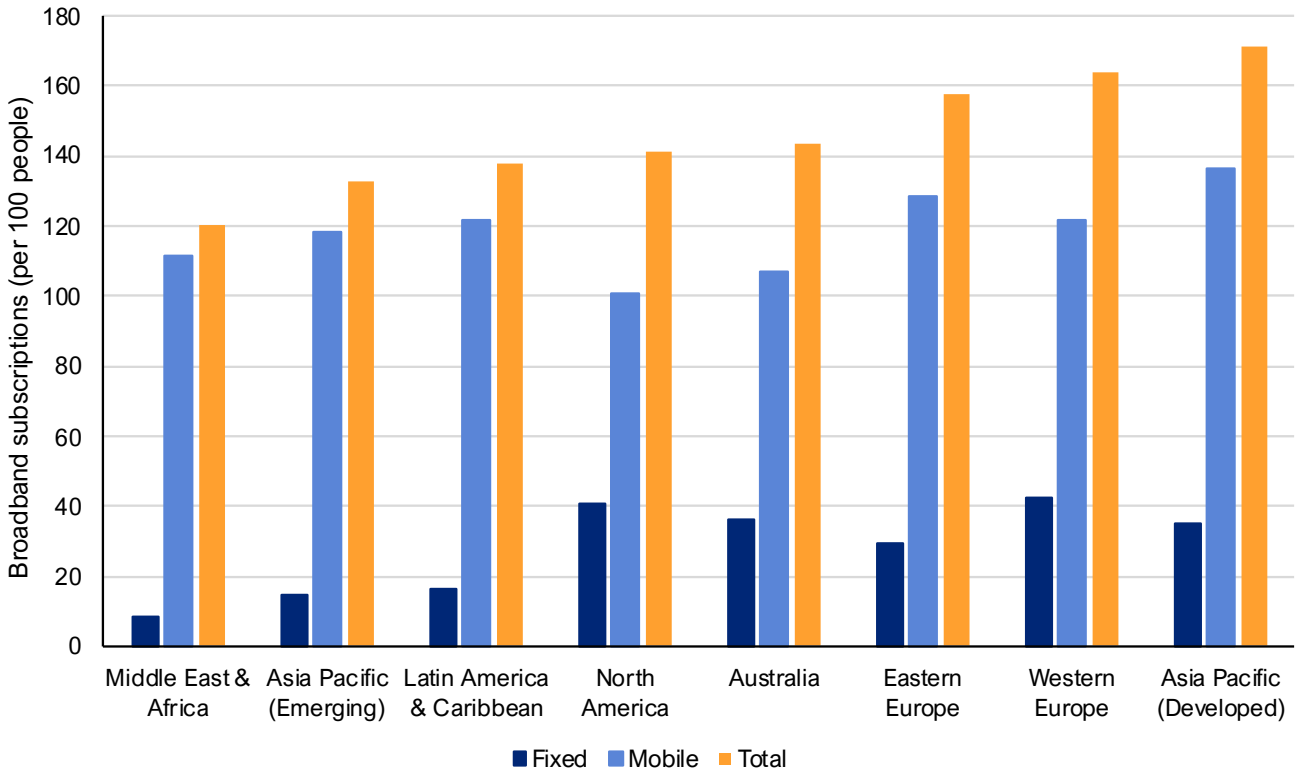
The estimated betas for telecoms networks in developing companies may be reflective of the investment and growth outlook for these regions. Networks in developing regions may, on average, be in an earlier stage of roll-out for cutting edge broadband technologies. The accelerated pace of expected future investment in these networks may:

- Have direct impacts on telecoms equity valuations that are not present in developed markets, which may feed through into asset beta estimates and;
- Drive higher levels of operational gearing and higher systematic risk exposure for firms in developed markets.

The figure below presents broadband subscriptions per 100 people in each of the BICS regions we consider.

[96] International Telecommunication Union, accessed 24 April 2025, available here.

Figure 4.3: Broadband subscriptions per 100 people



Source: CEPA analysis of World Bank data.

This analysis shows that, as far as total broadband subscriptions are concerned, there is a difference in the composition and volume of broadband penetration between emerging and developed markets. Emerging markets generally have higher levels of mobile broadband penetration (and many mobile subscriptions are pre-paid, which has implications for the composition of demand).

Insofar as the total number of broadband subscriptions per capita is correlated with the roll-out of the broadband network in each country, this suggests that there may be differences between emerging and developed markets in terms of their position within the roll-out cycle for cutting-edge generation technologies and the makeup of existing telecoms network service.

Expectations for future network roll-out are naturally priced into the equity valuations of listed telecoms firms, and where these expectations differ structurally between regions, this may drive structural differences in share pricing, which natural feed through into structural differences in estimated asset betas.

Furthermore, to take advantage of these growth opportunities, companies in emerging regions will have to undertake significant investment to enhance their network infrastructure. Materially higher levels of investment intensity could result in increased operating leverage for firms in emerging markets, relative to firms in developed markets. A higher ratio of fixed to variable costs may make firms in emerging regions more susceptible to systematic shocks.

Regulatory arrangements and risk sharing

Different forms of economic regulation may change the firm's systematic risk profile:

- Pricing flexibility can be impacted by regulatory arrangements that determine how the firms can adjust their prices in response to shocks.
- Exposure to demand risk may depend on whether prices or revenues are capped, whether under or over-recovery of allowed revenues can be recouped in future periods, and the presence of demand risk sharing mechanisms.

There is a wide variety of regulatory arrangements in emerging regions, which frequently do not align exactly with arrangements in Australia. For example, independent regulation is less common across South-East Asia than in developed regions.[97] This may have implications for the competitive neutrality of state-owned networks, and the risk of political influence over regulatory decisions, which feeds through into share pricing and estimated betas.

These arrangements can potentially influence the cost of equity (through beta) and the cost of debt (through differing levels of creditworthiness) and thus the WACC. We discuss these issues further in the relative risk analysis below.

Composition of the local index and overall investment environment

The composition of the local index used to estimate beta is a relevant factor when drawing inference from foreign betas.

If market indices in certain countries place greater weight on utility-like companies, estimated betas for a utility in those markets might be higher. All else equal, markets with similar compositions to the Australian market will be better comparators for Australian regulated firms.

Comparison with regulatory precedent

Australian regulators tend to agree that there are sound reasons to consider that comparators operating in different geographies may have different systematic risk exposures (and thus vary in their comparability to Australian regulated firms). However, there is no consensus across regulators on what filter to apply. We present below a review of recent regulatory approaches to geographical filtering by Australian and New Zealand regulators.

Table 4.7: Core comparator selection filters

Regulator	Markets included in beta sample (country of listing)	Rationale and criteria used
AER	Australia United States as a cross-check	Reviewed a range of potential comparators and found significant differences between international energy firms and Australian regulated energy networks, particularly in terms of firm characteristics.[98]
ACCC	Australia, NZ, USA, UK, Germany, Austria, Netherlands, Portugal, Belgium, Singapore, Malaysia, Japan	Not discussed, unclear if a country filter was applied.[99]
ERA	NZ, USA, Canada, UK	Consider jurisdictions that are most comparable to Australia with regard to regulatory, legal and institutional arrangements, and equity market size, depth, liquidity and informational efficiency. Prefers markets where companies disclose information in English, for ease of comparison.[100]
ESC	NZ, Greece, Taiwan, Singapore, Malaysia	Asset beta estimated from a sample of firms listed in markets classified as "developed" or "advanced emerging" by FTSE Russell.
ESCOSA	Not applicable. Beta estimate based on regulatory precedent.	NA

[97] OECD (2023), "Extending Broadband Connectivity in Southeast Asia", pp. 34, Available here

[98] AER (2023), p. 182.

[99] ACCC (2022), "ACCC view on Australia Post's draft price notification", Appendix A, pp. iii, Available here

[100] ERA (2022), p. 179.

Regulator	Markets included in beta sample (country of listing)	Rationale and criteria used
IPART	Europe, US, Chile, Brazil, Malaysia, India, Philippines, Hong Kong, Vietnam, Thailand	IPART "*seeks markets that approximate Australia's sovereign characteristics*". This includes considering if the government bond and equity markets are "*sufficiently deep and liquid*" and whether the firm's headquarters is consistent with their operating market.[101] IPART removes companies that are listed on Chinese, Russian and African stock exchanges.
OTTER	Not applicable. Beta estimate based on regulatory precedent.	OTTER expresses preference for Australian comparators. Considers that international comparators are less valid because their betas are calculated relative to their local market portfolio, the composition of which may differ significantly from the Australian market.[102]
QCA	Australia, US, Canada, UK, Italy, France	Consider that firms in developed countries are preferable as they are more likely to operate within a stable political and business environment and are subject to a well-developed system of property rights and legal protections. However, if there are not enough firms operating in developed countries, the QCA would investigate firms operating in developing countries to potentially generate a larger sample, having regard to country-specific factors that may make inclusion of certain firms unsuitable.[103]
NZCC	Australia, NZ, Spain, France, Germany, Switzerland, Thailand	Excludes comparators when it considers that their markets of listing are less comparable to the NZ market. Takes into account information from multiple sources, including Damodaran, the FTSE Equity Country Classification and the MSCI Market Classification. In practice gave most weigh to FTSE classification. The sample only includes markets listed as "developed" or "advanced emerging" by FTSE Russell.

Source: CEPA Analysis

We observe that the comparator samples in many recent regulatory decisions (except IPART) correspond to 'developed' and 'advanced emerging' country classifications of equity index providers (e.g., FTSE Russell, Bloomberg). The basis of and reasoning for these filtering decisions is not always made explicit. While the reasoning of these decisions may be different from ours, we consider that this precedent supports our proposed approach – that applying a country filter is appropriate.

Recommendation on geographic filter

The evidence presented above indicates comparators drawn from emerging economies may not be ideal comparators for NBN Co. This is due to differences in the characteristics of telecoms networks between advanced and emerging, cross-country differences in regulatory arrangements, and differences in financial market characteristics. While there is qualitative evidence for differences in these factors it would be difficult to quantitatively assess their impact. Overall, our analysis suggests that applying a geographic filter could be justified.

Our preferred approach is therefore to adopt a geographic filter that focuses on North America, Europe, and the developed Asia Pacific – we refer to this above as the "BICS developed economies filter."

[101] IPART (2019), *Estimating Equity Beta*.

[102] OTTER (2022), p. 92.

[103] QCA (2024), p. 85.

Relative risk assessment

There are relatively few 'pure-play' comparators for the services covered under the NBN SAU or voice interconnection. We have constructed a broad telecommunications comparator sample with 54 firms. To consider whether this broad sample has reasonably similar systematic risk to our two target services we undertake a relative risk assessment.

Our relative risk assessment is structured around key factors listed in Table 4.1 above. For each of these risk factors, we discuss how NBN SAU and voice interconnection services compare with our preferred sample of comparator companies.

Demand

Systematic demand risk exposure for a service is determined by the composition of its demand, the regulatory framework under which it operates, and its contracting profile.

Wholesale and retail demand

A potential difference between wholesale comparators and the vertically-integrated comparators is the extent to which they face retail demand, which may fluctuate more widely in response to systematic shocks. Wholesale services, which relate only to the underlying physical connection to the communications network, are typically provided on the basis of contractually-agreed long-term regular charges.

We are aware of the following features of NBN Co's business model:

- Retail Service Providers (RSPs) pay access rental charges in advance on a month-to-month basis – this charge varies according to the RSP's consumer base and chosen speed tiers. NBN relies on speed tier differentiation at the wholesale level for its business model. This suggests a substantial degree of exposure to fluctuations in retail demand for NBN.
- RSPs also pay a monthly usage-based Network-to-Network Interface (NNI) charge associated with the physical interface at which NBN's network interfaces with the RSP's. This is also likely to be driven by retail demand (possibly to a lesser extent than the monthly rental charges). However, RSPs face upfront costs and a security deposit associated with acquiring NNIs. They also pay their own backhaul and other retail network costs. This suggests that RSPs bear some counterparty risk that cannot be fully passed-through to NBN Co.
- For the time being, RSPs also pay usage based monthly Connectivity Virtual Circuit (CVC) charges associated with virtual broadband capacity at the point of interface. This charge exposed retailers to significant cost risks due to intraday "busy hour" demand volatility, but is being discontinued on 30 June 2026.

It is possible that retail service providers offer a slightly greater degree of product differentiation, given the wide variety of available retail-facing telecoms network technologies and the availability of pre-paid plans. For example, consumers of fixed-line broadband may have the option of substituting their demand for fixed-line telecoms service through the consumption of mobile services such as 5G. There is evidence that, to some extent, demand for these services is exposed to systematic risk – in the United Kingdom, Citizens Advice (a consumer advocacy and advice organisation) estimated that one million people disconnected their broadband in response to cost-of-living-pressures over the course of 2023.[104]

However, it is possible that, at most, NBN Co faces similar exposure to fluctuations in consumer demand due to disconnection or trading down, as many of these risks can be passed-through from the RSP to NBN Co.

[104] Citizens Advice (18 May 2023) One million lose broadband access as cost-of-living crisis bites

However, it may also be argued that NBN Co faces slightly lower levels of counterparty risk from bad debts at either the consumer or wholesale level than the RSPs that connect to its network, as these risks are not fully passed through to NBN Co.

In this respect, investors may view systematic demand risk for the NBN SAU as being more similar to the wholesale-only comparators, and for voice interconnection services as being more similar to the vertically-integrated comparators.

We have conducted a review of company financial reporting of their wholesale revenues to estimate the share of revenue from wholesale activities. In general, it is challenging to robustly estimate the wholesale share of value deriving from a vertically-integrated company's ownership of a network as:

- Many comparator firms do not separately report wholesale revenue, instead opting to group it into a broader revenue segment (frequently business/enterprise revenues).
- Very few companies separately report intersegmental revenues to the wholesale segment from the retail segments.

We provide a breakdown of wholesale revenues for the comparators below. While we lack robust data, we consider it likely that this breakdown is an underestimate of both wholesale revenue share and wholesale segment value. This is because for vertically integrated some proportion of retail revenues will inevitable flow down to the network, and the extent of this intersegmental pass-through is not always made explicit in companies' financial reporting.

We present below the average share of revenue from wholesale activities reported by the comparators. For each group, we present the overall average (including companies that both include and omit intersegmental revenues for their financing reporting) and a more restricted average including only those companies that report their intersegmental revenues.

Table 4.8: Wholesale share of revenue (average by subgroup)

Subgroup	Overall Subgroup	With intersegmental revenue only
Mobile Telecommunications	10%	16%
Fixed Telecommunications	13%	28%
Towers	90%	90%
Wholesale Fibre	100%	100%
Fixed Satellite	100%	100%

Source: CEPA analysis of data from Bloomberg and company financial statements

Note: We identified three mobile comparators and three fixed-line comparators that reported intersegmental revenue[105]

We observe that, when intersegmental revenue is presented, wholesale revenue shares of 16-28% are plausible for vertically-integrated network operators. The bulk of network operators do not present intersegmental revenues – the averages presented above for mobile and fixed telecoms service providers are based on only three comparators each. For example, Telstra's reporting suggests that its wholesale share of revenues is around 18%, while BT Group's is around 25%. Considering the limitations of the BICS classification scheme that we have mechanistically applied (and discussed previously in this section) we do not propose to infer differences between Mobile and Fixed telecoms service providers on the basis of this analysis.

Given the high degree of judgement involved in this analysis, we consider that a wholesale share of revenue of 16-28% is a reasonable assumption for our vertically-integrated operators.

NBN's systematic risk profile with respect to demand is likely to more closely resemble the wholesale comparators given the higher share of wholesale revenues (wholesale fibre, telecom towers operators, and fixed satellite

[105] For wireless telecoms, these include SK Telecom Co Ltd., Deutsche Telekom AG, and Telstra Group Ltd. For Wireline Telecoms, these include BT Group PLC, Cogent Communications Holdings, Inc., Lumen Technologies Inc.

providers). Voice interconnection services, with its higher degree of retail exposure, may be more similar to our vertically-integrated comparators.

We present the underlying company-level wholesale revenue shares in appendix Table 6.10.

Comparison with regulated utilities

We would expect the demand risk faced by water or energy utilities to be lower than for a typical telecoms service provider. While customers of water or energy utilities are likely to reduce consumption in response to reduced income this is likely to be to a lower extent than for telecommunications services. We would particularly expect this to be the case where utilities are exposed to economic regulation or can levy standing charges to cover fixed costs.

The extent of NBN Co's market power is related to its demand risk exposure. We consider that NBN is exposed to much more significant competition than typical utility network providers, and we do not see a distinction in monopoly power relative to the sample comparators. On balance we do not consider that NBN's market power impacts on its relative risk position beyond the other features of its demand composition described in this section.

Regulatory framework and contracting arrangements

NBN is regulated under a price cap model rather than a revenue cap model. This exposes NBN to a higher degree of volume risk relative to a revenue cap model, though we note that the SAU provides that the form of economic regulation be considered on an ongoing basis.

Where the vertically-integrated comparators in our sample are exposed to forms of economic regulation, this is generally in the form of a price cap on wholesale services, though there are examples of price caps on interconnection charges. A significant share of our comparators are unregulated – especially those domiciled in the United States and developed Asia-Pacific. This means that their systematic risk exposures may be slightly higher than their regulated counterparts. Our understanding is that many of the mobile tower companies and fixed satellite companies have long-term contracts in place with their clients. In some respects, these contracting arrangements could be viewed as providing a similar degree of long-term revenue stability as a price cap.

From a contracting perspective, NBN may therefore be considered slightly higher-risk than a wholesale comparator with significant long-term contracted revenues, but on balance is likely to be lower-risk than the sample of vertically-integrated comparators, which operate under a variety of regulatory regimes.

Summary

Our summary assessment of the systematic demand risk faced by the comparators, relative to the regulated services, is presented below.

Table 4.9: Relative risk assessment for demand

Regulated Service	Wholesale service providers		Vertically-integrated service providers	
NBN SAU	• Underlying income elasticity of demand potentially lower than vertically-integrated providers. • Frequently provide service on a contracted basis, providing some degree of revenue certainty, which may deliver similar revenue risk to a regulated provider.	▲ or ■	• Potential exposure to more variable end-user demand and counterparty risk. • Mix of regulatory arrangements, but many comparators are not economically regulated. • In some cases, include non-telecommunications services. • Slightly greater degree of product differentiation at the retail level may increase scope for heightened demand risk, as consumers may alter their service level in response to income fluctuations.	▼
Voice Interconnection Services		▲		■
Degree of systematic risk for the regulated service, relative to the comparators: ▲ = Higher ▼ = Lower ■ = Similar				

Source: CEPA analysis

Taking into account the considerations above, we consider it likely that NBN SAU's systematic demand risk exposure lies between that of the wholesale service providers and the vertically-integrated providers, with the wholesale providers serving as a lower bound.

Given its similarity to the vertically-integrated service providers, voice interconnection services is likely to be riskier than the wholesale service providers.

Growth opportunities

Companies invest to create value for their shareholders. Changes in investment expectations therefore contribute to changes in equity valuations, and thus asset betas. The effect of cyclical factors on the investment profile of the regulated service is therefore a key aspect of our relative risk assessment.

Our proposed geographic filter may reduce the differential between the regulated services and our comparators, as the comparators in the sample are operating in geographic areas with a similar pre-existing profile of telecoms service provision (see Figure 4.3 above).

Table 4.10: Relative risk assessment for growth opportunities

Regulated Service	Wholesale service providers		Vertically-integrated service providers	
NBN SAU	• The wholesale service providers in our sample reflect a diverse range of telecoms technologies and growth opportunities.	■	• Similar to the wholesale providers.	■
Voice Interconnection Services		■		■
Degree of systematic risk for the regulated service, relative to the comparators: ▲ = Higher ▼ = Lower ■ = Similar				

Source: CEPA analysis

Operating leverage

The presence of a significant capital spending commitment shrinks the gap between expected earnings and costs. A fall in expected revenues can therefore reduce expected earnings to a greater extent (as valuations are based on the discounted value of future cashflows). This leads to greater systematic risk.

Our view is that telecoms network operators generally will have relatively high operating leverage, especially while they are in the build phase of their network roll-out. Companies earlier in their network roll-out may have higher operating leverage due to lower economies of scale, and long future horizons over which cost recovery will take place. We have found little evidence to support the claim that operating leverage differs materially across the countries in which our comparators operate.

By similar logic, we would expect operating leverage for most mature regulated utility networks to be lower than for a typical telecoms service provider. The fast pace of technological innovation and frequent roll-out of new technologies in telecoms suggests higher levels of operating leverage for these companies on a forward-looking basis.

Consistent reporting of fixed and variable costs is generally not available, and at this stage we have not attempted to calculate operating leverage for the companies in our sample.

Table 4.11: Relative risk assessment for operating leverage

Regulated Service	Wholesale service providers		Vertically-integrated service providers	
NBN SAU	• Likely features significant operating leverage, which is associated with the large upfront cost of deploying network infrastructure. • The above may or may not be offset by a RAB-based economic regulation or long-term contracted service provision agreements.	■ or ▼	• Similar considerations apply as for wholesale service providers. • Certain retail activities may involve potentially lower levels of operating leverage.	▲ or ■
Voice Interconnection Services		■		▲ or ■
Degree of systematic risk for the regulated service, relative to the comparators: ▲ = Higher ▼ = Lower ■ = Similar				

Source: CEPA analysis

Overall, we consider that NBN SAU's RAB-based regulatory regime, as well as the relative maturity of its broadband network, affords it a degree of protection from systematic shocks that may not be present to the same extent for companies within our comparator sample, many of which are not economically regulated.

Asset stranding

Asset stranding risk should only be captured in the asset beta to the extent that it is systematic in nature, and several common sources of asset stranding risk are, in our view, not systematic:

- Stranding risk related to competition from alternative services can be diversified away by investing in a portfolio of telecoms service providers;
- Stranding risk related to the implementation of new technologies may be diversifiable to some extent, but this is likely to be highly contingent on the specific assets and technology, the potential for retrofitting, and other detailed considerations that impact on whether innovation is a diversifiable risk.

Population density is also a relevant indicator for asset stranding risk, as in rural locations with fewer premises to bear the cost of running the network, smaller fluctuations in take-up may be required to make that portion of the network un-economic. To the extent that NBN is a national network that covers both urban and rural areas, cross-subsidy from urban to rural service areas may mitigate this risk. We expect that, on balance, this is similar for our comparator sample, though we have not conducted quantitative analysis on this point.

Water and energy utility providers may have a reduced risk of asset stranding relative to telecoms services, as they are running networks that are natural monopolies, and feature less risk of replacement due to technological advancement. This may now be changing at least for gas networks. The NZCC has previously identified the possibility for systematic asset stranding risk for lower-penetration networks, such as for natural gas transmission and distribution operators[106], and the trend towards electrification could point to increased stranding risk for gas networks.

We have not found evidence of a distinction among our comparators, the NBN SAU, and voice interconnection services regarding asset stranding risk.

Company size

We agree with Frontier Economics in its advice to NBN Co that there is limited evidence to support the claim that asset betas should systematically differ between fibre providers on the basis of size. Furthermore, there is limited Australian regulatory precedent[107] and academic literature[108] in support of making an adjustment to the asset beta on this basis. Our market capitalisation filter will have removed all incredibly small firms which means the comparator sample and the firms providing the regulated services are all large scale firms.

Long-lived investments

We are of the view that the long-lived nature of new network assets is similar across the companies in our sample, and that there may be significant overlap with demand and operating leverage risks. Therefore, the length of time that network investments take to pay off is unlikely to be a determinative factor contributing to a higher asset beta for any particular group.

Mix effects and country premia

We consider that our choice of geographic filter, and the significant degree of financial market integration across developed economies, reduces the differential caused by differences in domestic market indices.

Mix effects are a related consideration in this context – this refers to the effect on a company's asset beta from a substantial share of non-domestic revenues. When a large share of a company's earnings are less correlated with its domestic market index, this may reduce the firm's asset beta estimates.

The satellite comparators in our sample earn a particularly large share of revenues outside of their home market, and we consider the possibility that this reduces asset beta for these firms when making our recommendations below.

Estimation Methodology

In this sub-section, we provide a summary of the key aspects of our beta estimation methodology. There is broad agreement amongst Australian regulators regarding the approach to beta estimation. Our approach is aligned with this precedent – we present a review of regulatory precedent below.

[106] NZCC (2016) Input methodologies, summary paper available here

[107] The sole example of a 'small-company premium' of which we are aware was applied in the United Kingdom by the CMA in its PR14 redetermination for Bristol Water. Notably, the CMA applied this premium to the cost of debt, but not to the regulatory beta.

[108] Some academic papers argue that company size is not a material explanatory factor for returns – for example, see Alquist et al (2018): 'Fact, Fiction and the Size Effect'

Table 4.12: Review of regulatory precedent on beta estimation methodology in Australia and New Zealand

Regulator	Estimation period	Market index	Return specification	De-leveraging formula	Estimation procedure	Special adjustments
AER	Multiple periods	Local	Weekly	Brealey-Myers	OLS	None
ACCC	5-year	Local	Weekly and monthly	Brealey-Myers	OLS	None
ERA	10-year	Local	Weekly/AD[109]	Brealey-Myers	OLS, LAD, MM, T-S	None
ESC	5-year, 10-year	Local	Weekly/AD and monthly cross-check	Brealey-Myers	OLS	None
IPART	5-year	Local	Weekly/AD	Brealey-Myers	OLS	Vasicek
QCA	10-year, 5-year as cross-check	Local	Weekly/AD	Brealey-Myers with non-zero debt beta	OLS, LAD as cross-check	None

Source: CEPA

Table 4.13 below presents a summary of our proposed methodology, as well as trade-offs involved in each methodological choice. We then discuss the elements of our proposed approach and contextualise it against regulatory precedent.

Table 4.13: Methodological choices for our core set of results

Methodological decision	Preferred approach	Trade-offs and alternatives
Estimation Procedure	We use Ordinary Least Squares (OLS) to estimate equity betas based on data on stock and market index returns.	OLS is transparent and accessible to a wide variety of stakeholders, but is sensitive to shocks - outlying observations on stock and market returns. Other estimation approaches are available to mitigate this.
Return interval (frequency)	We focus on weekly and four-weekly betas, with averaging across all possible reference days.	Higher-frequency returns increase the statistical robustness of the estimated betas, but are more likely to reflect bias from thin trading.
Estimation window	In our estimates we consider evidence from 5- and 10-year estimation windows.	Wider estimation windows increase the stability of the estimates and reflect a longer-term view of beta, but may exaggerate the duration of large shock impacts and reflect out-of-date information on systematic risk exposure (particularly in industries characterised by rapid technological advancement).

[109] We use the shorthand Weekly/AD to refer to weekly all day, which uses a weekly return specification including every reference day of the week, rather than just Friday to Friday.

Methodological decision	Preferred approach	Trade-offs and alternatives
Relative index	We focus on local indices.	The use of local indices may better reflect empirically-observed "home bias.[110]" The use of more highly-diversified stock market indices may be preferred in economies where capital markets are highly-integrated.
Estimation date range	We use 31 March 2025 as our cutoff date. Companies that were unlisted between 31 March 2020-2025 are not included in our comparator sample. We do not propose to make an explicit adjustment to betas for the effect of COVID-19, but we do consider its effects when making our proposals.	The use of more recent data ensures estimated betas are reflective of prevailing market conditions. Inclusion of data from de-listed companies can help to expand the comparator set and improve the statistical robustness of the estimates.
Gearing measure	Book value of net debt and market value of equity.	Please refer to Section 4.2 below for a discussion of our preferred approach to measuring gearing. We present results based on gross-debt gearing in Appendix C.
Debt beta	We apply a debt beta of zero.	A positive debt beta assumption can have implications for the value of a relevered equity beta (the direction of the impact depends on how the firm's actual gearing compares to the regulatory notional gearing.
De-leveraging formula	We apply the Brealey-Myers de-leveraging formula, which is consistent with the calculation of an after-tax WACC.[111]	Alternative de-leveraging formulae are available. The Brealey-Myers formula applies when the gearing ratio can be assumed to remain constant, whereas the Hamada formula is preferred when the stock of debt is assumed to remain constant.[112]
Low beta bias and additional adjustments	We do not apply additional adjustments to correct for low beta bias.	Practitioners sometimes apply the Blume and Vasicek adjustments to correct for "low-beta bias". Additional modelling approaches, including the Black CAPM and factor models are available as extensions to the standard CAPM.

Source: CEPA

4.1.2. Recommended approach

Our recommended approach is to develop a broad comparator sample applying a "developed economies filter" in conjunction with a liquidity filter based on bid-ask spreads.

Our recommended approach to estimating and de-levering betas themselves are presented in Table 4.13 above.

[110] In the literature on international capital markets, home bias refers to empirically-observed correlations between domestic aggregate savings and investment rates.

[111] Partington and Satchell (2021), *Report to the AER: WACC and Leverage,* pp. 29, available here

[112] IPART (2020)

4.1.3. Quantitative evidence and proposed point estimates

Quantitative estimates

We present below 5-year and 10-year asset betas by type of service provider, under our proposed liquidity and geographical filtering specifications. We primarily place weight on weekly and four-weekly betas, but we also present daily betas for context.

Table 4.14: 5- and 10-year asset beta estimates (local market indices)

	Four-weekly beta	Weekly beta	Daily beta
5-year asset beta			
Towers	0.42	0.38	0.37
Wholesale Fibre	0.29	0.29	0.31
Fixed Satellite	0.21	0.28	0.30
All wholesale comparators	0.36	0.35	0.35
Fixed Telecommunications	0.41	0.37	0.35
Mobile Telecommunications	0.33	0.33	0.32
All Comparators	0.36	0.35	0.34
10-year asset beta			
Towers	0.41	0.43	0.44
Wholesale Fibre	0.32	0.33	0.33
Fixed Satellite	0.36	0.32	0.33
All Wholesale Comparators	0.38	0.39	0.40
Fixed Telecommunications	0.42	0.41	0.41
Mobile Telecommunications	0.37	0.39	0.40
All Comparators	0.39	0.40	0.40

Source: CEPA analysis of Bloomberg data

The quantitative evidence spans a wide range when examined on a company-by-company basis (see Appendix C for lists of 5- and 10-year betas and gearing by comparator). The table above shows that the average over all 54 comparators ranges from 0.35-0.40, for the weekly and four-weekly betas. We note that daily betas do not point to a materially different range.

We present two cross-checks of this range:

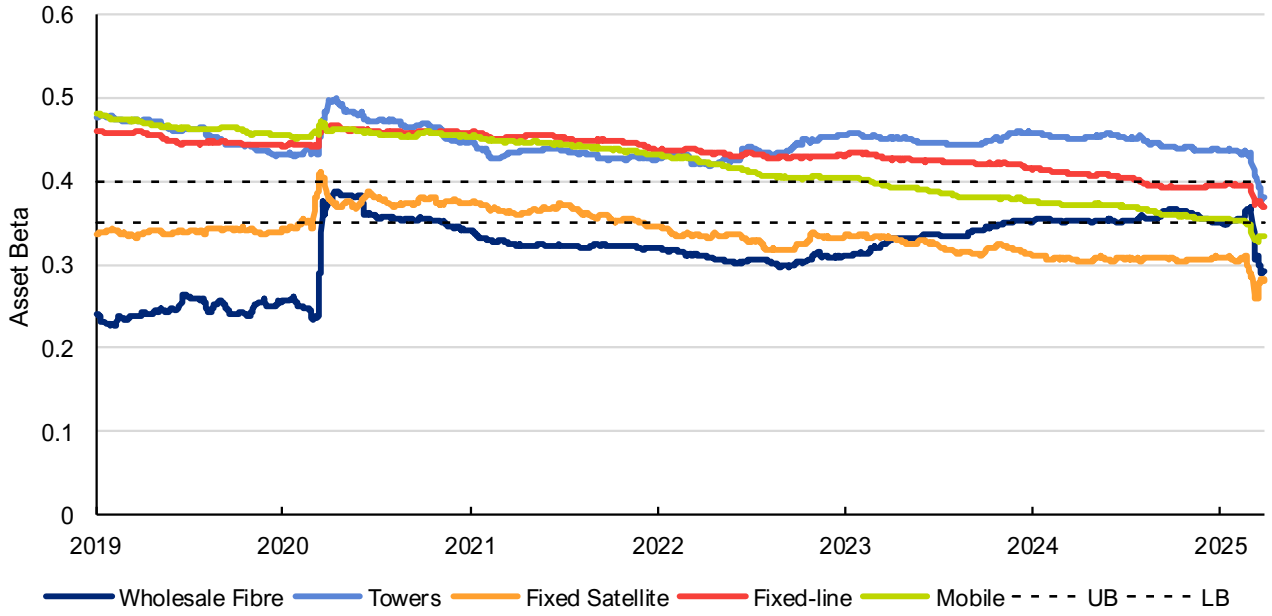
- Our comparator sample contains three companies that are from Australia or New Zealand (see Table 6.3 and Table 6.4 below). We observe that Chorus's asset betas, which vary within a range of 0.36-0.41, are consistent with this range. Telstra's asset beta estimates are similar, ranging from 0.34-0.40. Superloop Ltd., which is a fixed-line comparator also included within the sample, has much higher asset betas ranging from 0.79-1.43 (noting in particular its low 5-year gearing of 5%).
- We expect telecoms providers to have higher risk than network utilities, so the AER's 0.26 asset beta estimate should serve as a lower bound for any reasonable telecoms network provider. Our estimates are comfortably above this level, so we are confident that our estimates are not too low.

Given that some comparators have higher betas and some have lower betas, we consider this to be a defensible central range for an Australian telecoms network provider, and we propose to use the relative risk assessment to position our final recommendations for NBN SAU and voice interconnection services within this range.

Variation in beta estimates over time

Estimation of beta requires an exercise of judgement not only regarding the set of relevant comparators, but also regarding which periods of time are most relevant. We present the time series of rolling 5-year weekly asset betas for the comparator groups presented above:

Figure 4.4: Rolling 5-year weekly asset betas for the comparator groups, and the proposed asset beta range (figures refer to the average across the comparator group), 2019-present



Source: CEPA analysis of Bloomberg data

Figure 4.4 shows that standard econometric approaches to estimating beta are sensitive to large outliers, meaning that the impact of shock events like COVID-19 may linger in estimated betas for long periods after the shock hits[113]. In particular, the sharp upward spike observed in March 2020 and recent sharp fall in March 2025 correspond to the outlying return observations associated with COVID-19 entering and leaving the 5-year estimation window, respectively.

Periods affected by such outlying shocks may be less reflective of current and forward-looking risk pricing. This effect is particularly relevant for the long-history (5-year and 10-year windows of returns data) and low-frequency betas (weekly and four-weekly return intervals) on which we are proposing to place primary weight.

We draw the following conclusions from this analysis:

- There is evidence for a slow declining trend in beta for the vertically-integrated fixed-line and mobile service providers, particularly when accounting for COVID-19.
- The COVID-19 shock event led to significant increases in estimated asset betas, especially for the wholesale comparators, though we note that the muted response of average vertically-integrated telecoms

[113] In particular, these effects will linger until they drop out of the rolling estimation windows. In the case of 5-year betas, large outlying observations on returns will continue to influence beta estimates for 5 years. Mitigating this effect is the motivation for some Australian regulators' proposals to place weight on non-OLS estimation techniques for estimating beta.

betas presented above is in part due to the larger number of companies included in those groups (15 and 28 respectively for fixed-line and mobile providers).

- Outlying return observations from COVID-19 have at least partially unwound from the 5-year beta, leading to sharp reductions in the estimated asset beta.

Considering the above trends we place most weight on 5-year and 10-year betas as estimated on 31st March 2025 rather than recommending the use of a longer-term average beta.

A 5 year beta estimated using a cut-off date earlier in March of this year will contain the impact of the initial shock to financial markets from the onset of the COVID-19 pandemic. As this initial shock rolls out of the data the beta estimate falls suggesting that beta shouldn't remain permanently elevated.

We expect that 10-year betas also contain some degree of upward bias (as outliers related to COVID remains within the 10-year estimation window), but it is difficult to disentangle bias due to COVID-19 from higher levels of historical stock-market correlation from earlier in the last decade (as shown by the declining trend in the 5-year betas presented above). In general, betas estimated on wider estimation windows are less sensitive to the impact of shocks, but reflect those impacts for longer. In this case, we consider it appropriate to place weight on 10-year betas without making an explicit numeric adjustment, but we have not conducted an exhaustive assessment of outliers within the estimation sample.

To calibrate point estimates for NBN SAU and voice interconnection services, we rely on our relative risk assessment to position our proposals within the 0.35-0.40 range.

Proposed point estimate for NBN SAU

Table 4.15: Summary of relative risk analysis results for NBN SAU

	Wholesale Service Providers	Vertically-integrated service providers
Demand Risk	▲ or ■	▼
Growth Opportunities	■	■
Operating Leverage	■ or ▼	▲ or ■
Degree of systematic risk for the regulated service, relative to the comparators: ▲ = Higher ▼ = Lower ■ = Similar		

Source: CEPA analysis of Bloomberg data

On the basis of the relative risk assessment, we expect NBN SAU's systematic risk profile to more closely resemble that of our wholesale comparators.

The wholesale comparators are consistent with a similar range overall on average (0.35-0.39), but this masks variation among towers, wholesale fibre, and fixed satellite comparators. While tower operators (0.38-0.43) are near or above the top of this range, wholesale fibre (0.29-0.33) and fixed satellite companies (0.21-0.36) are consistent with figures near the bottom of or below the 0.35-0.40 range.

However, we consider it plausible that our two satellite comparators (Eutelsat and SES) may be particularly exposed to mix effects from their low share of home-market revenue, which may reduce the covariance of their stock returns with their home-market index. For this reason, and by comparison with the AER's determination for lower-risk energy utility networks, we do not consider the lower end of the fixed satellites range to be a plausible reference for NBN SAU's beta. We are comfortable that our proposed range of 0.35-0.40 is materially above this level.

Acknowledging that our wholesale comparators are consistent with a slightly lower range of asset beta estimates, we therefore propose an asset beta at the lower end of our range, of **0.35.**

Proposed point estimate for voice interconnection services

Table 4.16: Summary of relative risk analysis results for voice interconnection services

	Wholesale Service Providers	Vertically-integrated service providers
Demand Risk	▲	■
Growth Opportunities	■	■
Operating Leverage	■	▲ or ■
Degree of systematic risk for the regulated service, relative to the comparators: ▲ = Higher ▼ = Lower ■ = Similar		

Source: CEPA analysis

On the basis of the relative risk assessment, we expect voice interconnection services' systematic risk profile to more closely resemble that of our vertically-integrated comparators. Acknowledging that these are consistent with a slightly higher range of asset beta estimates, we therefore propose an asset beta at the upper end of our range, of **0.40.**

4.2. GEARING

This section sets out our proposed gearing range.

Gearing is the proportion of debt in the capital structure, and determines the weights applied to debt and equity financing costs when calculating the WACC.

4.2.1. Assessment of options

Measuring a regulated firm's gearing requires making choices around how to measure the components of the gearing ratio, including the values of debt and equity in the business, and the relevant time periods and comparator firms from which to draw evidence.

The table below presents a survey of recent Australian regulatory precedent on the calculation of gearing. It shows that, on balance, Australian regulatory precedent supports using the observed gearing of the comparator sample, and placing weight on gearing evidence from the same time period used to estimate beta.[114]

Table 4.17: Australian regulatory precedent on gearing

Entity	Debt metric	Value metric	Estimation period	Comparator set used	Retained previous value	Applied regulatory judgement
AER	Book value of gross debt	Market value of equity	Same as beta	Beta subset	Yes	Yes
ACCC[115]	Unclear	Unclear	Unclear	Same as beta	No	No
ERA	Book value of gross debt	Market value of equity	Same as beta	Only domestic comparators	Yes	Yes
ESC	Book value of net debt	Market value of equity	Same as beta	Same as beta	Requires justification for departure from previous value	
IPART	Book value of gross debt	Market value of equity	Same as beta	Same as beta	Yes	Yes
QCA	Book value of gross debt	Market value of equity	Same as beta	Beta sample, may be augmented with other sectors of similar risk	Yes	Yes

Source: CEPA analysis of regulatory determinations.

We now discuss each of these choices in turn:

Choice of debt metric

There are two related issues around the choice of the appropriate measurement for the stock of debt – a) whether gross debt or net debt is more suitable, and b) whether it is appropriate to pair a book-value debt measurement with a market-value equity measurement when computing enterprise value in the denominator of the gearing ratio.

[114] In particular, this means pairing a 5-year average of gearing with 5-year betas, 10-year average gearing with 10-year betas, etc.

[115] In its decision on Australia Post's 2023 price notification, the ACCC does not detail its approach to gearing, but refers to its previous 2022 Australia Post decision, noting that the gearing *estimate* has increased since then. We interpret this as the ACCC having relied on the same approach it used in the 2022 decision. The table includes details from the 2022 decision.

Gross debt and net debt

There is no regulatory consensus in Australia on whether gross debt or net debt (i.e., gross debt minus cash and cash equivalents) should be used for gearing. The choice of gross debt favours an assumption that companies retain cash balances that aren't used to fund debt payments, while use of net debt recognises that fluctuations in a company's cash balances impact its systematic risk exposure, and therefore should be reflected in a company's beta.

Put another way, estimating gearing on the basis of gross debt may understate the extent to which factors other than the capital structure contribute to equity risk, because cash-covered debt is assumed to have the same equity risk contribution as uncovered debt. This ignores the de-risking effect of a large liquidity buffer. On the other hand, net debt gearing encodes an assumption that all of a firm's cash balances are used to pay down debt, which may not be fully realistic. On balance, we propose that a cleaner interpretation of the impact of the liquidity buffer on beta is desirable, and that this constitutes a strong theoretical rationale for preferring net debt.

We present alternative asset beta and gearing estimates based on gross debt in Table 6.6 and Table 6.7 in Appendix C.

We further note that, especially when net debt is used to calculate gearing, there is no issue in principle with including comparators with negative gearing in the sample. Such companies could in principle pay off their stock of debt using their existing cash balances, and thus their debt may contribute little to equity risk. At the same time, this may be viewed as a legitimate capital structure choice, and such companies may be suitable for inclusion in a broad sample.

Book value and market value of debt

The use of book-value measurements for debt raises a conceptual issue – namely, the use of book-value debt introduces a discrepancy with the rest of the CAPM-based WACC exercise, which primarily uses market-value evidence. Mason and Wright[116] argue that this is equivalent to an assumption that all debt is on a floating rate[117], which may be inconsistent with the assumed liability structure of the notional regulated firm. They argue that the book value of debt should always be converted to market value. As noted by the QCA, there is a substantial analytical difficulty in doing this - the debt issued by regulated firms may trade thinly (and in the case of bank debt may not trade at all)[118], making it difficult to robustly estimate the market value of a firm's debt. Furthermore, as noted by Mason and Wright, the direction of the required adjustment is ambiguous, and depends on whether the market value of debt is greater or less than its book value – when a large sample is used, these adjustments may "come out in the wash."

We therefore propose that the use of book values is a reasonable proxy that can improve the simplicity and analytical clarity of the regulatory settlement.

Choice of value metric

Australian regulators are largely agreed that the market value of equity is appropriate to use when calculating gearing, due to the availability of robust data and its conceptual consistency with the rest of the CAPM exercise.

Estimation period

Likewise, Australian regulators generally acknowledge that is common regulatory practice to match the averaging period for gearing to the length of the beta estimation window. We agree that this promotes internal consistency within the CAPM, and should be preferred over end-of-period estimates or similar. IPART recently changed its

[116] Mason and Wright (2021) *"A report on financial resilience, gearing, and price controls",* Available here

[117] The un-levering formula commonly applied by practitioners relies on an assumption that assets are liquidly-traded and that pricing is continuously-updated throughout the estimation window.

[118] QCA (2024), "*Rate of return review, Version 3,"* Available here

approach to gearing in acknowledgement of this conceptual alignment – previously, it had adopted end-of-period estimates for gearing.[119]

Comparator set

Australian regulators also generally agree that the comparator set for gearing should be similar to that used to estimate beta (though we note that some regulators have preferred to use a subset of their beta comparators, such as domestic companies). We consider that, for consistency with the estimated beta and the broader WACC exercise, it is preferable to base observed gearing on the same comparator set used for beta estimation.

When the Brealey-Myers de-leveraging formula is used, there are risks involved in moving away from using a gearing level consistent with the comparator set used to estimate beta. The construction of this formula means that increasing gearing leads to a higher WACC, when holding all other parameters constant. This unintuitively suggest that firm value would be maximised if no debt is issued, which contrasts with the observation that comparator firms do issue debt. This has previously been referred to as the "*leverage anomaly*" by the New Zealand Commerce Commission.[120] It is possible that a different de-leveraging formula (such as one with a positive debt beta) would produce more intuitive results. Alternatively, this issue can be side-stepped by using the same comparator set to estimate both beta and gearing.

Furthermore, we consider that there are several reasonable ways of summarising the evidence from across the comparator set. In this methodology note, we take a straightforward approach that focuses on averages across the comparator group.

4.2.2. Recommendation

As outlined above, we prefer the following approach to estimating gearing:

- Use the book value of net debt to estimate debt.
- Use the market value of equity to estimate equity.
- Use backward-looking averages of the gearing ratio over the beta estimation window.
- Draw evidence from the same comparator set as used to estimate beta.

4.2.3. Estimate

We present below 5-year and 10-year average gearing estimates over our beta comparator sample.

As we proposed in the beta section above, it is possible that the wholesale comparators bear greater similarity to NBN SAU and that the vertically-integrated comparators are more similar to voice interconnection services.

We observe that both wholesale and vertically-integrated comparators have an average gearing range of 0.33-0.36, based on 5-year and 10-year gearing. This is consistent with the overall sample range. We therefore see little quantitative evidence of a difference in gearing between the wholesale comparators and the vertically-integrated comparators.

We therefore propose to use the mid-point of the overall 5-year and 10-year estimates, which provides a gearing estimate of 35%. Because of the similarity between the wholesale and vertically-integrated estimates, we propose to apply this estimate for both NBN SAU and voice interconnection services.

[119] IPART (2020)

[120] See for example, NZCC (2016), Input methodologies review draft decisions – Topic paper 4: Cost of capital issues, page 118.

Table 4.18: 5- and 10-year average gearing estimates

	5-year gearing	10-year gearing
Towers	34%	30%
Wholesale Fibre	29%	30%
Fixed Satellite	53%	45%
All wholesale comparators	36%	33%
Fixed Telecommunications	40%	37%
Mobile Telecommunications	35%	31%
All vertically-integrated comparators	36%	33%
All comparators	36%	33%

Source: CEPA analysis of Bloomberg data

4.3. COST OF DEBT

This section sets out our proposed options for estimating the cost of debt.

4.3.1. Assessment of options

There is general agreement amongst Australian regulators regarding the estimation approach for cost of debt. Estimation is divided into two broad steps. Firstly, a benchmark credit rating is determined. Secondly, the estimation technique is established. In this sub-section we set out our assessment aligned with these steps. We also consider whether the cost of debt should include debt issuance costs.

Credit rating

A credit rating reflects a borrower's ability to repay debt on time and the likelihood of default. An increased likelihood of default increases borrowing costs.

There are several factors that impact the credit rating. These include characteristics of the company's cashflows as well the level of gearing. We are proposing to align our gearing estimate with the average of the comparator sample. This comparator sample should also have similar cash-flow characteristics. For these reasons, the credit ratings of comparators are relevant evidence.

We would expect any regulated infrastructure business to seek to maintain at least an investment grade credit rating. Aligned with this is an expectation that the regulatory framework allows the business a realistic opportunity to achieve at least an investment grade credit rating.

The table below provides a summary of the target credit ratings applied in recent Australian regulatory decisions and a summary of the justification. We observe that all regulators target an investment grade credit rating or higher and some justify this on the basis of comparator's credit ratings.

Table 4.19: Credit ratings used in Australian regulatory precedent

Regulator	Target credit rating (S&P rating scale)	Justification
AER	BBB+	Comparator evidence
ACCC	Investment grade (not specified)	Not specified
ERA	BBB+	Comparator evidence
ESC	BBB	Regulatory precedent
ESCOSA	BBB	Regulatory precedent
ICRC	BBB	Regulatory precedent
IPART	BBB	Considers that a rating towards the lower end of investment grade range represents an efficient capital structure.
OTTER	BBB+	Comparator evidence
QCA	BBB	Requires strong evidence of a change to depart from previous value. Evidence base includes comparator sample, regulatory gearing, regulatory precedent, and the entity's risk.

Source: See Appendix A

Appendix D provides the credit ratings for our proposed comparators where they have a current credit rating from one of the three main providers. The table below summarises the average rating across the sample and broken down by comparator type. The figure below shows the distribution of these credit ratings. We observe that Baa2 is the most common rating type, and the distribution is centred around this value.

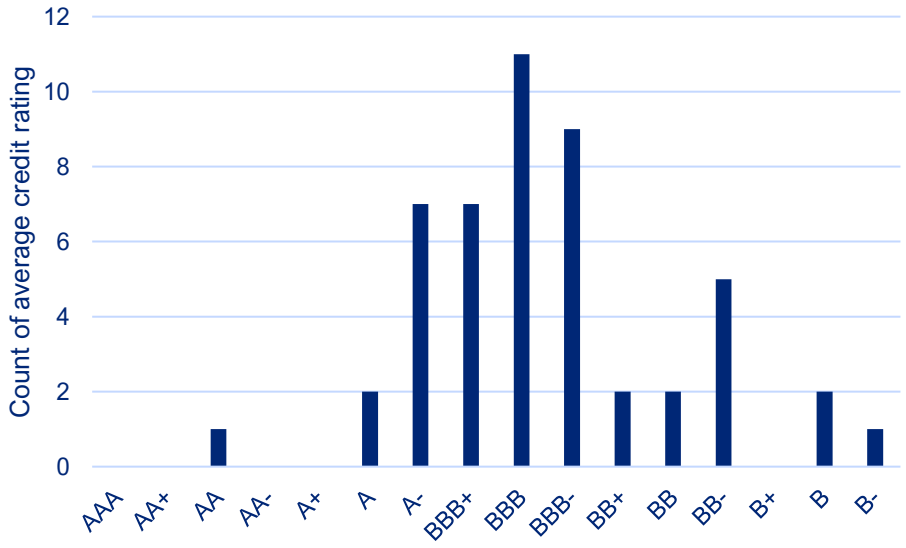
Table 4.20: Average credit rating by comparator type

Comparator type	Average credit rating
All	BBB
Wireless	BBB
Wireline	BBB-
Fibre	BBB
Satellite	BB
Towers	BBB-

Source: CEPA analysis of Bloomberg data.

Note: Average across all three credit rating agencies (S&P, Moody's and Fitch) shown in terms of S&P's nomenclature.

Figure 4.5: Spread of comparator credit ratings



Source: CEPA analysis of Bloomberg data.

We observe that NBN Co has a significantly higher credit rating at AA+ (Fitch) and Aa3 (Moody's).[121] However, in both cases the strong credit rating is predicated on the assumption of significant Australian Government support. Moody's states "*NBN Co's Aa3 rating benefits from a seven-notch rating uplift above its ba1 BCA, based on our assessment of a very high level of extraordinary support from the Australian Government*." We observe that Moody's baseline credit assessment (BCA) of ba1 is below investment grade. We are inclined to place emphasis on the average credit rating of comparators rather than NBN Co's credit rating. This reflects a focus on the concept of a benchmark efficient firm.

Debt estimation approaches

To estimate the cost of debt for a target credit rating involves determining the following:

- **Term to maturity** – i.e., the term of the bonds used as benchmarks to estimate the cost of debt.
- **Data source** – Data sources include the RBA and private providers such as Bloomberg and Refinitv. It is also possible to observe and use the yields on individual corporate bonds, but it is not clear if there is an

[121] Fitch (2024), Fitch Upgrades Australia's NBN Co to AA+ and Moody's (2025), Moody's Ratings affirms NBN Co's Aa3 ratings.

advantage to doing this relative to using the summary values from a provider. Sometimes additional adjustments are applied.

- **Reference period** – In the context of setting a cost of capital in a regulatory setting we observe two typical approaches used in Australia:
    - the on-the-day approach, where the cost of debt is based on average yields over a recent short period (e.g., 20-40 days), and is locked in over the course of the regulatory period; or
    - the trailing average approach, which estimates cost of debt as the average yield of multiple debt 'tranches' that are assumed to have been issued at regular intervals over N years (typically ten). This requires updating the cost of debt for each year in a price control period, as a new tranche is estimated and replaces the oldest tranche in the calculation.

  A third approach was considered in the recent Rate of Return process by the AER but was rejected. This was the weighted trailing average approach. This is similar to the trailing average approach but instead of equal weights on each year the weights are determined by notional annual capex in each year.
- **Averaging period** – We observe that regulators typically do not take a single cost of debt estimate (for example at the end of a single day). Instead, a short averaging period (for example 20 working days) is used. We understand this is done to smooth out any significant volatility observed for a single day.

The table below provides a summary of the approach taken in recent Australian regulatory decisions. We observe that:

- The term to maturity/tenor of debt is uniformly 10-years.
- A range of data sources have been used, predominantly Bloomberg and RBA.
- The majority of regulators place at least some weight on a cost of debt calculated using a trailing average and where this is done the averaging period is uniformly ten years.
- Typically, the averaging period applied by regulators is between 20 and 40 working days though there are a range of alternatives.

Table 4.21: Debt estimation approach used in recent Australian regulatory decisions

Regulator	Term to maturity	Data source	Reference period	Averaging period
AER	10-year	• RBA (spread to swap series)[122] • Bloomberg (BVAL curve) • Refinitiv	10-year trailing average	Between 10 days and 12 months, nominated by the company.
ACCC	10-year	• Bloomberg Fair Value curve in the 2022 decision. Not stated in the 2024 decision.	On-the-day	20 days

[122] Since the AER set the latest Rate of Return Instrument the RBA has ceased publishing this data series and the AER has reverted to using only Bloomberg and Refinitiv data.

Regulator	Term to maturity	Data source	Reference period	Averaging period
ERA	10-year	• Bloomberg (sample of relevant corporate bonds)	Hybrid trailing average approach: • 10-year trailing average for the debt risk premium; • risk-free rate fixed at the start of the regulatory period.[123]	• Between three and seven months for the DRP. • 20 days for the risk-free rate.
ESC	10-year	• RBA (spread-to-swap series) • Bloomberg (BVAL)	10-year trailing average	20 days
ESCOSA	10-year	• RBA (series not specified)	10-year trailing average	Average of 120 monthly observations
ICRC	10-year	• RBA (series not specified) • Bloomberg (series not specified)	10-year trailing average	Between two and 12 months, nominated by the company.
IPART	10-year	• RBA (spread to CGS)	Average of a 10-year trailing average and a trailing average equal to the length of regulatory period	40 days
OTTER	10-year	• RBA (series not specified)	Average of on-the-day (25% weight) and long-term average debt yield (aggregate 75% weight on six to nine years averages)	Two months for the on-the-day component, all monthly observations for the long-term average component
QCA	10-year	• RBA (spread to CGS)	10-year trailing average	Between one and 12 months, nominated by the company.

Source: See Appendix A

[123] The ERA's 'hybrid' trailing average approach assumes that the entity uses derivative arrangements to lock in five-year interest rate swaps rates at the start of each regulatory period. As a result, the cost of debt risk-free rate is fixed for the duration of the regulatory period, and is based on the observed yield of a five-year interest rate swap, averaged over a 20-day period just prior to the start of the regulatory period. The debt risk premium is calculated as the difference between the 10-year debt yield and the interest rate swap rate, and is updated every year (as is generally the case under a trailing average approach).

Relative advantages of on-the-day and trailing average approaches

The majority of Australian regulators now apply some version of a trailing average. However, this was not always the case and there has been a shift over time in Australian regulatory precedent since 2013 from on-the-day.[124] In transitioning to a trailing average approach in 2013 the AER observed that:[125]

> *"most service providers hold a diversified portfolio of debt with staggered maturity dates. This means that a service provider will only have to refinance a proportion of its debt at any point in time. Holding a portfolio of debt with different terms to maturity allows a service provider to manage its refinancing risk."*

The AER's comments relate to energy networks. However, we consider that refinancing risk is something that all infrastructure providers with significant borrowings will need to consider. Mitigating this risk by adopting a staggered maturity profile could be a reasonable assumption for a benchmark telecommunications provider.

However, not all experts are convinced that the trailing average is an appropriate approach.[126] If we take the perspective that we are attempting to construct the best estimate of the expected forward-looking return, than a trailing average approach may not be the preferred method. We observe that the on-the-day cost of debt seems to align best with a forward-looking concept, as well as CAPM theory. If a regulated company needs to raise debt today it is the on-the-day rate that matters, not what the rates were 4 years ago. The use of on-the-day also assists in avoiding unintuitive outcomes, such as a risk-free rate estimated on-the-day exceeding the cost of debt.

As such, an issue arises in reconciling theory with the use of a trailing average approach. In the UK a divergence between expected returns with regards to the cost of debt and actual practice has also been recognised.[127] The discussion has centred around the treatment of embedded debt costs, which has a clear read across to a trailing average approach (which compensates benchmark embedded debt). The proposed attempt at reconciling practice and theory is to recognise that the phrase "*cost of debt*" should relate to the expected return while regulatory practice around embedded debt should be distinguished as the "*allowed return*".

In the Australian context, arguments have been put forward that the allowed return on debt should be seen in the context of "*viable*" debt strategies for regulated firms.[128] The ten-year trailing average being an example of a regulatory allowance with a viable debt strategy attached. This contrasts with a firm that attempted to match its debt costs with an on-the-day debt estimate that is periodically reset. The implied debt strategy would be to roll over all the firm's debt on-the-day, which may result in an unacceptably high refinancing risk.

We do however observe that unregulated firms in competitive markets are not necessarily able to update their prices to reflect "viable" (however defined) debt issuance strategies. The market rate for debt is a key driver of market behaviour (for example new entrants could finance themselves using the on-the-day rate) and historical decisions on embedded debt can cause firms to lose market share or even default as market rates move against them. In the UK it has been observed that this might mean customers of regulated firms are in some way providing 'insurance' to the regulated firm.[129]

However, if we assume that there is a practical constraint on the ability of firms to achieve a cost of debt allowance that reflects an on-the-day rate, then the trailing average cost of debt approach may be more compatible with an economic efficiency criterion.

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[124] CEG (2022) WACC for NBN, Page 18.

[125] AER (2013), Better Regulation, Explanatory Statement, Rate of Return guideline.

[126] For example, Partington (2022), Don't use the weighted trailing average!!!!

[127] UKRN (2018), Estimating the cost of capital for implementation of price controls by UK Regulators.

[128] Lally (2014), The Trailing Average Cost of Debt.

[129] UKRN (2018), Estimating the cost of capital for implementation of price controls by UK Regulators.

It is however worth considering the circumstances where providing a debt allowance using a trailing average approach could produce undesirable consequences. For example, if rates are increasing it is possible that the cost of debt allowance provided is too low relative to current rates. This can mean that the regulated company has difficulty raising sufficient debt to finance new investment. This problem would be particularly acute in a situation where new capital expenditure is a significant proportion of the current asset base.

It is also possible to consider a circumstance where the regulated firm has decided to raise floating rate debt instead of the issuance profile assumed by the trailing average. In this case the firm appears to experience a windfall gain as interest rates fall with a cost of debt allowance significantly in excess of interest costs. It might be argued that this firm has taken an unacceptably high level of risk in that their borrowing practices are not aligned with regulatory assumptions. This may put them in a precarious position if rates were to rise. However, this windfall possibility cannot be ignored.

The AER considered the circumstance of the debt allowance being too low because rates have risen in the context of a weighted average trailing approach. Under the weighted average approach, instead of placing 10% weight on each year, the weight in each year is varied in proportion to the assumed or observed capital expenditure in that year. This potentially mitigates this issue and may better align assumptions with a company's actual borrowing practices.

However, the AER ultimately rejected this approach for two reasons:[130]

- Firstly, a weighted trailing average would perform better if a business raised extra debt beyond 10% of existing debt balances, assuming that capital was raised consistent with the benchmark gearing ratio. However, the AER was not convinced that it would be efficient for a benchmark business to increase debt by raising significantly more than 10% of its debt balance in a year. Instead, when faced with this requirement, the AER expects businesses to raise proportionately more equity, adjusting their gearing ratios downwards.

  This rejection of the weighted trailing average approach was not supported by Marinus Link, who argued that such an approach would better align with their cost of debt, given their proposed debt raising profile. This at least suggests that it is plausible the weighted trailing average approach would be a superior option (in the sense of reflecting the actual practice of the regulated entity) in some conditions.

- Secondly, the AER highlighted "*administrative complexities and practical difficulties with implementing a weighted trailing average*".

This suggests that the AER might consider a weighted trailing average approach to better meet their requirements, if the circumstances were different.

Consideration of the ACCC's statutory criteria

The issues described above are relevant for considering whether an on-the-day or trailing average approach is more aligned with the ACCC's statutory criteria. We note that the NBN SAU rate of return objectives makes explicit reference to the "*market cost of capital*". It is possible to interpret this requirement as meaning today's market cost of capital, which given the two options would be best represented by the on-the-day approach. However, we consider it plausible that the phrase is ambiguous and that the wording should be interpreted in the context of the wider objectives. These include:

- "*The objective of promoting stability in the rate of return over time*" – The trailing average approach would provide a more stable value relative to on-the-day. However, this is only achieved if the regulator maintains its approach going forward and doesn't switch back and forth between approaches. The currently agreed NBN SAU already embeds a trailing average approach.

[130] AER (2023), Rate of Return Instrument – Explanatory Statement, page 22.

- The "*efficient financing costs of a benchmark efficient entity*", which if an assumption is made regarding constraints on historical financing practices, this could potentially be compatible with a trailing average approach.
- The "*legitimate commercial interests of the supplier*" and "*the direct costs of providing access*" could also potentially be construed as pointing towards a trailing average approach if historical debt raising practices aligned with the implied debt raising profile of the trailing average.

Given this interpretation a case could be mounted that a trailing average approach best aligns with the ACCC's statutory objectives for the NBN SAU.

Regarding voice interconnection, there may be issues with updating the cost of debt annually within the ACCC's currently implemented pricing approach for these services. Our understanding is the current pricing approach for voice interconnection provides no possibility for indexation within the decision period. Without the ability to index the debt allowance, it does not seem practical to implement the trailing average cost of debt approach.[131] This suggest applying an on-the-day approach for voice interconnection.

Debt issuance costs

We observe that Australian regulators generally make an allowance for debt issuance costs and include this as an additional margin on top of their cost of debt estimate. The AER also makes a provision for debt issuance costs, but instead includes this as part of operating expenditure allowances.

Debt issuance costs are a cost that companies need to fund. However, it is crucial to first determine whether these costs are met by the operating expenditure allowance or whether a margin on the cost of debt is applied. Once this is determined the amount of the allowance then needs to be set.

The AER's current approach updates the methodology initially produced by Allen Consulting Group in 2004 for the ACCC.[132] This approach aims to compensate for the direct cost of raising debt by assuming a benchmark bond size, calculating the number of bond issues that the regulated service provider would need to issue to refinance its debt and attaching a cost to each issuance.

The most recent update for the AER was provided by Chairmont in 2019.[133] Chairmont assessed current debt raising practice in Australia and developed a model which split ongoing debt costs from one off debt issuance costs. Chairmont's estimate of debt raising costs of between 4.6 bps and 7.2 bps relates to the ongoing costs with a recommendation that any one-off costs be compensated under a separate opex allowance. The ongoing costs include an arrangement fee, annual rating agency costs, rating agency costs associated with each bond issue, annual registrar costs and agent expenses.

In the AER's most recent determinations the Chairmont 2019 methodology and estimates have been used. However, the arrangement fee component has been updated for data on arrangement fees published by Bloomberg. This has led to debt raising cost estimates higher than Chairmont's 2019 estimate.

The table below summarises the debt raising costs applied in recent Australian regulatory decisions and a summary of the justification for the estimate. We observe that the ERA applies the same methodology as the AER but commissioned Chairmont for an estimate more recently.[134] The QCA references a 2013 study done by PWC which results in a similar estimate. All other regulators primarily rely on estimates produced by other regulators.

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[131] It may be possible to develop an appropriate indexation approach even with this framework, for example using forward rates to establish a forward-looking trailing average. However, implementation would be a methodological challenge and in Australia no such approach exists to draw on. As such, we constrain our considerations here to the two established approaches.

[132] AER (2023), Draft decision – Ausgrid – Rate of return.

[133] Chairmont (2019), Debt raising costs.

[134] Chairmont (2021), Debt Raising and Hedging Costs.

Table 4.22: Debt issuance costs used in recent Australian regulatory decisions

Regulator	Debt raising costs	Justification and evidence
AER	0.0827%[135]	Methodology from Allen Consulting Group (2014) updated for debt raising costs using Chairmont (2019) and a higher allowance for arrangement fees.
ACCC	Not stated	
ERA	0.165%	Methodology from Allen Consulting Group (2014) updated for debt raising costs using Chairmont (2021) and a higher allowance for arrangement fees.
ESC	0.10%	Primarily regulatory precedent.
ESCOSA	0.125%	Primarily regulatory precedent.
ICRC	0.10%	Primarily regulatory precedent.
IPART	0.125%	Unspecified.
OTTER	0.08%	Primarily AER's estimates.
QCA	0.10%	Data submitted by regulated companies on their debt issuance costs and PWC (2013)[136]

Tenor of debt

As outlined above, Australian regulators have universally applied a 10-year term for debt. The AER states that "*benchmark debt term should match that of an efficient firm's borrowing."* As evidence that the 10-year term is appropriate in the AER's case they show evidence collected from the regulated networks where *"the WATMI [weighted average term to maturity at issuance] suggests that the average term of debt is currently between 8 years as the lower bound and 10 to 11 years as the upper bound"*.[137] Others have observed that a 10-year term is "*consistent with observed practice of large infrastructure businesses in Australia and internationally*".[138]

It is possible that the telecommunications sector firms have different borrowing profiles than other infrastructure providers. We have been unable to examine the weighted average term of maturity at issuance for the comparator set. However, we have examined the weighted average duration of bonds outstanding. This is not equivalent to the AER's analysis nor is it a perfect measure of borrowings as it does not include loans.

If we assume an issuance profile implied by the trailing average cost of debt assumption (10% each year over the last ten years) then we should expect to see a weighted average duration of around 4.5 years.[139] We find slight support for this hypothesis. The overall average of 6.9 years is higher than the expected finding. This is however skewed upwards by some particularly long dated issuances by a subset of wireless telecommunications companies. The median is materially lower at 4 years, suggesting a preference for shorter dated bond issuances.

Table 4.23: Weighted average duration of bonds outstanding by comparator type

Comparator type	Mean (years)	Median (years)
Wireless Telecommunications	7.9	4.9

[135] Result of the AER's current benchmark approach as shown in Ausgrid's draft determination. Potentially varies between determinations even if these are close in date as the arrangement fee is updated for more up to date data. Typically stated as a rate in AER determinations but included as part of opex allowance.

[136] PWC (2013), A cost of debt estimation methodology for businesses regulated by the Queensland Competition Authority.

[137] AER (2023), Rate of Return Instrument – Explanatory Statement, page 196

[138] CER (2022), WACC for NBN.

[139] Assuming that the debt to be rolled over within the next year is categorised as year 0.

Comparator type	Mean (years)	Median (years)
Wireline Telecommunications	5.6	3.6
Towers	5.0	4.8
Fixed Satellite	3.4	3.4
Overall	6.9	4.0

Note: Weighted average duration calculated separately for each comparator and then averaged.

NBN itself and Singapore's Netlink NBN Trust are not included in the above analysis (not listed and did not have any active bond issuances respectively). If we examine the financial accounts of these organisations, they report a weighted average duration of debt of 4.4 years and 3.4 years respectively. Chorus, a potentially good comparator for NBN, has a weighted average bond duration of 3.2 years.[140]

Given this evidence, we consider that further analysis would be required to rule out a ten-year tenor assumption.

4.3.2. Recommendations on methodology

The table below provides a summary of our recommendations for the cost of debt methodology.

Table 4.24: Methodological recommendations for cost of debt estimation

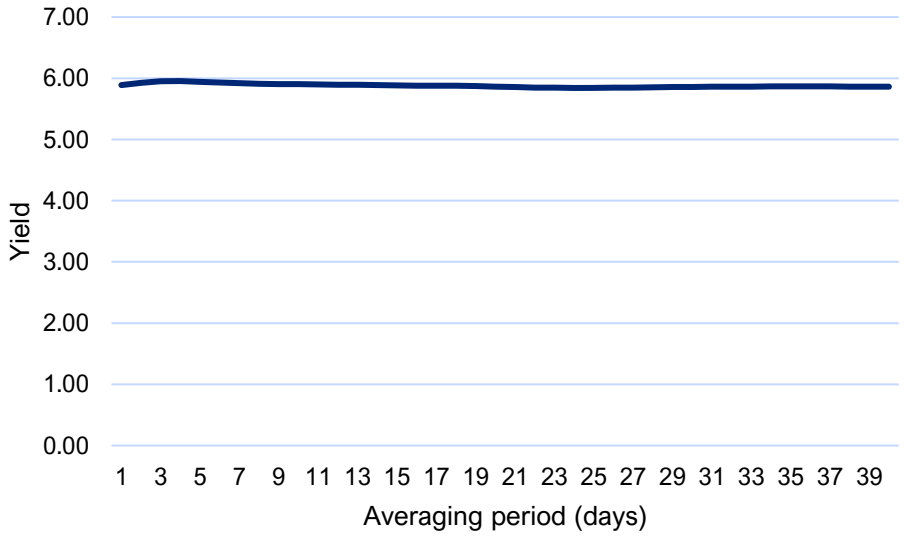
Methodology	Recommendation	Justification
Term to maturity	10-year	Australian regulators uniformly apply a 10-year estimate based on evidence of issuance behaviour of Australian infrastructure firms in general as well the regulated firms specifically. Our analysis of the comparator sample does not convincingly rule out ten years.
Data sources and methodology	• Bloomberg – AER Methodology • RBA – QCA Methodology[141]	We observe that regulators in Australia widely use RBA data to estimate the cost of debt and we propose to use RBA data applying the QCA's approach to estimation. We also observe that Bloomberg data is commonly used and we propose to use this data provider with the AER's methodology. The only other data provider in use by Australian regulators is Refinitiv, which is used by the AER. We do not propose to develop an estimate using Refinitiv data but would consider this to be a reasonable data source that could be applied.
Reference period	• On-the-day • Trailing average	We have considered the two approaches most commonly applied by Australian regulators – on-the-day and 10-year trailing average. We conclude that: • It is possible the interpret the ACCC's statutory objectives in such a way that it supports a trailing average approach to be applied to the NBN SAU. • There are practical difficulties with implementing the trailing average cost of debt approach given the voice interconnection regulatory regime. By extension, we recommend on-the-day.

[140] CEPA analysis using Eikon data.

[141] As noted above the AER currently do not use an estimate applying RBA data as their preferred data table has been discontinued. We have applied the QCA's methodology as set out in their February 2024 cost of debt estimation workbook.

Methodology	Recommendation	Justification
Averaging period	40 working days for Bloomberg. RBA data provides end of month estimates and no averaging is applied.	The RBA data source we have used provides end of month estimates and no averaging is applied. We have decided to apply a 40 working day averaging period to the daily Bloomberg corporate debt estimates. This is in line with our recommendation on risk-free rate. The averaging period chosen does have a slight impact on the cost of debt. The figure below demonstrates that for our chosen estimation date a 5-day averaging period would produce an estimate 0.08% higher than a 40-day period. Our decision is a judgement, and we observe that it would also be reasonable to use an alternative short averaging period.
Credit rating	BBB	The appropriate credit rating should be driven by the regulated service being assessed. Given the evidence on telecommunication firm comparator credit ratings and the strong arguments in favour of applying at least an investment grade rating the bounds of reasonable are likely to be in the range A to BBB. The credit ratings of telecommunications comparators do however point to a broad BBB rating being more appropriate.
Debt issuance costs	0.1%	We have taken the mid-point of the evidence considered above. We assume that the regulatory frameworks provide no additional allowance (for example in the opex building block) for debt issuance.

Figure 4.6: Debt yield by averaging period – BBB – Bloomberg – 31st March 2025



Source: CEPA analysis

4.3.3. Estimates

The table below provides our estimates for the cost of debt by data source, credit rating and reference period.

Table 4.25: Cost of debt estimates by data source, estimate type and credit rating

Data source/estimate type	A	BBB
Bloomberg		
On-the-day – 31st March 2025	5.40%	5.86%
10-year trailing average	4.02%	4.68%
RBA		
On-the-day – 31st March 2025	5.09%	5.56%
10-year trailing average	4.26%	5.06%

Source: CEPA analysis of Bloomberg and RBA data

We have estimated the cost of debt using RBA data with a slightly modified version of the QCA's methodology. Our starting point was the QCA's February 2024 Excel workbook. This was modified to correct an issue that occurs in certain circumstances that results in an unintuitive shape of the yield curve. For example, in some circumstances the methodology would result in a lower tenor estimate having a higher yield than a longer tenor estimate (e.g. a 9.1 year bond having a higher yield than a 10-year bond). We understand that the QCA issued an updated version of the workbook in September 2024 which also corrects for this issue.

The RBA data does not provide exact 10-year estimates for corporate bond yields and typically the estimates provided relate to a lower tenor (e.g. 9.1 years). This means a method of extrapolating out is required to achieve an exact ten-year estimate. A key assumption of the QCA's methodology is that spreads to the risk-free rate are extrapolated rather than the yields themselves. It is possible to consider circumstances where this assumption would not provide realistic estimates, for example where a significant extrapolation is required. However, where the extrapolation is relatively small, for example from 9.1 years to ten years, the estimates recovered appear reasonable.

The table below shows our recommended estimates for on-the-day and trailing average averaging both Bloomberg and RBA.

Table 4.26: On-the-day estimates (BBB, average of Bloomberg and RBA)

	Estimate
On-the-day estimate	5.71%
Debt issuance costs	0.10%
On-the-day (incl. debt issuance)	5.81%

Source: CEPA analysis of Bloomberg data

Table 4.27: Trailing average estimates (BBB, average of Bloomberg and RBA)

	Estimate
Trailing average estimate	4.87%
Debt issuance costs	0.10%
Trailing average (incl. debt issuance)	4.97%

Source: CEPA analysis of Bloomberg data

5. COST OF EQUITY

We have used the Capital Asset Pricing Model (CAPM) to estimate our cost of equity. The Sharpe-Linter CAPM assumes expected returns for an asset are equal to the risk-free rate plus the equity beta times the MRP, where the equity beta represents the extent to which market returns affect the returns on an individual security.

Australian regulators have considered other variations of the CAPM – this includes the Black CAPM and the Fama French Model (FFM). In Australia, there has been a careful assessment of these models by regulators, but these models are not used to set the cost of equity for the purpose of pricing for regulated entities. In contrast, the SL-CAPM has universal acceptance.

Academics regularly consider alternative asset pricing approaches including Black CAPM and FFM amongst others. However, there does not appear to be a consensus on the appropriate implementation approach for these models in the context of estimating the cost of equity for an Australian benchmark efficient entity.

The CAPM formula is:

$$\text{Expected Return} = R_f + \beta \times (R_m - R_f)$$

Here,

- R_f is the estimated risk-free rate
- β is the equity beta
- R_m is the market return, (R_m – R_f) gives the MRP

6. SUMMARY OF WACC ESTIMATES

Our proposed WACC estimates for NBN SAU and voice interconnection are set out in the table below. We provide vanilla and pre-tax estimates as the ACCC requires different versions of the WACC for different regulated services.

Table 6.1: WACC estimates

Parameter	NBN SAU	Voice Interconnection
Gearing	**35%**	**35%**
Risk-free rate	4.47%	4.47%
Market risk premium	6.40%	6.40%
Asset beta	0.35	0.40
Equity beta	0.54	0.62
Cost of equity (post-tax nominal)	**7.92%**	**8.41%**
Credit rating	BBB	BBB
Debt yield	4.87%	5.71%
Debt raising costs	0.10%	0.10%
Cost of debt (pre-tax nominal)	**4.97%**	**5.81%**
Tax rate	30%	30%
Gamma	0.57	0.57
Cost of equity (pre-tax nominal)	**9.09%**	**9.65%**
Nominal vanilla WACC	**6.89%**	**7.50%**
Nominal pre-tax WACC	**7.65%**	**8.31%**

Source: CEPA analysis

Appendix A REGULATORY DECISIONS

Regulator	Decision
Australian Energy Regulator (AER)	2022 Rate of Return Instrument – Explanatory statement (Feb 2023) Applies to energy networks
Australian Competition and Consumer Commission (ACCC)	ACCC's decision on Australia Post's Letter Pricing 2024 – Review of the Draft Price Notification (March 2024) ACCC's decision on public inquiry into Final Access determinations for Fixed Line Services (2015) ACCC's final report on public inquiry on the access determination for the Domestic Mobile Terminating Access Service (2020) ACCC's consultation paper on proposed variation to the NBN Co Special Access Undertaking (2023)
Economic Regulation Authority (ERA) – Western Australia	Explanatory statement for the 2022 final gas rate of return instrument (Dec 2022)
Essential Services Commission (ESC) – Victoria	Interim commentary – Port of Melbourne Tariff Compliance Statement 2023–24 (Dec 2023) Port of Melbourne – 2024-2025 (May 2024) Tariff Compliance Statement
Essential Services Commission of South Australia (ESCOSA)	SA Water Regulatory Determination 2024 – Final Determination: Statement of reasons (Jun 2024)
Independent Pricing and Regulatory Tribunal (IPART) - NSW	Review of our WACC method (Feb 2018) Applies to water companies
Independent Competition and Regulatory Commission (ICRC) – Australian Capital Territory	Regulated water and sewerage services 2023-28: Report 3 of 2023 (May 2023)
Office of the Tasmanian Economic Regulator (OTTER)	Investigation into TasWater's prices and services for the period 1 JULY 2022 to 30 June 2026 – Final report (May 2022)
Queensland Competition Authority (QCA)	Rate of return review Feb 2024 Applies to water companies
New Zealand Commerce Commission (NZCC)	Part 4 Input Methodologies Review 2023 – Final decision, Cost of capital topic paper (Dec 2023)

Appendix B MRP EQUATIONS & PARAMETERS

The following DDM models estimate the MRP over multiple phases (*P*). A key assumption in these models is the use of a growth rate *g*, which represents the long-term nominal growth rate of the dividend – this is assumed to match the long-term nominal GDP growth rate.

The tax rate and gamma are used to derive the value of the current dividend values.

Equations

Damodaran (2013)

$$P_0 = \sum_{t=1}^{t=5} \frac{E(D_t)}{(1+MRP+r_f)^t} + \frac{E(D_6)}{(MRP+r_f-g)} \frac{1}{(1+MRP+r_f)^5}$$

Bank of England (2002)[142]

$$P_0 = \frac{D_0}{(MRP+r_f)-g}[(1+g)+8(g_{LTG}-g)]$$

Bank of England (2010)

$$P_0 = \sum_{t=1}^{4} \frac{E(D_t)}{(1+MRP+r_f)^t} + \frac{E(D_5)}{(MRP+r_f-g)} \frac{1}{(1+MRP+r_f)^4}$$

ERA 2-stage DDM

$$P_0 = \frac{m \text{ x } E(D_0)}{(1+k)^{m/2}} + \sum_{t=1}^{N} \frac{E(D_t)}{(1+k)^{m+t-0.5}} + \frac{\frac{E(D_N)(1+g)}{k-g}}{(1+k)^{m+N-0.5}}$$

Parameters

Parameter	Estimate
Long run growth rate (IPART)	5.50%[143]
Long run growth rate (ERA)	4.60%[144]

[142] Here, the g_{LTG} is the forecast for the long-term growth rate.

[143] This was the constant growth rate assumed by IPART in their 2013 Review of WACC Methodology where they discussed approaches for estimating implied market risk premiums and measuring economic uncertainty in Australia. AER's 2022 RoRI Explanatory Note quotes the long-term nominal GDP growth rate forecast by the Australian Treasury to be 5%.

[144] ERA's DDM estimate for 2022 retained the growth rate of 4.6 per cent.

Parameter	Estimate
Earnings yield estimates (IPART)	ASX200[145]
Dividend yield estimates (ERA)	ASX All Ordinaries[146]
Risk-free rate	4.47%
Gamma	0.57
Corporate tax rate	30%

[145] Estimates from Bloomberg (AS51)

[146] Estimates from Bloomberg (AS30)

Appendix C PROPOSED COMPARATORS

Table 6.2: Final comparator set

Wholesale service providers			Vertically integrated service providers	
Fibre providers	Telecommunication tower companies	Satellite Operators	Wireline Telecoms	Wireless Telecoms
• Chorus Ltd. • Netlink NBN Trust	• American Tower Corp • Cellnex Telecom SA • Crown Castle Inc • Infrastrutture Wireless Italiane SpA • RAI Way SpA • SBA Communications Corp • Uniti Group Inc	• Eutelsat Communications SACA • SES SA	• BCE Inc • BT Group PLC • Cable One Inc • Charter Communications Inc • Chunghwa Telecom Co Ltd • Cogent Communications Holdings Inc • HKT Trust & HKT Ltd • Liberty Global Ltd • Lumen Technologies Inc • NOS SGPS SA • Superloop Ltd • Swisscom AG • Tele2 AB • Turk Telekomunikasyon AS • WideOpenWest Inc. •	• 1&1 AG • AT&T Inc • Deutsche Telekom AG • Digi Communications NV • Elisa Oyj • Gamma Communications PLC • Hutchison Telecommunications Hong Kong Holdings Ltd • Koninklijke KPN NV • KT Corp • LG Uplus Corp • Orange SA • Proximus SADP • Rogers Communications Inc • Shenandoah Telecommunications Co • Singapore Telecommunications Ltd • SK Telecom Co Ltd • StarHub Ltd • Telecom Italia SpA/Milano • Telefonica SA • Telekom Austria AG • Telenor ASA • Telephone and Data Systems Inc • Telia Co AB • Telstra Group Ltd • TELUS Corp • Turkcell Iletisim Hizmetleri AS • Verizon Communications Inc • Vodafone Group PLC

Source: CEPA

Table 6.3: 5-year asset beta and gearing estimates, net debt gearing, comparator detail

		Asset Beta			Gearing
Comparator Group	Comparators	Daily	Weekly	Four-weekly	Net Debt
Towers	American Tower Corp	0.51	0.56	0.61	29%
	Cellnex Telecom SA	0.26	0.24	0.34	35%
	Crown Castle Inc	0.46	0.50	0.56	32%
	Infrastrutture Wireless Italiane SpA	0.28	0.24	0.25	30%
	RAI Way SpA	0.34	0.37	0.31	4%
	SBA Communications Corp	0.47	0.50	0.54	33%
	Uniti Group Inc	0.26	0.26	0.35	74%
Fixed Satellite	Eutelsat Communications SACA	0.23	0.19	0.00	59%
	SES SA	0.38	0.37	0.42	47%
Wholesale Fibre	Chorus Ltd	0.44	0.41	0.39	44%
	NETLINK NBN TRUST	0.17	0.17	0.19	14%
Fixed-line	BCE Inc	0.26	0.28	0.32	38%
	BT Group PLC	0.39	0.49	0.52	59%
	Cable One Inc	0.48	0.52	0.53	37%
	Charter Communications Inc	0.35	0.40	0.40	52%
	Chunghwa Telecom Co Ltd	0.13	0.07	0.09	0%
	Cogent Communications Holdings Inc	0.47	0.46	0.41	27%
	HKT Trust & HKT Ltd	0.13	0.10	0.10	36%
	Liberty Global Ltd	0.22	0.25	0.27	72%
	Lumen Technologies Inc	0.18	0.14	0.04	79%
	NOS SGPS SA	0.36	0.41	0.41	45%
	Superloop Ltd	0.68	0.79	1.43	5%
	Swisscom AG	0.30	0.29	0.27	24%
	Tele2 AB	0.28	0.30	0.35	28%
	Turk Telekomunikasyon AS	0.67	0.62	0.66	37%
	WideOpenWest Inc	0.39	0.42	0.41	58%
Mobile	1&1 AG	0.43	0.49	0.48	25%
	AT&T Inc	0.22	0.22	0.18	51%
	Deutsche Telekom AG	0.19	0.25	0.25	58%
	Digi Communications NV	0.29	0.30	0.27	60%
	Elisa Oyj	0.31	0.30	0.35	14%
	Gamma Communications PLC	0.47	0.61	0.52	-6%
	Hutchison Telecommunications Hong Kong Holdings Ltd	0.38	0.38	0.52	-132%
	Koninklijke KPN NV	0.18	0.22	0.21	34%
	KT Corp	0.25	0.22	0.16	42%
	LG Uplus Corp	0.22	0.22	0.16	54%
	Orange SA	0.16	0.18	0.18	53%
	Proximus SADP	0.28	0.27	0.33	46%
	Rogers Communications Inc	0.25	0.30	0.32	51%
	Shenandoah Telecommunications Co	0.73	0.65	0.60	10%
	Singapore Telecommunications Ltd	0.69	0.69	0.74	19%
	SK Telecom Co Ltd	0.24	0.25	0.21	40%
	StarHub Ltd	0.34	0.38	0.35	27%

		Asset Beta			Gearing
	Telecom Italia SpA/Milano	0.20	0.22	0.23	78%
	Telefonica SA	0.28	0.32	0.34	64%
	Telekom Austria AG	0.20	0.23	0.27	36%
	Telenor ASA	0.25	0.21	0.11	37%
	Telephone and Data Systems Inc	0.25	0.27	0.19	66%
	Telia Co AB	0.24	0.20	0.14	41%
	Telstra Group Ltd	0.40	0.35	0.34	27%
	TELUS Corp	0.36	0.36	0.43	39%
	Turkcell Iletisim Hizmetleri AS	0.75	0.68	0.69	22%
	Verizon Communications Inc	0.18	0.18	0.18	46%
	Vodafone Group PLC	0.33	0.37	0.42	63%

Source: CEPA analysis of Bloomberg Data

Table 6.4: 10-year asset beta and gearing estimates, net debt gearing, comparator detail

		Asset Beta			Gearing
Comparator Group	Comparators	Daily	Weekly	Four-weekly	Net Debt
Towers	American Tower Corp	0.55	0.52	0.50	27%
	Cellnex Telecom SA	0.38	0.35	0.33	30%
	Crown Castle Inc	0.50	0.48	0.45	29%
	Infrastrutture Wireless Italiane SpA	0.35	0.35	0.31	18%
	RAI Way SpA	0.43	0.46	0.51	3%
	SBA Communications Corp	0.51	0.50	0.43	34%
	Uniti Group Inc	0.36	0.35	0.34	66%
Fixed Satellite	Eutelsat Communications SACA	0.26	0.24	0.20	51%
	SES SA	0.40	0.41	0.51	39%
Wholesale Fibre	Chorus Ltd	0.40	0.41	0.36	47%
	NETLINK NBN TRUST	0.26	0.24	0.29	13%
Fixed-line	BCE Inc	0.41	0.34	0.32	34%
	BT Group PLC	0.47	0.45	0.45	44%
	Cable One Inc	0.54	0.59	0.56	26%
	Charter Communications Inc	0.40	0.46	0.44	49%
	Chunghwa Telecom Co Ltd	0.19	0.12	0.12	-2%
	Cogent Communications Holdings Inc	0.59	0.52	0.40	23%
	HKT Trust & HKT Ltd	0.15	0.12	0.12	34%
	Liberty Global Ltd	0.18	0.19	0.20	77%
	Lumen Technologies Inc	0.24	0.20	0.16	71%
	NOS SGPS SA	0.45	0.48	0.48	37%
	Superloop Ltd	0.61	0.79	1.14	4%
	Swisscom AG	0.45	0.41	0.35	24%
	Tele2 AB	0.45	0.45	0.39	25%
	Turk Telekomunikasyon AS	0.64	0.63	0.65	38%
	WideOpenWest Inc	0.34	0.40	0.46	64%
Mobile	1&1 AG	0.61	0.65	0.55	14%
	AT&T Inc	0.33	0.30	0.26	44%
	Deutsche Telekom AG	0.29	0.33	0.31	51%
	Digi Communications NV	0.26	0.29	0.28	58%
	Elisa Oyj	0.46	0.41	0.32	15%
	Gamma Communications PLC	0.42	0.53	0.59	-6%
	Hutchison Telecommunications Hong Kong Holdings Ltd	0.46	0.52	0.68	-91%
	Koninklijke KPN NV	0.35	0.34	0.28	36%
	KT Corp	0.25	0.26	0.24	41%
	LG Uplus Corp	0.25	0.28	0.25	46%
	Orange SA	0.30	0.30	0.27	47%
	Proximus SADP	0.37	0.34	0.35	32%
	Rogers Communications Inc	0.37	0.30	0.29	44%
	Shenandoah Telecommunications Co	0.68	0.53	0.38	18%
	Singapore Telecommunications Ltd	0.71	0.68	0.70	17%
	SK Telecom Co Ltd	0.27	0.30	0.30	32%
	StarHub Ltd	0.46	0.46	0.42	23%
	Telecom Italia SpA/Milano	0.25	0.25	0.26	72%

		Asset Beta			Gearing
	Telefonica SA	0.38	0.38	0.39	59%
	Telekom Austria AG	0.24	0.28	0.30	37%
	Telenor ASA	0.40	0.35	0.23	29%
	Telephone and Data Systems Inc	0.38	0.39	0.36	51%
	Telia Co AB	0.37	0.32	0.25	36%
	Telstra Group Ltd	0.43	0.39	0.40	26%
	TELUS Corp	0.42	0.35	0.40	36%
	Turkcell Iletisim Hizmetleri AS	0.72	0.68	0.69	19%
	Verizon Communications Inc	0.26	0.23	0.21	40%
	Vodafone Group PLC	0.42	0.45	0.42	49%

Source: CEPA analysis of Bloomberg Data

Table 6.5: Average 5-year weekly asset betas by country, for the full shortlist

Region	Country	Number of firms	Towers	Fixed Satellite	Wholesale Fibre	Mobile	Fixed	All
Asia Pacific (Developed)	AUSTRALIA	2				0.35	0.79	0.57
	HONG KONG	3				0.32	0.10	0.24
	JAPAN	1					1.23	1.23
	NEW ZEALAND	1			0.41			0.41
	SINGAPORE	3			0.17	0.54		0.41
	SOUTH KOREA	3				0.23		0.23
	TAIWAN	2				0.08	0.07	0.08
Asia Pacific (Emerging)	CHINA	13	0.59			0.83	0.83	0.79
	INDIA	5	0.77			0.30		0.49
	INDONESIA	7	0.17			0.61	0.47	0.36
	MALAYSIA	4				0.73	0.45	0.59
	PAKISTAN	1					0.57	0.57
	PHILIPPINES	2				0.30		0.30
	SRI LANKA	2				0.27	0.31	0.29
	THAILAND	2				0.41	0.36	0.38
	VIETNAM	3	1.41				1.06	1.18
Eastern Europe	BOSNIA-HERZE.	1				0.25		0.25
	ROMANIA	1				0.30		0.30
	SLOVENIA	1					0.30	0.30
	TURKEY	2				0.68	0.62	0.65
Latin America & Caribbean	ARGENTINA	1				0.20		0.20
	CHILE	1				0.24		0.24
	MEXICO	3				0.49	0.53	0.52
Middle East & Africa	BURKINA FASO	1					0.36	0.36
	GHANA	1				1.72		1.72
	KENYA	1				1.15		1.15
	MOROCCO	1				0.61		0.61
	NIGERIA	1				0.76		0.76
	SENEGAL	1				1.40		1.40
	SOUTH AFRICA	3				0.48	0.51	0.49

Region	Country	Number of firms	Towers	Fixed Satellite	Wholesale Fibre	Mobile	Fixed	All
	UAE	2				0.79		0.79
North America	CANADA	4				0.33	0.19	0.26
	UNITED STATES	16	0.45			0.33	0.33	0.36
Western Europe	AUSTRIA	1				0.23		0.23
	BELGIUM	1				0.27		0.27
	BRITAIN	6	0.43			0.60	0.37	0.50
	FINLAND	1				0.30		0.30
	FRANCE	2		0.19		0.18		0.19
	GERMANY	3				0.37	0.06	0.26
	ITALY	4	0.30			0.26		0.28
	LUXEMBOURG	2		0.37		0.30		0.33
	NETHERLANDS	1				0.22		0.22
	NORWAY	1				0.21		0.21
	PORTUGAL	1					0.41	0.41
	SPAIN	2	0.24			0.32		0.28
	SWEDEN	2				0.20	0.30	0.25
	SWITZERLAND	1					0.29	0.29

Source: CEPA analysis of Bloomberg Data

Note: these figures are based on the full shortlist, prior to the application of our preferred liquidity filter based on bid-ask spreads. We have primarily focused our desk research into company operations (including M&A activity, ownership relations, and segmented revenues) on companies that survive our preferred liquidity and geographical filtering. Further consideration of these issues for the other shortlisted companies would be appropriate before drawing inference from these figures.

Table 6.6: 5- and 10-year asset beta estimates (local market indices, Gross-debt gearing)

	Four-weekly beta	Weekly beta	Daily beta
5-year asset beta			
Towers	0.41	0.38	0.36
Wholesale Fibre	0.28	0.28	0.30
Fixed Satellite	0.16	0.23	0.25
All wholesale comparators	0.34	0.33	0.33
Fixed Telecommunications	0.39	0.35	0.33
Mobile Telecommunications	0.29	0.30	0.29
All Comparators	0.33	0.32	0.31
10-year asset beta			
Towers	0.40	0.42	0.43
Wholesale Fibre	0.31	0.32	0.32
Fixed Satellite	0.30	0.28	0.28
All Wholesale Comparators	0.37	0.38	0.38
Fixed Telecommunications	0.40	0.39	0.39
Mobile Telecommunications	0.34	0.35	0.36
All Comparators	0.36	0.37	0.37

Source: CEPA analysis of Bloomberg data

Table 6.7: 5- and 10-year average gearing estimates (Gross-debt gearing)

	5-year gearing	10-year gearing
Towers	35%	31%
Wholesale Fibre	31%	33%
Fixed Satellite	62%	52%
All wholesale comparators	39%	35%
Fixed Telecommunications	43%	39%
Mobile Telecommunications	44%	39%
All vertically integrated comparators	44%	39%
All Comparators	43%	39%

Source: CEPA analysis of Bloomberg data

Table 6.8: 5-year asset beta and gearing estimates, gross debt gearing, comparator detail

		Asset Beta			Gearing
Comparator Group	Comparators	Daily	Weekly	Four-weekly	Gross Debt
Towers	American Tower Corp	0.50	0.55	0.60	30%
	Cellnex Telecom SA	0.25	0.22	0.32	40%
	Crown Castle Inc	0.46	0.50	0.55	32%
	Infrastrutture Wireless Italiane SpA	0.28	0.24	0.25	30%
	RAI Way SpA	0.33	0.36	0.30	6%
	SBA Communications Corp	0.47	0.50	0.54	33%
	Uniti Group Inc	0.25	0.25	0.34	74%
Fixed Satellite	Eutelsat Communications SACA	0.19	0.17	0.00	64%
	SES SA	0.30	0.29	0.33	59%
Wholesale Fibre	Chorus Ltd	0.43	0.40	0.38	45%
	NETLINK NBN TRUST	0.17	0.16	0.18	17%
Fixed-line	BCE Inc	0.26	0.27	0.31	39%
	BT Group PLC	0.34	0.44	0.46	63%
	Cable One Inc	0.46	0.50	0.51	40%
	Charter Communications Inc	0.35	0.40	0.40	53%
	Chunghwa Telecom Co Ltd	0.13	0.07	0.09	4%
	Cogent Communications Holdings Inc	0.45	0.44	0.38	31%
	HKT Trust & HKT Ltd	0.13	0.09	0.10	38%
	Liberty Global Ltd	0.17	0.20	0.21	77%
	Lumen Technologies Inc	0.17	0.14	0.04	79%
	NOS SGPS SA	0.35	0.40	0.41	46%
	Superloop Ltd	0.63	0.73	1.31	13%
	Swisscom AG	0.29	0.29	0.26	26%
	Tele2 AB	0.28	0.29	0.34	30%
	Turk Telekomunikasyon AS	0.59	0.55	0.58	45%
	WideOpenWest Inc	0.38	0.41	0.40	59%
Mobile	1&1 AG	0.42	0.48	0.47	26%
	AT&T Inc	0.22	0.21	0.18	53%
	Deutsche Telekom AG	0.18	0.23	0.24	60%
	Digi Communications NV	0.27	0.28	0.25	63%
	Elisa Oyj	0.30	0.29	0.34	15%
	Gamma Communications PLC	0.44	0.57	0.49	1%
	Hutchison Telecommunications Hong Kong Holdings Ltd	0.22	0.22	0.30	13%
	Koninklijke KPN NV	0.18	0.21	0.20	36%
	KT Corp	0.20	0.18	0.13	55%
	LG Uplus Corp	0.21	0.20	0.15	58%
	Orange SA	0.13	0.15	0.15	62%
	Proximus SADP	0.26	0.26	0.31	48%
	Rogers Communications Inc	0.25	0.29	0.32	52%
	Shenandoah Telecommunications Co	0.67	0.59	0.54	20%
	Singapore Telecommunications Ltd	0.67	0.67	0.71	22%
	SK Telecom Co Ltd	0.22	0.23	0.19	45%
	StarHub Ltd	0.28	0.32	0.29	40%
	Telecom Italia SpA/Milano	0.17	0.19	0.20	82%

		Asset Beta			Gearing
	Telefonica SA	0.24	0.28	0.29	69%
	Telekom Austria AG	0.19	0.22	0.25	39%
	Telenor ASA	0.24	0.20	0.11	41%
	Telephone and Data Systems Inc	0.23	0.25	0.18	68%
	Telia Co AB	0.23	0.19	0.13	44%
	Telstra Group Ltd	0.40	0.35	0.34	28%
	TELUS Corp	0.35	0.36	0.42	40%
	Turkcell Iletisim Hizmetleri AS	0.55	0.50	0.51	42%
	Verizon Communications Inc	0.17	0.17	0.18	47%
	Vodafone Group PLC	0.28	0.31	0.36	69%

Source: CEPA analysis of Bloomberg Data

Table 6.9: 10-year asset beta and gearing estimates, gross debt gearing, comparator detail

		Asset Beta			Gearing
Comparator Group	Comparators	Daily	Weekly	Four-weekly	Gross Debt
Towers	American Tower Corp	0.54	0.52	0.49	28%
	Cellnex Telecom SA	0.35	0.33	0.31	35%
	Crown Castle Inc	0.50	0.48	0.45	30%
	Infrastrutture Wireless Italiane SpA	0.35	0.34	0.31	19%
	RAI Way SpA	0.42	0.45	0.50	6%
	SBA Communications Corp	0.50	0.50	0.42	34%
	Uniti Group Inc	0.35	0.35	0.33	67%
Fixed Satellite	Eutelsat Communications SACA	0.23	0.21	0.17	56%
	SES SA	0.34	0.34	0.43	47%
Wholesale Fibre	Chorus Ltd	0.39	0.40	0.34	49%
	NETLINK NBN TRUST	0.25	0.23	0.28	17%
Fixed-line	BCE Inc	0.41	0.34	0.31	35%
	BT Group PLC	0.42	0.40	0.41	49%
	Cable One Inc	0.52	0.57	0.54	29%
	Charter Communications Inc	0.40	0.46	0.44	49%
	Chunghwa Telecom Co Ltd	0.18	0.12	0.12	2%
	Cogent Communications Holdings Inc	0.54	0.48	0.37	29%
	HKT Trust & HKT Ltd	0.15	0.12	0.12	35%
	Liberty Global Ltd	0.16	0.17	0.18	81%
	Lumen Technologies Inc	0.23	0.20	0.15	71%
	NOS SGPS SA	0.45	0.47	0.48	38%
	Superloop Ltd	0.57	0.74	1.06	11%
	Swisscom AG	0.44	0.40	0.35	26%
	Tele2 AB	0.45	0.44	0.39	26%
	Turk Telekomunikasyon AS	0.57	0.56	0.58	45%
	WideOpenWest Inc	0.33	0.40	0.46	65%
Mobile	1&1 AG	0.59	0.64	0.54	16%
	AT&T Inc	0.32	0.29	0.25	46%
	Deutsche Telekom AG	0.28	0.31	0.30	54%
	Digi Communications NV	0.25	0.28	0.26	60%
	Elisa Oyj	0.45	0.40	0.32	16%
	Gamma Communications PLC	0.39	0.50	0.55	1%
	Hutchison Telecommunications Hong Kong Holdings Ltd	0.29	0.33	0.43	15%
	Koninklijke KPN NV	0.34	0.32	0.27	39%
	KT Corp	0.20	0.20	0.19	53%
	LG Uplus Corp	0.24	0.26	0.23	50%
	Orange SA	0.25	0.26	0.23	55%
	Proximus SADP	0.35	0.33	0.33	35%
	Rogers Communications Inc	0.37	0.30	0.29	44%
	Shenandoah Telecommunications Co	0.64	0.50	0.36	24%
	Singapore Telecommunications Ltd	0.70	0.66	0.69	19%
	SK Telecom Co Ltd	0.24	0.27	0.27	38%
	StarHub Ltd	0.40	0.40	0.37	32%
	Telecom Italia SpA/Milano	0.22	0.22	0.23	76%

		Asset Beta			Gearing
	Telefonica SA	0.34	0.34	0.35	63%
	Telekom Austria AG	0.23	0.27	0.29	40%
	Telenor ASA	0.37	0.33	0.21	34%
	Telephone and Data Systems Inc	0.34	0.35	0.33	57%
	Telia Co AB	0.35	0.30	0.24	40%
	Telstra Group Ltd	0.43	0.38	0.39	27%
	TELUS Corp	0.42	0.35	0.39	37%
	Turkcell Iletisim Hizmetleri AS	0.56	0.53	0.54	36%
	Verizon Communications Inc	0.25	0.22	0.20	41%
	Vodafone Group PLC	0.36	0.38	0.36	57%

Source: CEPA analysis of Bloomberg Data

Table 6.10: Wholesale share of revenue by comparator group

Comparator Group	Comparators	Intersegmental revenue reported?	Wholesale Share
Towers	American Tower Corp		91%
	Cellnex Telecom SA		
	Crown Castle Inc		68%
	Infrastrutture Wireless Italiane SpA		100%
	RAI Way SpA		
	SBA Communications Corp		100%
	Uniti Group Inc		
Fixed Satellite	Eutelsat Communications SACA		100%
	SES SA		100%
Wholesale Fibre	Chorus Ltd		100%
	NETLINK NBN TRUST		100%
Fixed-line	BCE Inc	FALSE	
	BT Group PLC	TRUE	25%
	Cable One Inc	FALSE	
	Charter Communications Inc	FALSE	5%
	Chunghwa Telecom Co Ltd	FALSE	11%
	Cogent Communications Holdings Inc	TRUE	36%
	HKT Trust & HKT Ltd	FALSE	
	Liberty Global Ltd	FALSE	9%
	Lumen Technologies Inc	TRUE	22%
	NOS SGPS SA	FALSE	7%
	Superloop Ltd	FALSE	12%
	Swisscom AG	FALSE	8%
	Tele2 AB	FALSE	4%
	Turk Telekomunikasyon AS	FALSE	
	WideOpenWest Inc	FALSE	3%
Mobile	1&1 AG	FALSE	
	AT&T Inc	FALSE	
	Deutsche Telekom AG	TRUE	10%
	Digi Communications NV	FALSE	
	Elisa Oyj	FALSE	
	Gamma Communications PLC	FALSE	13%
	Hutchison Telecommunications Hong Kong Holdings Ltd	FALSE	
	Koninklijke KPN NV	FALSE	12%
	KT Corp	FALSE	16%
	LG Uplus Corp	FALSE	6%
	Orange SA	FALSE	15%
	Proximus SADP	FALSE	6%
	Rogers Communications Inc	FALSE	
	Shenandoah Telecommunications Co	FALSE	
	Singapore Telecommunications Ltd	FALSE	
	SK Telecom Co Ltd	TRUE	20%
	StarHub Ltd	FALSE	
	Telecom Italia SpA/Milano	FALSE	19%
	Telefonica SA	FALSE	

Comparator Group	Comparators	Intersegmental revenue reported?	Wholesale Share
	Telekom Austria AG	FALSE	
	Telenor ASA	FALSE	4%
	Telephone and Data Systems Inc	FALSE	3%
	Telia Co AB	FALSE	8%
	Telstra Group Ltd	TRUE	18%
	TELUS Corp	FALSE	
	Turkcell Iletisim Hizmetleri AS	FALSE	
	Verizon Communications Inc	FALSE	2%
	Vodafone Group PLC	FALSE	

Source: CEPA analysis of Bloomberg Data

Appendix D CREDIT RATINGS

Table 6.11: 10-year asset beta and gearing estimates, gross debt gearing, comparator detail

Comparator set	Name	Type	Moody's Long Term Rating	S&P LT local currency issuer credit rating	Fitch Long Term Rating - Issuer Level
017670 KS Equity	SK Telecom Co Ltd	Mobile Telecoms	A3	A-	A-
030200 KS Equity	KT Corp	Mobile Telecoms	A3	A-	A
032640 KS Equity	LG Uplus Corp	Mobile Telecoms		NR	WD
1U1 GR Equity	1&1 AG	Mobile Telecoms			
215 HK Equity	Hutchison Telecommunications Hong Kong Holdings Ltd	Mobile Telecoms			
2412 TT Equity	Chunghwa Telecom Co Ltd	Fixed Telecoms		AA	WD
6823 HK Equity	HKT Trust & HKT Ltd	Fixed Telecoms			
AMT US Equity	American Tower Corp	Towers	Baa3	BBB	BBB+
BCE CN Equity	BCE Inc	Fixed Telecoms	Baa3	BBB	NR
BT/A LN Equity	BT Group PLC	Fixed Telecoms		BBB	BBB
CABO US Equity	Cable One Inc	Fixed Telecoms	Ba3	BB-	
CCI US Equity	Crown Castle Inc	Towers	Baa3	BBB *-	BBB+ *-
CCOI US Equity	Cogent Communications Holdings Inc	Fixed Telecoms	B2	B+	
CHTR US Equity	Charter Communications Inc	Fixed Telecoms	Ba2	BB+	BB+
CLNX SM Equity	Cellnex Telecom SA	Towers		BBB-	BBB-
CNU NZ Equity	Chorus Ltd	Wholesale Fibre	Baa2	BBB	
DIGI RO Equity	Digi Communications NV	Mobile Telecoms		BB-	BB
DTE GR Equity	Deutsche Telekom AG	Mobile Telecoms	Baa1	BBB+	BBB+
ELISA FH Equity	Elisa Oyj	Mobile Telecoms	Baa2	BBB+	
ETL FP Equity	Eutelsat Communications SACA	Fixed Satellite	B2	B-	B
GAMA LN Equity	Gamma Communications PLC	Mobile Telecoms			
INW IM Equity	Infrastrutture Wireless Italiane SpA	Towers		BB+	BBB-
KPN NA Equity	Koninklijke KPN NV	Wholesale Fibre		BBB	BBB
LBTYA US Equity	Liberty Global Ltd	Fixed Telecoms		BB-	

Comparator set	Name	Type	Moody's Long Term Rating	S&P LT local currency issuer credit rating	Fitch Long Term Rating - Issuer Level
LUMN US Equity	Lumen Technologies Inc	Fixed Telecoms	B3	B-	CCC+
NETLINK SP Equity	NETLINK NBN TRUST	Wholesale Fibre			
NOS PL Equity	NOS SGPS SA	Fixed Telecoms		BBB-	BBB
ORA FP Equity	Orange SA	Mobile Telecoms	Baa1	BBB+	BBB+
PROX BB Equity	Proximus SADP	Mobile Telecoms	A3	BBB+	
RCI/B CN Equity	Rogers Communications Inc	Mobile Telecoms	Baa3	BBB-	WD
RWAY IM Equity	RAI Way SpA	Towers			
SBAC US Equity	SBA Communications Corp	Towers	Ba2	BB+	
SCMN SW Equity	Swisscom AG	Fixed Telecoms	A2	A-	
SESG FP Equity	SES SA	Fixed Satellite	Baa3	NR	BBB
SHEN US Equity	Shenandoah Telecommunications Co	Mobile Telecoms			
SLC AU Equity	Superloop Ltd	Fixed Telecoms			
ST SP Equity	Singapore Telecommunications Ltd	Mobile Telecoms	A1	A	WD
STH SP Equity	StarHub Ltd	Mobile Telecoms			
T CN Equity	TELUS Corp	Mobile Telecoms	Baa2	BBB-	WD
T US Equity	AT&T Inc	Mobile Telecoms	Baa2	BBB	BBB+
TCELL TI Equity	Turkcell Iletisim Hizmetleri AS	Mobile Telecoms	B1	BB	BB-
TDS US Equity	Telephone and Data Systems Inc	Mobile Telecoms	Ba1 *-	BB *	BB+ *-
TEF SM Equity	Telefonica SA	Mobile Telecoms	Baa3	BBB-	BBB
TEL NO Equity	Telenor ASA	Mobile Telecoms	Baa1	A-	NR
TEL2B SS Equity	Tele2 AB	Fixed Telecoms		BBB	
TELIA SS Equity	Telia Co AB	Mobile Telecoms	Baa1	BBB+	WD
TIT IM Equity	Telecom Italia SpA/Milano	Mobile Telecoms	Ba2	BB	BB
TKA AV Equity	Telekom Austria AG	Mobile Telecoms	A3	A-	A-
TLS AU Equity	Telstra Group Ltd	Mobile Telecoms	A2	A-	
TTKOM TI Equity	Turk Telekomunikasyon AS	Fixed Telecoms		BB	BB-
UNIT US Equity	Uniti Group Inc	Towers	B3	B-	B+ *-
VOD LN Equity	Vodafone Group PLC	Mobile Telecoms	Baa2	BBB	BBB
VZ US Equity	Verizon Communications Inc	Mobile Telecoms	Baa1	BBB+	A-
WOW US Equity	WideOpenWest Inc	Fixed Telecoms			

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