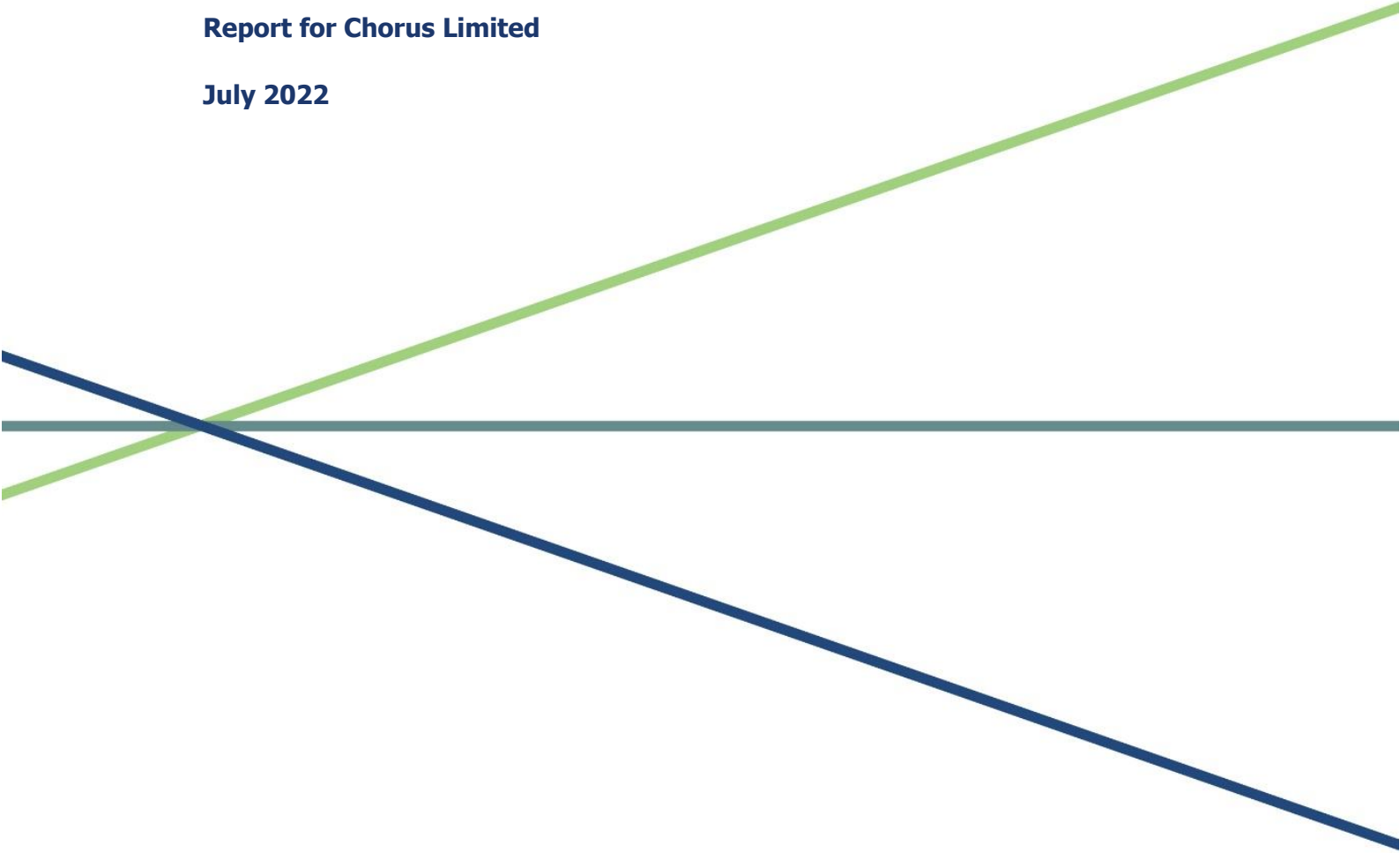


Measures to improve the stability in WACC estimates

Report for Chorus Limited

July 2022



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Table of Contents

1. Executive Summary	1
1.1 Our brief.....	1
1.2 Trailing average cost of debt.....	2
1.3 Move to “Total Market Return” when estimating the cost of equity	4
2. Trailing average of the cost of debt	6
2.1 Proposal to transition to averaging of the risk-free rate component	6
2.2 The current “hybrid” cost of debt method.....	6
2.3 Reasoning behind the AER’s (2013) adoption of a trailing average of the cost of debt.....	9
2.4 Transitional arrangements.....	9
2.5 Options for a trailing average of the risk-free rate component	10
2.6 Conclusion on trailing average of the risk-free component of the cost of debt	12
3. Applying a Total Market Return approach to estimate the cost of equity	13
3.1 Proposal to apply the Total Market Return approach	13
3.2 The Commerce Commission applies the TAMRP approach	13
3.3 Application of the TMR approach by UK and Italian regulators.....	15
3.3.1 Ofcom’s adoption of the TMR approach	15
3.3.2 Other UK regulators’ application of the TMR approach	16
3.3.3 ARERA: Italian regulator’s application of the TMR approach	17
3.4 FERC’s application of the CAPM	17
3.5 Australian Energy Regulator’s views on the TMR approach	17
3.5.1 No theory explaining a negative relationship between the risk-free rate and the MRP 19	
3.5.2 No predictable relationship between the MRP and the risk-free rate	21
3.5.3 Practitioners do not implement a TMR approach	23
3.6 Application of the TMR method.....	25
3.7 Conclusion on the Total Market Return approach.....	27

Tables and figures

Table 1: Estimates of the TAMRP with 3, 4, and 5 year risk-free rates	14
Figure 1: Commission estimates of the risk-free rate and debt premium (BBB+)	7
Figure 2: Changes in the risk-free rate and debt premium for Transpower over time	8
Figure 3: Yields on 10-year gilts and Ofcom decisions on real RFR	15
Figure 4: 10-year CGS Beta estimate – Rolling 10-year periods.....	20
Figure 5: DGM ERm vs spot risk free rate, and DGM MRP vs spot risk-free rate (2005-2021)	22
Figure 6: Sub-period analysis of implied MRP vs prevailing risk-free rate in the US (1993 break point).....	22
Figure 7: Total Market Returns used in independent expert reports (Australia)	24
Figure 8: Fernandez surveys of Market Risk Premium and Risk-Free Rate (2013 to 2022).....	25

1. Executive Summary

1.1 Our brief

Incenta Economic Consulting (Incenta, we or us) has been asked by Chorus Limited (Chorus) to review the methods being applied to estimate the weighted average cost of capital (WACC) for Chorus's regulated fibre services, having regard to developments in other jurisdictions. If deemed appropriate, we have been asked to make recommendations about potential improvements. As the issues that we address are potentially relevant across all regulated sectors, this material is being prepared for the Commission's review of the Input Methodologies for the sectors regulated under Part 4 of the Commerce Act. We are aware that a key concern of Chorus has been the volatility in the estimated WACC depending on the precise date that the WACC is estimated, with large swings being observed in recent years within reasonably short intervals. Accordingly, we have given particular focus to methods that may reduce the volatility of its estimated WACC at the time of a price review.

Our review has determined that the two improvements in the WACC methodology applied to Chorus that hold the greatest potential to reduce the volatility of the WACC estimate, whilst also being likely to improve the resulting estimates, are as follows:

- *Move to a full trailing average of the cost of debt* – the debt risk premium in Chorus' WACC is currently determined as a five-year trailing average; however, the risk-free element is determined as a spot rate.¹ We propose to also apply a trailing average to the risk-free component, and to transition to this new approach on a forward-looking basis. This would be very similar to the approach that is currently applied by the Australian Energy Regulator (AER). The term of the trailing average should be matched with the average term of the debt that it would be prudent and efficient for a firm in Chorus's position to issue, which may be longer than the 5 year trailing average that is currently applied for the debt risk premium element.
- *Move to Total Market Return (TMR, which is the sum of the risk-free rate and (tax adjusted) market risk premium, TAMRP)* – we propose changing the way the TAMRP is estimated, so that one commences with the TMR and derives the TAMRP as a residual that depends on the prevailing risk-free rate of return. We also propose that the Input Methodologies specify the TMR rather than the TAMRP as the parameter that is kept stable over the duration of the Methodologies (the TAMRP would then vary in opposite direction to the risk-free rate). The focus on the TMR – rather than the TAMRP – is the now-standard approach of the UK regulators (Ofgem, Ofwat and Ofcom), and this change would be expected to improve considerably the stability over time of the estimated cost of equity.

We do not recommend applying a trailing average of the risk-free rate to the cost of equity, as these are separate issues. The recommended approach is consistent with Australian practice, where the AER applies a 10-year trailing average to derive the cost of debt and has signalled an intention to move to apply a 5-year risk-free rate determined on a spot basis when estimating the cost of equity component.

Our reasons for recommending these two changes are summarised below.

¹ More specifically, the average over a three-month period that ends 7 months prior to the commencement of the new regulatory period.

1.2 Trailing average cost of debt

This approach would involve determining the cost of debt for the regulated firm as the trailing average of the cost of debt over a pre-determined period prior to the time in question (a five-year period would most closely reflect current arrangements, although we also recommend that this should be reviewed). This would replace the current approach whereby the debt risk premium is calculated as a five-year trailing average, but a spot risk-free rate is applied.

There are two types of trailing average that could be applied, namely:

- *Annual update option* – this is a trailing average that continues throughout the regulatory period and is accompanied by either an annual update to prices/revenue, as is the practice in Australia, or alternatively could be applied via an extension to existing *ex post* “wash up” arrangements, and
- *Simple fixed option* – this is a trailing average that runs to the start of the regulatory period but then is fixed, applying the same method as the debt risk premium.

Out of these, our preference would be the first option because this option would generate the cost of debt that would be incurred by a firm that refinances a set proportion of its debt portfolio annually and so would generate a debt financing strategy that could be replicated by a firm in practice. However, either would reduce the volatility of WACC redeterminations.

We note that the Commission has emphasised in past decisions that its cost of debt allowance – in which the risk-free element is determined with reference to spot rates around the time of a determination – can also be replicated by firms using interest rate swaps to lock-in that spot risk-free rate. However, we understand that the size of Chorus relative to the New Zealand market is likely to make this hedging activity infeasible. Chorus, and other large regulated firms, may therefore face a considerable mismatch between the allowance received for the cost of debt and the embedded cost. Ideally, the term of the trailing average should match the average term at issuance of the debt issued, which may be longer than five-years.² This is consistent with the AER’s practice, where a ten-year trailing average is applied to energy businesses issuing ten-year term debt. This approach would enable Chorus to match the cost of debt benchmark with its debt issuance program without the need for hedging.

Critically, we propose transitioning to the trailing average cost of debt on a purely forward-looking basis, following the approach that was applied in Australia. Specifically, this would involve determining the trailing average initially using the “spot” risk free rate as a proxy for history, and then replacing the spot rate with actual market data as the trailing average moves forward in time (if a five-year trailing average is applied, then one-fifth of the spot rates would be replaced with actual market data each year). The practical effect of this transition would depend upon whether the annual update option or simple fixed option is selected.

- Under the “annual update” option, the risk-free rate element for the first year of the next regulatory period would comprise 100 per cent spot rate, then (if a five-year trailing average were

² The current regulatory arrangements for Chorus and in Part 4 recognise longer term debt via the potential for a term credit spread differential allowance, and we note that Chorus received such an allowance in the determination for its first regulatory period.

applied) the next year it would comprise 80 per cent spot rate and 20 per cent reflecting the actual interest rates over the first year of the regulatory period, and so forth.³

- Under the “simple fixed” option, the same transition would be applied; however, as the risk-free element would be locked-in at the trailing average prevailing at the start of a regulatory period, the practical effect is that:
 - the trailing average for the first regulatory period would be the same as the spot rate, and
 - if a five-year trailing average is applied,⁴ the transition would have finished by the commencement of the next regulatory period, and so the risk-free component would simply be determined as the average of the past five years of interest rates.⁵

As noted above, the debt risk premium component is currently determined as a five-year trailing average. Whilst there has been little variation in this parameter over time, it would make sense for the debt risk premium to be aligned with how the risk-free rate element of the cost of debt is determined in the future. This would imply:

- if the “annual update” option is applied, then the debt risk premium component should also be redetermined annually (noting that the Commission already estimates this parameter on a near-continuous basis in any event for Information Disclosure purposes), and
- if the term of the trailing average is extended beyond five-years (say, to 7 or 10 years), then the term of the debt risk premium element should also be extended.⁶

In the previous Australian and New Zealand debates that considered the application of a trailing average cost of debt the Commerce Commission’s adviser, Dr. Martin Lally, has emphasised the need for stakeholders to avoid experiencing a windfall gain / loss. Noting that the change recommended here relates only to the risk-free rate element (as the debt risk premium element is already subject to a trailing average), if a “historical” trailing average were to be applied after a period in which the risk-free rate had been declining, this would provide a windfall to the service provider. A windfall to customers would occur if a “historical” trailing average were applied after a period when the cost of debt had been rising.

The proposed transitional arrangements would avoid incorporating past “known” information, and reflects the approach applied by the AER in Australia, and so would avoid creating windfall gains or losses (and therefore meet the NPV=0 objective).

³ If a ten-year trailing average was instead applied, in line with the approach of the AER, the proportions would be 90 per cent and 10 per cent for year 2, and so forth.

⁴ This also assumes a five-year regulatory period.

⁵ In contrast, if a ten-year trailing average was instead applied, then half of the debt portfolio at the commencement of the second regulatory period would be assumed to have been financed at the spot-rate immediately prior to the commencement of the first regulatory period. The transition in this case would be completed by the commencement of the third regulatory period.

⁶ Whilst, in principle, some form of transition could be contemplated for the extension of the trailing average to the debt risk premium, the limited variation in this parameter means that this is unlikely to be warranted.

1.3 Move to “Total Market Return” when estimating the cost of equity

The total market return (TMR) is the sum of the risk-free rate of return and the tax-adjusted market risk premium (TAMRP).⁷ Our second proposal is to follow the standard approach of the UK regulators, which is to estimate the TMR when deriving the cost of equity, and to allow the TAMRP to be determined as a residual, and so dependent on the level of the risk-free rate. At the core of the approach of the UK regulators is an implicit or explicit belief that the TMR is more stable over time than the TAMRP, so that an approach that focusses on estimating – and that prescribes – a TAMRP will introduce an excessive degree of volatility into the estimated cost of equity.

- Importantly, whilst moving to a TMR approach may improve the stability of WACC estimation over time, the view of the UK regulators is that this more stable estimate of WACC is also a more accurate estimate of the WACC. If this view is correct, then there would be no reason to believe that a trade-off is being performed between stability and accuracy, rather both goals would be pursued simultaneously.

Applying an approach that focusses on the TMR would imply two changes to how the Commission estimates the cost of equity and then gives effect to this decision in Input Methodologies.

- *Prescribe the TMR in the Input Methodologies* – the logic of the UK regulators would hold that the TMR should be prescribed in the Input Methodologies rather than the TAMRP. A TAMRP would still be required; however, this would be derived by deducting the risk-free rate, and so would vary depending on the level of the risk-free rate. The effect of this would be to reduce the variability in the estimated cost of equity considerably between reviews of the Input Methodologies. Once the TMR is fixed, if the risk-free rate falls, the TAMRP increases; however, this effect is symmetric – the benefit to investors that would result from a high interest rate would also be reduced.
- *Interpret history by looking at TMR rather than TAMRP* – when the UK regulators look at the historical average of realised equity returns as a means of predicting expected *future* returns, they focus on averages of the historical TMR rather than averages of the historical TAMRP (indeed, no weight appears to be placed on the average TAMRP). That is, the TMR is assumed to be stable, and so the better predictor of future requirements, rather than the TAMRP. The equivalent for the Commission would be to cease having regard to the historical TAMRP when deriving its cost of capital inputs, and to focus only on the historical TMR to the extent that history is considered. This would be a material change to the Commission’s current practice, whereby little weight is ascribed to the historical average TMR and substantial weight is applied to historical average TAMRP.⁸

We observe that, under the Commerce Commission’s current approach – which is informed by analysis from Dr Lally – a 20 per cent weight has been applied to the TMR approach, this being the

⁷ The tax-adjusted nature of the market risk premium is specific to the form of CAPM that is standard in New Zealand (the Brennan-Lally model, with both a “full” and “simplified” sub-option), which is different to the form of CAPM that is applied in the UK (where the classical form is standard); however, the issues discussed here are common.

⁸ The Commission also gives some weight to forward-looking models of equity returns, as do the UK regulators. However, there is no difference between focussing on TMR or TAMRP in a forward-looking model.

Siegel 2 approach, which was one of the five methods that Dr Lally averaged to arrive at his result.⁹ Moreover:

- Dr Lally’s estimate of the TAMRP for Chorus of 7.5 per cent was based on the risk-free interest rates observed in August 2019, which were historically very low, and caused a material difference between the TAMRP that is determined under an approach that assumes the TMR is stable over time relative to one that assumes the TAMRP is stable over time.
- However, Chorus’s Input Methodologies prescribed the TAMRP (rather than the TMR), and by the time the Commerce Commission applied the estimate to Chorus’ regulatory determination, the 5-year risk free rate had fallen an additional 55 basis points. This movement in risk-free interest rates meant that Chorus’s regulatory WACC fell further relative to what was expected in the Input Methodologies, which – under the TMR view of the world – would imply a further wedge between the regulatory WACC and the true cost of capital.

In summary, we recommend that the Input Methodologies specify the TMR (rather than the TAMRP), so that the TAMRP would be determined as a residual and depend on the estimate of the spot risk-free rate that was based on observations around the time of a determination. We recommend that the TMR parameter, in turn, be estimated in a manner that is consistent with the proposition that the TMR – rather than the (tax adjusted) market risk premium (TAMRP) – is more stable over time. That is, the TMR would be estimated with reference to the historically observed TMR (using the “Siegel 2” method), and cross-checked against forward-looking approaches¹⁰ (like the Dividend Growth Model (DGM)) and survey evidence on TMR.

⁹ The other methods were: two versions of the historical average ex post MRP, an *ex ante* estimate and survey evidence. Our recommendation would be to dispense with the *ex post* MRP approaches, and continue with the other approaches as cross checks. However, in the text we also note that any survey evidence needs to be interpreted carefully and focus on the TMR that is assumed by the surveyed party rather than the MRP in isolation.

¹⁰ The distinction between TMR and TAMRP is irrelevant when forward-looking methods are applied.

2. Trailing average of the cost of debt

2.1 Proposal to transition to averaging of the risk-free rate component

We propose the adoption of a staged forward averaging of the risk-free rate component of the cost of debt, similar to the approach adopted by the Australian Energy Regulator (AER) when it introduced its trailing average cost of debt approach during the formulation of its “Rate of return guideline” in 2013.

There are two types of trailing average that could be applied, namely:

- *Annual update option* – this is a trailing average that continues throughout the regulatory period and is accompanied by either an annual update to prices/revenue, as is the practice in Australia, or alternatively could be applied via an extension to existing *ex post* “wash up” arrangements, and
- *Simple fixed option* – this is a trailing average that runs to the start of the regulatory period but then is fixed, applying the same method as the debt risk premium.

Our preference is for the “annual update option” as this approach can be reflected in the actual debt management policy of a company that refinances a fixed proportion of its debt portfolio each year. We also recommend transitioning to the trailing average on a purely forward-looking basis in order to avoid the potential for stakeholder windfall gains or losses. We note that the term of the trailing average should also be reviewed: whilst a five-year term on its face may seem consistent with existing arrangements,¹¹ the term of the trailing average should reflect the term of debt at issuance that it would be efficient for a regulated business in Chorus’s position to issue, and five-years is lower than the practice of many infrastructure firms (including Chorus).

In Australia, much of the detailed analysis leading to the adoption of a trailing average approach for both the debt risk premium and risk-free rate components with a smooth transition was contained in the AER’s draft decision in 2013,¹² which was subsequently confirmed by the final decision.¹³ The trailing average approach and its implementation was subsequently confirmed in the 2018 review of the “Rate of return guidelines”.¹⁴

2.2 The current “hybrid” cost of debt method

The Commerce Commission’s 2020 final decision on fibre input methodologies determined to apply a five-year averaging of the debt risk premium for five-year term BBB rated debt, consistent with the method applied through the Part 4 input methodologies.¹⁵ A term credit spread differential (TCSD) could be applied to compensate firms for the term premium they incur if they actually issue debt with a term exceeding five years. The key question is how the risk-free rate component is incorporated, as

¹¹ Having said that, the existing regulatory arrangements for Chorus and in Part 4 recognise longer term debt via the potential for a term credit spread differential allowance, and we note that Chorus received such an allowance in the determination for its first regulatory period.

¹² AER (August, 2013), Better Regulation, Explanatory Statement, Draft Rate of Return Guideline.

¹³ AER (December, 2013), Better Regulation, Explanatory Statement, Rate of Return Guideline

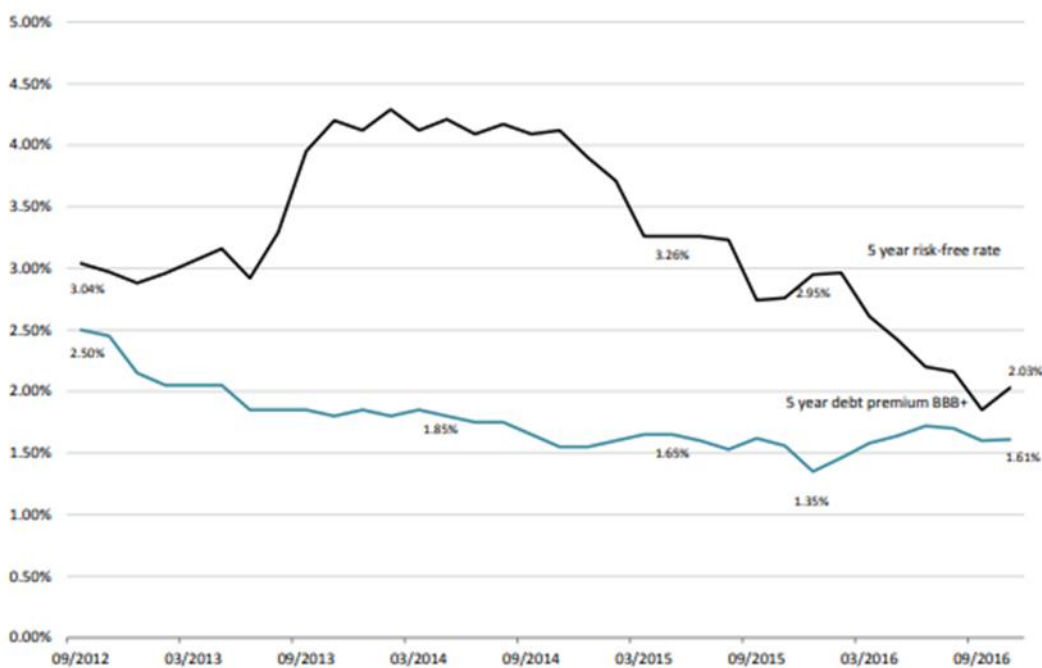
¹⁴ AER (July, 2018), Draft, Rate of return guidelines, Explanatory statement.

¹⁵ Commerce Commission (13 October, 2020), Fibre input methodologies: main final decisions – reasons paper.

this is currently proposed to be applied with reference to spot rates just prior to the commencement of a new regulatory period – in other words it is a “hybrid system”. The current approach combines the 5-year average debt risk premium with a spot risk-free rate. Thus, the stability of the cost of debt parameter also depends on the risk-free rate component.

It is well-known that in New Zealand the risk-free rate is a much more volatile variable than the debt risk premium. As displayed in Figure 1, this relative volatility of the risk-free rate component was observed by the Commerce Commission when undertaking its Input Methodologies review in 2016,¹⁶ and earlier in its 2015 determination on Maui Development Limited.¹⁷

Figure 1: Commission estimates of the risk-free rate and debt premium (BBB+)



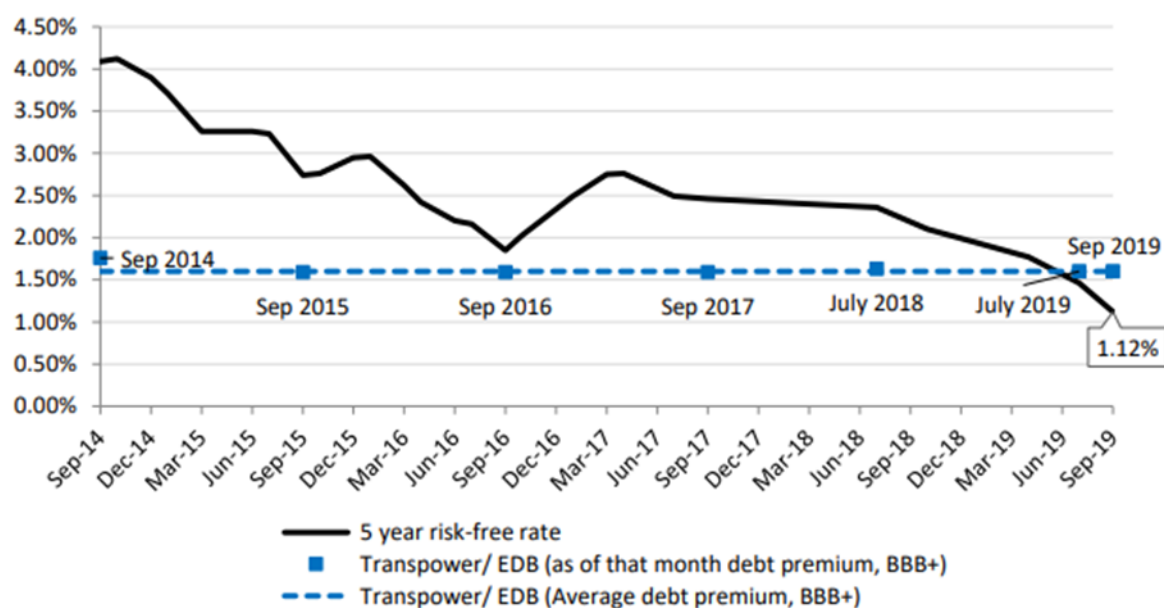
Source: Commerce Commission (20 December, 2016), p.36.

Figure 2 shows that in 2019, that over the period from 2014 to 2019, the Commerce Commission observed a very stable debt risk premium for Transpower. While the risk-free rate declined from over 4 per cent to 1.12 per cent, the debt premium faced by Transpower barely moved.

¹⁶ NZCC, (20 December, 2016), Input methodologies review decisions, Topic paper 4: Cost of capital issues.

¹⁷ NZCC (30 June 2015), Cost of capital determination for customised price-quality path proposals made by Maui Development Limited for gas transmission services, p.5.

Figure 2: Changes in the risk-free rate and debt premium for Transpower over time



Source: NZCC (25 September, 2019), p. 8.

After a debate of the issues in New Zealand,¹⁸ a hybrid approach was adopted, partly on the assumption that firms could themselves hedge the volatility of the risk-free rate component. Under the current “hybrid” cost of debt method being applied by the Commerce Commission, this creates two problems:

- Firstly, the volatility of the risk-free rate component of the debt proportion of the WACC introduces volatility into regulatory determinations that could be avoided by applying the trailing average to the risk-free rate component; and
- Second, owing to its relatively large size in the New Zealand market, Chorus is likely not to be able to enter swap contracts for the risk-free rate component of its debt in order to accommodate temporal fluctuations in the risk-free rate. The current approach assumes that a firm could replicate the benchmark cost of debt using interest rate swaps. However, if Chorus is unable to do this owing to its size, it will become exposed to a potential material mismatch of its debt cost relative to the regulatory benchmark. The same risk applies to other large regulated firms.

In Australia there was a long running debate about the introduction of a full trailing average approach, which was subsequently implemented and has operated for almost a decade.

¹⁸ For example, see: NZCC, (20 December, 2016), Input methodologies review decisions, Topic paper 4: Cost of capital issues; and Lally, Martin, (22 May, 2016), *Review of further WACC issues*, Capital Financial Consultants.

2.3 Reasoning behind the AER's (2013) adoption of a trailing average of the cost of debt

The AER considered three possible cost of debt approaches:

- **On the day approach** – the previously prevailing approach that assumed the whole of the debt holdings of a regulated business were re-financed over a short period, or that hedging arrangements can be applied to achieve an equivalent result.
- **“Hybrid” approach** – which applies the on the day approach to the underlying risk-free rate component and applies a trailing average approach to the debt risk premium component.
- **Trailing average approach** – which applies a trailing average to both the underlying risk-free rate component and the debt risk premium.

The AER preferred the trailing average approach, as it was considered to provide “incentives to engage in efficient debt financing practices.” Specific benefits of the trailing average approach were described as follows:¹⁹

- *It smooths movements in the return on debt over a number of years, which would result in lower price volatility for energy consumers and more stable returns for investors than the “on the day” approach.*
- *It minimises the consequence of a single measurement error.*²⁰
- *It is more reflective of the actual debt management approaches of non-regulated businesses and, therefore, is more likely to represent efficient financing practice.*

The majority of stakeholders supported the trailing average approach, although there were valid concerns about how it might be implemented.

2.4 Transitional arrangements

During the course of the AER's review, SP AusNet (an energy transmission and distribution business) submitted that an appropriate transition path:

- *Should compensate businesses consistent with NER 6.5.2(c). Note that this refers to ‘efficient financing costs of a benchmark efficient entity.’*
- *Should avoid large step changes in prices as this could create problems for customers to manage.*
- *Should maximise certainty for customers and businesses (consumers interested in certainty over prices)*

¹⁹ AER (August, 2013), Better Regulation, Explanatory Statement, Draft Rate of Return Guideline. p.84.

²⁰ This is because a larger number of observations are used in calculating the final estimate of the cost of debt.

SP AusNet and the AER both agreed that a method for transitioning to the trailing average cost of debt that had been proposed by the Queensland Treasury Corporation – and that became known as the “QTC method” – would be the most appropriate.²¹

Under this rule, at the time the NSP elects to use the moving average approach, the prevailing rate during the next rate reset period will apply for the first year. In the second year, the first-year rate will in effect have a 90% weighting, absent any increases in debt which affect the weighting, and that weighting will diminish by 10% each year. Based on a ten-year averaging period and quarterly observations, this is equivalent to setting the initial forty observations in the moving average to equal the average prevailing rate during the next rate reset period.

The AER in its 2018 draft decision outlined the importance of transitioning to the trailing average in a manner that does not provide windfall gains or losses to stakeholders.²²

A key feature of our transition to the trailing average is that, in each year during which we update the trailing average portfolio, we do so by adding an estimate of debt based on the prevailing cost of debt. It is this feature of our approach that provides for revenue neutrality and satisfies the NPV=0 principle.

The AER confirmed this view in its 2018 final decision.²³

In the draft decision we stated that a key feature of our transition to the trailing average is that, in each year during which we update the trailing average portfolio, we do so by adding an estimate of debt based on the prevailing cost of debt. It is this feature of our approach that provides for revenue neutrality and satisfies the NPV=0 principle.

In a number of papers, the Commerce Commission’s consultant Dr Martin Lally also highlighted the need for a transition to a trailing average that does not transgress the NPV=0 principle.²⁴ We believe that applying the essence of the QTC method – which would imply adopting a forward-looking implementation of the trailing risk-free rate component – that we discuss further Section 2.5 below achieves the revenue neutrality that is desired.

2.5 Options for a trailing average of the risk-free rate component

Annual update of the trailing average

Under the “annual update” option, assuming a 5-year regulatory period and that 5-year term debt issuance were prudent and efficient for the regulated supplier:

²¹ Queensland Treasury Corporation (8 June, 2012), *Moving average approach – detailed design issues: Supplementary submission to the economic regulation of network service providers rule change process*, p.2.

²² AER (July, 2018), Draft, Rate of return guidelines, Explanatory Statement, p. 335.

²³ AER (December, 2018), Rate of return instrument, Explanatory Statement, p.281

²⁴ Lally, Martin, (21 April, 2015), *Review of submissions on the cost of debt*, Report for the Australian Energy Regulator; and Lally, Martin, (22 May, 2016), *Review of further WACC issues*, Capital Financial Consultants.

- the risk-free rate element for the first year of the next regulatory period would comprise 100 per cent spot rate,
- in the second year, the first year's risk-free rate comprises 80 per cent spot rate and 20 per cent reflecting the actual interest rates over the first year of the regulatory period, and
- so on.

This would be accompanied by either an annual update to prices / revenue, as is the practice in Australia, or alternatively could be applied via an extension to existing “wash up” arrangements.

Simple fixed trailing average

Under the “simple fixed” option, the same transition would be applied as in the “annual update” option; however, as the risk-free element would be locked-in at the trailing average prevailing at the start of a regulatory period, the practical effect is that:

- the trailing average for the first regulatory period would be the same as the spot rate at the start, and
- assuming a five-year trailing average is applied,²⁵ the transition would have been completed by the commencement of the next regulatory period, and so the risk-free component would then simply be determined on the basis of the average of the past five years of interest rates.

Preference for an annual update of the trailing average

We recommend that the annual update approach be adopted as this option is capable of being matched by companies' actual debt management. That is, if it were prudent and efficient for a regulated supplier to issue 5-year term debt and refinanced one-fifth its debt portfolio each year, its actual cost of debt could closely reflect the regulatory cost of debt allowance being provided via the trailing average approach. This is of particular significance to Chorus, which is a large issuer in the New Zealand market and is therefore unable to match the risk-free rate component to assumed debt terms via the swap market owing to the relative thinness of that market.

Whilst the annual update approach is our preferred option, adoption of either option would have the effect of reducing the volatility of WACC determinations when the cost of debt component is dependent on a highly volatile spot risk-free rate.

Transition on a forward-looking basis

In previous debates surrounding the introduction of a trailing average cost of debt in both Australia and New Zealand, regulators and their advisers like Dr Martin Lally have placed emphasis on achieving a transition to the new approach that satisfies the NPV=0 Rule and avoids stakeholders realising windfall gains or losses.

Our proposal to achieve a transition on a forward-looking basis achieves the NPV=0 objective. By applying 100 per cent weighting to the prevailing spot rate at the commencement of the period (i.e. a proxy for “history”), and successively reducing this weighting by 20 percentage points each year as

²⁵ This also assumes a five-year regulatory period.

subsequent prevailing spot rates (which are NPV neutral at each point in time) are substituted, a complete transition to a trailing average is achieved by the 5th year (again, assuming that issuance of 5-year term debt is appropriate).

We also note that although the debt risk premium is already determined by a 5-year trailing average, it would not be possible to graft a “historical” trailing average of the risk-free component onto the debt risk premium and remain revenue neutral. After 5 years of implementation, under the assumptions regarding 5-year term debt discussed above, the risk-free and debt risk premium components would become aligned. After that point the trailing average would be for the entire cost of debt.

As noted above, the debt risk premium component is currently determined as a five-year trailing average. Whilst there has been little variation in this parameter over time, it would make sense for the debt risk premium to be aligned with how the risk-free rate element of the cost of debt is determined in the future. This would imply:

- if the “annual update” option is applied, then the debt risk premium component should also be redetermined annually (noting that the Commission already estimates this parameter on a near-continuous basis in any event for Information Disclosure purposes), and
- if the term of the trailing average is extended beyond five-years (say, to 7 or 10 years), then the term of the debt risk premium element should also be extended.²⁶

2.6 Conclusion on trailing average of the risk-free component of the cost of debt

We have noted that the current “hybrid” cost of debt method being applied by the Commerce Commission creates two problems, because the volatility of the risk-free rate component of the debt proportion of the WACC introduces volatility into regulatory determinations and owing to its relatively large size in the New Zealand market, Chorus is not able to enter swap contracts for the risk-free rate component that would insulate it from this volatility. This would leave Chorus, and other large regulated suppliers, exposed to the risk that their cost of debt will not match the regulatory benchmark.

Our proposed solution to these problems is to adopt the trailing average cost of debt for the risk-free rate component via the “annual update” option, and to achieve a transition to that method on a purely forward-looking basis. We have reviewed the debates that have taken place in Australia and New Zealand when a trailing average of the risk-free rate was being considered and found that an overarching concern was whether a transition could be accomplished that would not allow stakeholders to earn windfall gains or losses. We are confident that the forward-looking, gradual adoption of the trailing average achieves that objective.

²⁶ Whilst, in principle, some form of transition could be contemplated for the extension of the trailing average to the debt risk premium, the limited variation in this parameter means that this is unlikely to be warranted.

3. Applying a Total Market Return approach to estimate the cost of equity

3.1 Proposal to apply the Total Market Return approach

In order to provide greater stability in estimation of the regulatory WACC we propose that the Commerce Commission adopt a Total Market Return (TMR) approach to estimate the cost of equity within the Capital Asset Pricing Model (CAPM) framework, as has been applied for some time in the UK and in Italy. Within the framework of the simplified Brennan-Lally CAPM, this would imply specifying the cost of equity as follows:

$$K_e = \text{Risk-free rate} \times (1 - \text{tax rate}) + \text{Equity Beta} \times (\text{TMR} - \text{Risk-free rate} \times (1 - \text{tax rate}))$$

The Input Methodologies would specify the equity beta, (investor) tax rate and TMR, and apply an estimate of the risk-free rate that was based on observations around the time of a determination. The TMR parameter, in turn, would be estimated in a manner that is consistent with the proposition that the TMR – rather than the (tax adjusted) market risk premium (TAMRP) – is more stable over time. That is, the TMR would be estimated with reference to the historically observed TMR,²⁷ and cross-checked against forward-looking approaches²⁸ and survey evidence on TMR.

A key benefit of adopting the TMR approach is the stability that it provides for regulated returns, since much of the short-term volatility in the risk-free interest rates would be offset by movements in the TAMRP. However, the firm belief of the UK regulators and others is that the TMR approach will also provide more accurate estimates of the cost of equity.

3.2 The Commerce Commission applies the TAMRP approach

The Commerce Commission currently specifies the simplified Brennan-Lally equation for the cost of equity (K_e) as follows:

$$K_e = \text{Risk-free rate} \times (1 - \text{tax rate}) + \text{Equity Beta} \times \text{TAMRP}$$

where TAMRP is the Tax Adjusted Market Risk Premium. The equity beta, (investor) tax rate and TAMRP are specified in the Input Methodologies. A consequence is that a material change in the risk-free rate will generate a material change in the estimated cost of equity.²⁹

During recent years, when risk free rates proxied by the New Zealand Government five-year bond rate fell to record lows, the Commerce Commission continued its approach of combining the spot risk-free rate with a long term TAMRP when estimating the cost of equity using the Capital Asset Pricing Model (CAPM). This approach has been adopted despite submissions that in the circumstances it is likely to under-estimate the cost of equity, since the cost of equity is likely not to have fallen to the same degree as the TAMRP.

²⁷ In the notation of Dr Lally, this is the “Seigel 2” method.

²⁸ The distinction between TMR and TAMRP is irrelevant when forward-looking methods are applied.

²⁹ The tax term under the simplified Brennan-Lally provides some dampening, such that a 1 percentage point change to the risk-free rate will imply a 0.72 percentage point change to the cost of equity.

In September 2019 Dr Martin Lally estimated a TAMRP of 7.5 per cent for New Zealand, which was applied in Chorus' current Input Methodologies. Dr Lally's analysis was based on the results displayed in Table 1 below.³⁰ The median value of 7.3 per cent was rounded up to obtain the 7.5 per cent TAMRP estimate. A weighting of 20 per cent was applied to each of five estimation methods, with only one of those methods, Siegel version 2, being the TMR method. It is apparent from the results in the table that the TMR approach at that time, when the risk-free rate was almost at historical lows, provided the highest estimate of the TAMRP.

As discussed further below, there is also strong evidence indicating that market practitioners apply the TMR (by using a longer-term average of the risk-free rate) even if they maintain in a survey that they are applying an MRP closer to the long-term historical average. Hence, providing 20 per cent weight to surveys based on only a TAMRP perspective is likely to under-estimate the effective TAMRP that is applied by market practitioners when a TMR perspective is adopted.

Table 1: Estimates of the TAMRP with 3, 4, and 5 year risk-free rates

Method	Description	Weight	Risk-free rate period		
			3 years	4 years	5 years
Ibbotson estimate	Historical (ex post) TAMRP	20.0%	7.4%	7.4%	7.4%
Siegel estimate: version 1	Historical (ex post) TAMRP less adjustments	20.0%	6.0%	6.0%	6.0%
Siegel estimate: version 2	Historical (ex post) TMR less risk-free rate	20.0%	9.5%	9.4%	9.4%
DGM estimate	Forward looking estimates	20.0%	7.3%	7.3%	7.3%
Surveys	Surveys of MRP used (practitioners / academics)	20.0%	6.4%	6.4%	6.4%
Median		100.0%	7.3%	7.3%	7.3%

Source: Lally (26 September, 2019), p.21.

At the time that Dr Lally undertook these estimates, he reported that during August, 2019 the average 5-year New Zealand risk-free rate was 0.88 per cent. However, by the time the decision for Chorus was implemented the risk-free rate at a 5-year term had fallen further. This further reduction in the risk-free rate, between the time the TAMRP policy of 7.5 per cent was established and the Chorus decision was finalised, means that the inaccuracies resulting from the ATMRP approach were compounded. That is, the final decision shifted the WACC further away from where the market's return requirements would have been and introduced additional volatility into Chorus' returns.

The Commerce Commission's approach mirrors that adopted by several Australian regulators but is not the approach that has been used explicitly in the UK and Italy. Whilst in the US the Federal Energy Regulation Commission (FERC) has only recently formally afforded significant weight to the CAPM, it is apparent from an examination of US regulatory decisions that for some time the cost of equity has not fallen by the same degree as the risk-free rate.

These approaches are discussed further below.

³⁰ Martin Lally, (26 September, 2019), *Estimation of the TAMRP*, Capital Financial Consultants, p.21.

3.3 Application of the TMR approach by UK and Italian regulators

The TMR approach is applied by all UK regulators as well as the Appeals body, the CMA. It is also applied by the Italian Regulatory Authority for Energy, Networks and the Environment (ARERA).³¹

3.3.1 Ofcom's adoption of the TMR approach

The UK's telecommunications regulator, Ofcom, formally adopted the TMR approach in 2014, along with a number of other UK regulators.³² In 2016, Ofcom noted³³ that in previous years the MRP had not declined at the same pace as the real risk-free rate had been an aspect of its decisions for some years. The growing disparity between the spot risk-free rate and the risk-free rate adopted in regulatory determinations was displayed in its Figure A30, which we reproduce below.³⁴

Figure 3: Yields on 10-year gilts and Ofcom decisions on real RFR



Source: Bank of England, Ofcom analysis. Data as at 30 November 2015.

Source: Ofcom (2016), *Business Connectivity Review, Annex 30, p.68.*

Ofcom observed that other UK regulators making decisions in the 2014-2015 period considered the MRP (ERP) and real risk-free rate (RFR) together “because there may be an inverse relationship between the real RFR and ERP such that the TMR is more stable.”³⁵ It also noted that:³⁶

³¹ The Brattle Group (June, 2020), *A Review of International Approaches to Regulated Rates of Return*, Report prepared for the Australian Energy Regulator, p. 109.

³² Europe Economics (October, 2018), *Cost of Capital: Total Market Return*, pp.4-5.

³³ Ofcom, (2016), *Business Connectivity Market Review, Annex 30.*

³⁴ Ofcom, (2016), *Business Connectivity Market Review, Annex 30, p.68.*

³⁵ Ofcom, (2016), *Business Connectivity Market Review, Annex 30, p.66.*

³⁶ Smithers & Co, (13 February, 2003), *A study into certain aspects of the cost of capital for the regulated utilities in the UK*, pp.48-49.

The 2003 Smithers & Co report recommended that the costs of equity should be derived from estimates of the TMR, with any changes in the real RFR or ERP offsetting each other.

Ofcom's reason for preferring to estimate the TMR rather than MRP (ERP) was that:³⁷

Estimating the ERP directly is difficult since it depends on the weight placed on different sources of evidence, none of which will perfectly capture what is not a directly observable variable; the expected ERP. While the TMR is also not directly observable, the TMR has been historically less volatile than the ERP. We have considered historical ex-post and historical ex-ante estimates of the TMR.

The estimation approaches applied were:

- *Historical ex-post estimates of the TMR* – the 2016 edition of the Credit Suisse Global Investment Returns Yearbook (compiled by Dimson, Marsh and Staunton, or DMS) and the 2015 Barclays Equity Gilt Study were consulted for evidence on historical returns. These sources indicated a real historical *ex-post* average annual return on equity of 6.4 per cent to 7.2 per cent for holding periods of 1 to 20 years.
- *Estimates of the “historically expected” TMR* – were made using two approaches:
 - The Fama and French method, which estimates the real TMR from the sum of average real dividend yields and the average real rate of dividend growth (suggesting a long run expected TMR from 1900 to 2014 of 5.5 per cent).
 - The DMS 2016 study was considered, as it attempted to infer what component of historical returns reflected investor expectations as opposed to non-repeatable good or bad luck. This approach implied an expected real TMR of 5.7 per cent to 6.2 per cent.

Ofcom concluded that a real TMR of 6.1 per cent was appropriate, which given a 3.3 per cent expected inflation rate implied a nominal TMR of 9.6 per cent, and an implied real ERP (MRP) of 5.1 per cent given a real risk-free rate of 1 per cent. Ofcom cross-checked the implied ERP (MRP) using the TMR approach against the Bank of England's ERP (MRP) forward-looking estimates using the Dividend Growth Model (DGM), survey evidence and regulatory precedent, and was found to be broadly consistent.

3.3.2 Other UK regulators' application of the TMR approach

Like the Ofcom (2016) decision, all UK regulators adopted a formal TMR approach during the period 2013-2018, which has considered similar historical *ex ante*, and *ex post* evidence, as well as direct estimates of the TMR using multi-stage dividend discount models and expectations of finance practitioners. In its advice to Ofwat, Europe Economics concluded that:³⁸

The preponderance of this evidence is consistent with a CPIH-deflated TMR range of 6.0-7.0 per cent, i.e. implying a drop at the lower end compared with our 2017 recommendation. That would be consistent with a point estimate for the CPIH-deflated TMR 6.50 per cent. At

³⁷ Ofcom, (2016), Business Connectivity Market Review, Annex 30, p.68.

³⁸ Europe Economics (December, 2019), *The Allowed Return on Capital for the Water Sector at PR19 – Final Advice*, p.22.

2 per cent assumed CPIH that would imply a nominal TMR range of 8.12-9.14 per cent, with a nominal TMR point estimate of 8.63 per cent. (Emphasis in original)

Ofwat noted that among the methods it had applied to estimate real TMR, “the area of overlap lay in the range of 6.5% to 6.6% in CPIH terms, from which [it] picked a point estimate of 6.5%.”³⁹

3.3.3 ARERA: Italian regulator’s application of the TMR approach

The Italian Regulatory Authority for Energy, Networks and the Environment (ARERA) regulates energy infrastructure, water and wastewater in Italy. The regulatory period is generally 6 years, and the rate of return is determined by estimating the WACC using the CAPM methodology. However, there is a base parameter update covering inflation, risk-free rate and market risk premium (MRP) each 3 years.

ARERA calculates the MRP as a residual by subtracting the real risk-free rate from the real TMR. In 2015 ARERA calculated a real TMR of 6.0 per cent and subtracted the real risk-free rate of 0.5 per cent to obtain an MRP estimate of 5.5 per cent.⁴⁰

3.4 FERC’s application of the CAPM

In 2020 FERC determined to apply equal weighting to the DCF and CAPM approaches when estimating the return on equity of gas pipelines, although a broader range of methods are applied to electricity transmission businesses.⁴¹ As noted by The Brattle Group, FERC applies a “Risk Premium model” that analyses past ROE decisions to determine a current ROE benchmark. Importantly:⁴²

The FERC has recognized that there is a statistically significant relationship between historical movements in interest rates and equity risk premiums (defined as the authorised return on equity for electric transmission utilities over and above bond rates). When interest rate levels are relatively high, equity premiums narrow, and when interest rates are relatively low, equity risk premiums widen. In order to calculate the equity risk premium, the FERC examines all electric transmission determinations after the Energy Policy Act of 2005.

In other words, the FERC obtains its risk premium estimate as a residual in a manner that has a similar effect to estimation of the TMR and subtraction of the risk-free rate.

3.5 Australian Energy Regulator’s views on the TMR approach

The AER has considered the TMR approach (which is referred to as the “Wright Approach”) on several occasions since 2013 and on each occasion has rejected its implementation. In its current round of discussions aimed at revising its periodic “Rate of return instrument”, the AER engaged three consultants, CEPA, The Brattle Group, and professors Graham Parkinson and Stephen Satchell. The

³⁹ Ofwat (2019), PR19 final determinations: Allowed return on capital appendix, p.43.

⁴⁰ This decision is summarised in The Brattle Group (June, 2020), *A Review of International Approaches to Regulated Rates of Return*, Prepared for The Australian Energy Regulator, pp.107, 109.

⁴¹ FERC (2020), *Inquiry Regarding the Commission’s Policy for Determining Return on Equity*, 171 FERC, ¶ 61,155, p.2.

⁴² The Brattle Group (June, 2020), *A Review of International Approaches to Regulated Rates of Return*, Report prepared for the Australian Energy Regulator, p. 93.

first two consultants recommended that the AER accord material weight to the TMR approach (“Wright Method”). The AER summarised the views as follows:⁴³

The consultants offered contrasting views on the role of the DGM to estimate an MRP and the existence of a relationship between the risk-free rate and MRP.

The Brattle Group’s report recommended the use of a DGM to estimate an MRP and the existence of a relationship between the risk-free rate and the MRP.

The CEPA report suggested that the AER consider three options for calculating the MRP from historical data:

- *Fixed MRP approach*
- *Fixed total market return (TMR) approach*
- *Hybrid approach*

In contrast, the Partington and Satchell report did not recommend any use of the DGM, primarily because of problems of implementation, nor did the report support using the fixed total market return (TMR) approach.

The AER reached the same conclusion as the Partington and Satchell report. However, the Brattle Group’s report did not only recommend use of the DGM to estimate the MRP. Its discussion of MRP estimation methods included those applied by a number of regulators (Ofgem, Ofwat and ARERA) where the MRP is estimated as the residual after subtracting the risk-free rate from the TMR. The Brattle Group concluded that:⁴⁴

Fundamentally, we view the consideration of multiple methods [to estimate the MRP] favourably as they provide different types of information. Using a single model implies placing zero weight on the information in other models, which we think is unlikely to be the best approach.

The AER’s objections to applying the TMR approach can be summarised as follows:

- There is no generally accepted theory to explain a negative relationship between the MRP and the risk-free rate,
- There is no predictable relationship between the MRP and the risk-free rate, and hence the TMR method cannot be implemented, and
- Practitioners (independent experts and survey respondents) are observed not to implement a TMR approach.

⁴³ AER (December, 2021), Rate of return: Overall rate of return, equity and debt omnibus, Final working paper, p. 32.

⁴⁴ The Brattle Group (June, 2020), *A Review of International Approaches to Regulated Rates of Return*, Report prepared for the Australian Energy Regulator, p. 45.

We consider each issue in turn.

3.5.1 No theory explaining a negative relationship between the risk-free rate and the MRP

In its 2018 Rate of return instrument the AER concluded that:

We are of the view that there is neither strong theoretical reasons, nor strong empirical evidence, to support assumption of an ongoing and consistent inverse relationship between the risk free rate and the MRP... Whilst there are times the MRP and risk free rate may show a negative correlation, this does not prove a causal relationship.

As an example, the AER pointed to the fact that during the GFC (global financial crisis) interest rates decreased through monetary authorities expanding credit and reducing interest rates including those for Commonwealth Government Securities (CGS) which are the risk-free proxy in Australia, while market investors demanded a higher MRP. Although this created the impression of a negative correlation, each movement was causally unconnected.

More recently the AER issued its Equity Omnibus draft working paper, which Queensland Treasury Corporation (QTC) has responded to with a submission.⁴⁵ QTC considered that the key question to ask is:⁴⁶

*Have the factors that have contributed to the long-term fall in CGS yields caused the required return on equity (ie, **ERm**) to fall by the same amount?*

QTC noted that recent speeches by senior central bankers in the US and Australia have focussed on the reasons that the equilibrium yield of government securities have fallen since the 1970s and 1980s, and why this phenomenon has no effect on the *ERm* (i.e., the Expected TMR). Richard Clarida, Vice Chair of the United States Federal Reserve System noted that since government bonds had a low positive beta against stocks in the 1970s and 1980, their value rose and fell with stocks, and they provided a diversification benefit when held in a portfolio together with stocks.⁴⁷ Since the late 1990s nominal bonds have had a negative beta as low as -0.20 against stocks, which provides them with hedging value. This in turn has given nominal bonds a value that is reflected in reduced yields – a process that is independent of *ERm*, and will result in a negative relationship between the *ex ante* MRP and bond yields.

In 2021 Brad Jones, Head of Economic Analysis at the Reserve Bank of Australia (RBA) noted that when government bonds “payoff in recessions [they] are highly valuable for their consumption smoothing properties, and so can attract demand even at low or negative yields.”

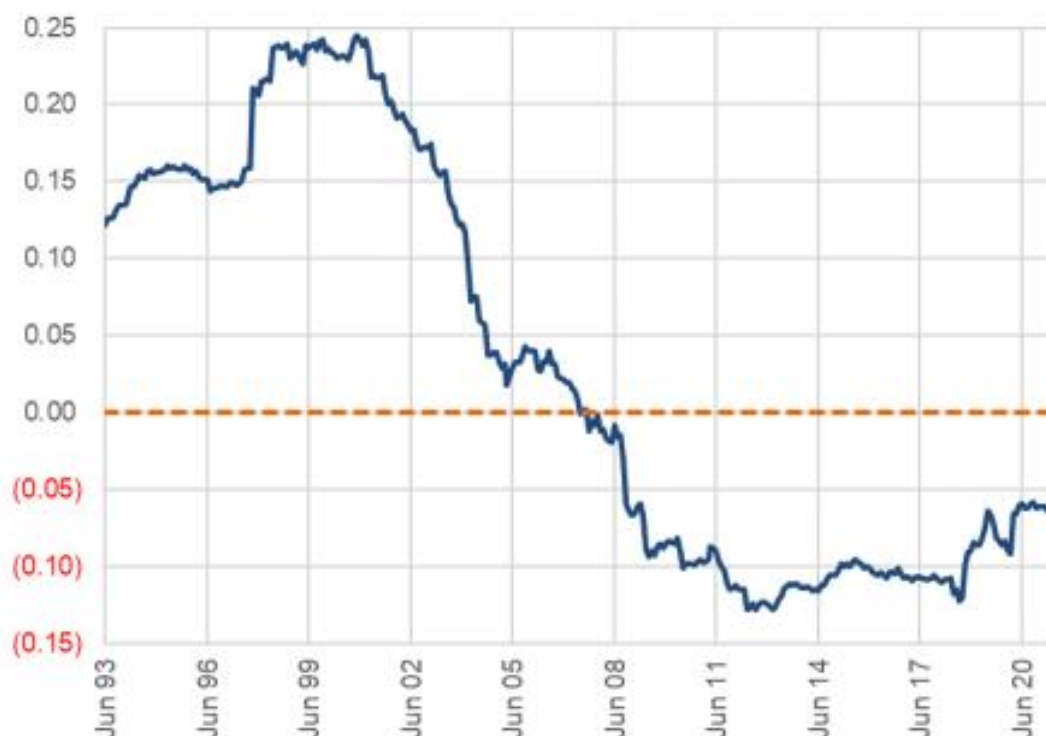
Again, QTC noted that this process is independent of *ERm*. As displayed in Figure 4 below, QTC confirmed the switch in bond (CGS) beta from being mildly positive in the period prior to the GFC, to mildly negative during and since the GFC. However, the slide in bond beta began around the turn of the century.

⁴⁵ QTC, (3 September, 2021), *Submission to the Equity Omnibus draft working paper*.

⁴⁶ QTC, (3 September, 2021), *Submission to the Equity Omnibus draft working paper*, p.2.

⁴⁷ R. Clarida (2019), *Monetary Policy, Price Stability, and Equilibrium Bond Yields: Success and Consequences*, p.8.

Figure 4: 10-year CGS Beta estimate – Rolling 10-year periods



Source: RBA, S&P. QTC calculations.

QTC referenced three academic papers that in its words:⁴⁸

provide sound empirical and theoretical reasons for why the systematic risk of nominal bonds changed from positive to negative circa 2000. The common theme is that a change in the correlation between inflation and measures of real economic activity has changed the timing of when nominal bonds are expected to deliver strong real returns relative to equities.

A fourth paper links these reasons to the success of monetary policy in reducing inflation, inflation volatility and in anchoring inflation expectations at historically low levels.

In QTC’s view the theoretical and empirical analysis is sufficient to prompt a departure from the AER’s 2018 position, which was to assume that there is no negative relationship between the *ex ante* MRP and the spot risk-free rate. On the other hand, CEPA’s view was more cautious:⁴⁹

From 1989 onwards, central banks, starting with New Zealand, began explicitly targeting inflation through monetary policy. We consider that this had a material effect on investor

⁴⁸ See QTC, (3 September, 2021), *Submission to the Equity Omnibus draft working paper*, p.4 referencing: J. Campbell, C. Pflueger and L. Viceira (May, 2019), *Macroeconomic Drivers of Bond and Equity Risks*; Li, Zha, Zhang and Zhou (October, 2020), *Stock-bond Return Correlation, Bond Risk Premium Fundamentals, and Fiscal-Monetary Policy Regime*; J. Campbell, A Sunderam and L. Viceira (2016), *Inflation bets or deflation hedges? The changing risks of nominal bonds*, and F. Gourio and P. Ngo (January, 2020), *Risk Premia at the ZLB: A Macroeconomic Interpretation*.

⁴⁹ CEPA (16 June, 2021), *Relationship between RFR and MRP*, Australian Energy Regulator (AER), p.6.

expectations and the way that both short and long rates were set in the relevant developed economies. It is plausible therefore that a substantial structural change in MRP and its relationship to other economic variables would have occurred at around that time.

Nonetheless, we accept that we have not yet identified a strong theoretical reason for why the direction of the relationship changed in the way that it did.

CEPA nevertheless recommended that the AER attach material weight to the TMR approach. CEPA referenced none of the research reports that QTC considered critical to understanding the reasons for the shift in the relationship between the Expected MRP and the spot risk-free rate, and neither did the AER's Final Equity Omnibus report.

3.5.2 No predictable relationship between the MRP and the risk-free rate

The AER considers that a TMR approach cannot be implemented as the relationship between the Expected MRP and the spot risk-free rate cannot be predicted. However, the Italian regulator and every UK regulator including Ofcom and the appeals body (CMA) has been implementing the TMR approach for up to almost a decade now. Describing Ofcom's application of the TMR methodology, Europe Economics noted that:⁵⁰

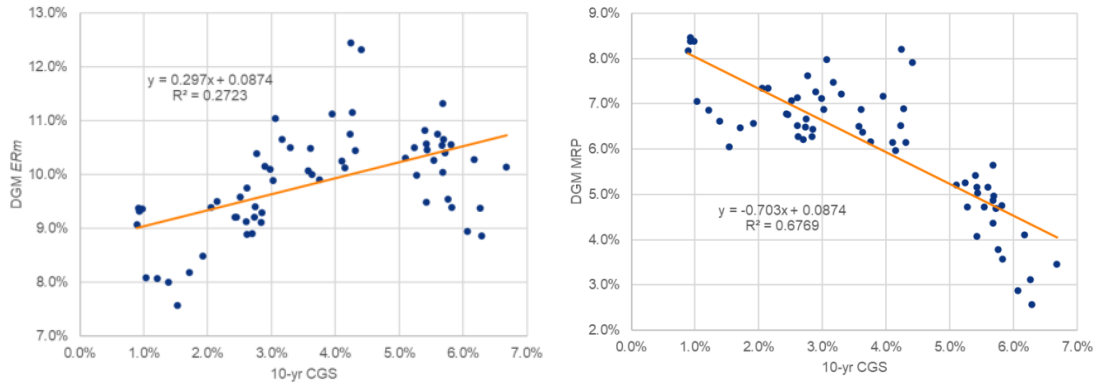
Neither the TMR nor the ERP is directly observable. Both are forward-looking variables relating to the expected return required by investors for investing in a diversified portfolio. On the grounds that the total returns earned by stock market investors have historically been less volatile than the premium earned over gilt yields, Ofcom started with estimates of the TMR and then calculated the ERP as a residual (by subtracting the risk-free rate). These estimates were then cross-checked with direct evidence on the ERP.

In advising the AER, CEPA held that there is "no good evidence" that the MRP can be assumed to be independent of the risk-free rate, and in its submission QTC provided evidence to the contrary. In Figure 5 below (reproducing QTC's figures 5 and 6) we find that:

- During the whole 2005-2021 period the linear trend of 10-year CGS regressed on the QTC's DGM-generated *ERm* (Expected TMR) showed a slope of only **0.30**, which falls well short of the slope of unity assumed by the AER's approach to MRP estimation, however
- During the same period the linear trend of the 10-year CGS regressed on the QTC's DGM-generated MRP showed a slope of -0.70 and a much higher R-squared of 0.68, which is materially less than the slope of 0.0 assumed by the AER's approach to MRP estimation.

⁵⁰ Europe Economics (October, 2018), *Cost of Capital: Total Market Return*, p.2.

Figure 5: DGM ERm vs spot risk free rate, and DGM MRP vs spot risk-free rate (2005-2021)



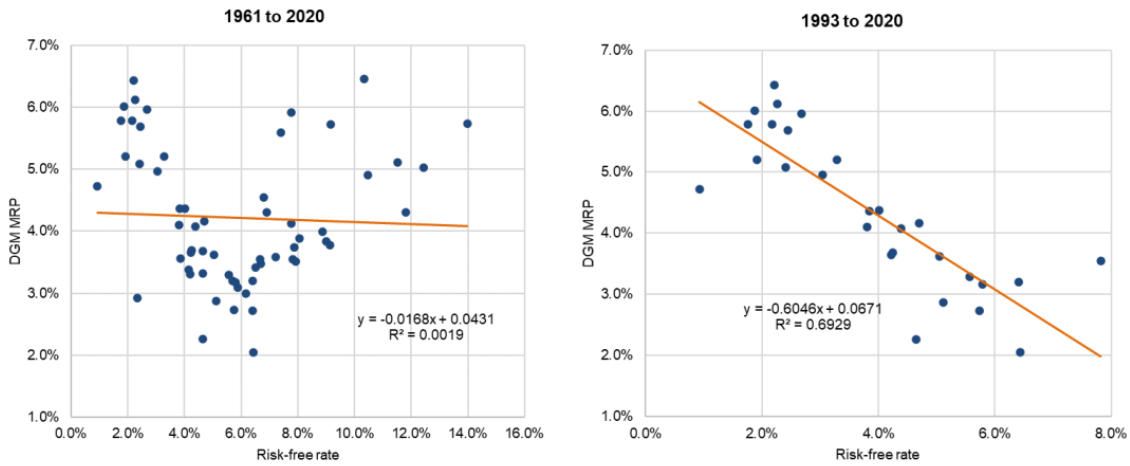
Source: Bloomberg, Yieldbroker. QTC calculations.

Source: Bloomberg, Yieldbroker. QTC calculations.

Using Damodaran’s data for the US, which were also mentioned by CEPA, QTC found similar relationships to those found in Australia could be observed over a longer period, with the structural break observed in 1993. These are shown in Figure 6 below.

In QTC’s view this empirical evidence strengthens the case for a departure from the approach taken by the AER in its 2018 Rate of return instrument, which “gives 100 per cent weight to an estimation approach that assumes no relationship exists between the *ex ante* MRP and the prevailing CGS yield.”⁵¹

Figure 6: Sub-period analysis of implied MRP vs prevailing risk-free rate in the US (1993 break point)



Source: Damodaran (2021)

⁵¹ See QTC, (3 September, 2021), *Submission to the Equity Omnibus draft working paper*, p.11.

3.5.3 Practitioners do not implement a TMR approach

In its 2018 Rate of return instrument the AER concluded that its “review of broker reports and valuation reports do not indicate use of the Wright CAPM in practice.”⁵² In its recent Omnibus report, the AER reached the same conclusion adding the following observation:⁵³

We also note that CEPA considered evidence on the approaches to MRP used by financial market practitioners and concluded that while there is acceptance that MRP may change, in practice, the MRP has been relatively stable.

The CEPA report assembled a sample of independent expert reports drawn from 8 firms, which it noted was “not designed to act as a comprehensive sample of independent expert reports undertaken during this period.” After reviewing the methods applied, CEPA concluded that “over the entire period (2013 to 2021) the MRP applied was commonly 6% with no adjustment for the falling RfR over this period.”⁵⁴

The AER’s observation that CEPA found MRP to be stable, commonly set at 6 per cent, over the period in question does not support for its contention that the behaviour of practitioners does not support the TMR approach. QTC’s submission to the AER’s current review stated that in its view the independent expert reports studied by CEPA showed that:⁵⁵

- *If a 6.0 per cent MRP was used its was common practice for an uplift to be added to the risk-free rate to reduce the impact of falling CGS yields.*
- *If the prevailing CGS yield was used it was typically added to an MRP that was higher than the long-term average of 6.0 per cent.*

QTC’s observations about CEPA’s sample support a TMR approach being applied by independent experts, as do the findings of Synergies’ comprehensive analysis of independent expert reports, whose findings are summarised in Figure 7 below.⁵⁶ The TMR and risk-free rate over the whole period averaged at 9.7 per cent and 2.6 per cent respectively, which imply that the experts were applying:

- A 7.1 per cent implied MRP plus a 2.6 per cent risk-free rate; or
- A 6.0 per cent MRP and a 3.7 per cent risk-free rate (which would have meant a 1.1 per cent uplift to the spot risk-free rate).

⁵² AER (December, 2018), Rate of return instrument, Explanatory Statement, p.86.

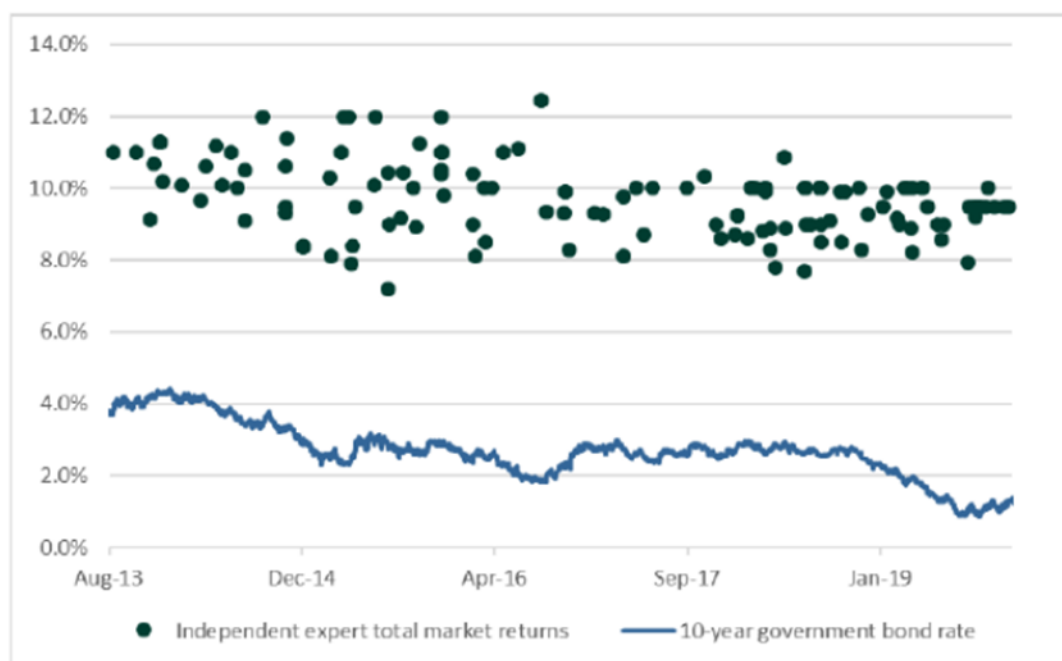
⁵³ AER (December, 2021), Rate of return: Overall rate of return, equity and debt omnibus, Final working paper, p.40.

⁵⁴ CEPA (16 June, 2021), *Relationship between RFR and MRP, Final Report*, Australian Energy Regulator (AER), p.18.

⁵⁵ QTC (3 September, 2021), *Submission to the Equity Omnibus draft working paper*, p.13.

⁵⁶ Synergies Economic Consulting (May, 2020), *Determining a WACC estimate for Port of Melbourne*, p.115.

Figure 7: Total Market Returns used in independent expert reports (Australia)



Note: The TMRs in this chart are presented on a post-tax basis and do not include any ad hoc risk premia, which would further increase the post-tax return on equity for a firm with an equity beta of 1.

Data source: Connect 4, Synergies calculations

Source: Synergies (2020). Figure 9 on p. 115.

QTC concluded that the behaviour of the independent experts indicates that as a group they were approximating a “hybrid approach” where a TMR approach and the fixed MRP approach were being given equal weighting. It also commented on the bias that is likely to affect the AER’s analysis of surveys of practitioners and academics if they are only asked “what they expect the MRP to be in the Australian market.”⁵⁷ This is because, when viewed in isolation, obtaining views on the median or average MRP in a survey would not allow valid conclusions to be reached on how the respondents view the expected TMR. To obtain the respondents’ views on the expected TMR, the survey would need to ask a direct question about TMR, or obtain respondents’ views on what risk-free rate should be applied in combination with the MRP they would apply.

While CEPA concluded that it found a:⁵⁸

relatively constant [MRP from surveys] at least over the time period examined. This suggests the assumed relationship is that total market return would decrease [sic] as risk-free rate decreases.

However, QTC undertook:⁵⁹

⁵⁷ QTC (3 September, 2021), *Submission to the Equity Omnibus draft working paper*, p.15.

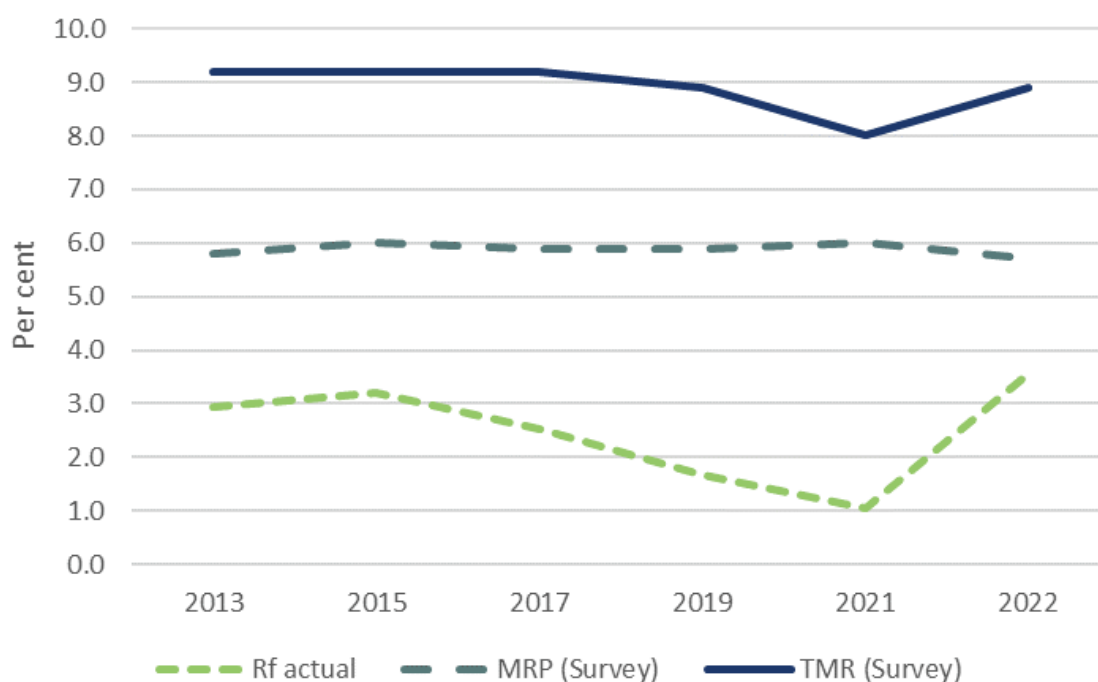
⁵⁸ CEPA (16 June, 2021), *Relationship between RFR and MRP, Final Report*, Australian Energy Regulator (AER), p.17.

⁵⁹ QTC (3 September, 2021), *Submission to the Equity Omnibus draft working paper*, p.15.

A closer analysis [which] shows that ERm [expected TMR] has been relatively stable, with the consequence being a negative relationship between the ex-ante MRP and the prevailing CGS yield [risk-free rate].

The behaviour that Synergies found in Australian independent expert reports, and the observations made by QTC in Australia are mirrored in New Zealand if full account is taken of the TMR implied in surveys undertaken by Professor Pablo Fernandez and his co-researchers.⁶⁰ In Figure 8 below, the implied TMR (i.e. the sum of respondents' MRP and assumed risk-free rate) varies by approximately 100 basis points during a period in which the actual risk-free rate at the times that the surveys were undertaken varied more than 250 basis points, and only in one year (2021) was there a temporary 100 basis points fall in the expected TMR. Whilst respondents held their views of the MRP relatively constant, they adjusted the risk-free rate applied, in this case above the spot-rate, which had the effect of maintaining a relatively constant TMR.

Figure 8: Fernandez surveys of Market Risk Premium and Risk-Free Rate (2013 to 2022)



Source: P. Fernandez et.al, various survey publications, 2015 to 2022. Note: Rf actual for 5-year government bond yields sourced from Reserve Bank of New Zealand website

3.6 Application of the TMR method

As noted above, in estimating the MRP, the Commerce Commission takes an average of five different methods on grounds that each will have its advantages and disadvantages. The Commerce Commission's view is that "there is no best way to estimate TAMRP and this is consistent with advice

⁶⁰ See Pablo Fernandez, Teresa Garcia, and Javier Fernandez Acin (2022), *Survey: Market Risk Premium and Risk-Free Rate used for 95 countries in 2022*, IESE Business School; and similar publications for earlier years.

from Dr Lally.”⁶¹ However, it is not known whether the biases of a number of alternative methods, expressed as an average, provide a neutral outcome. Furthermore, much of the evidence presented by various advisers and researchers referenced in the discussion above demonstrates that two of the approaches, Ibbotson (assuming constant historical MRP) and Siegel 1 (assuming a constant adjusted historical MRP) are flawed, particularly in the context of market behaviour over the past 20 years. In addition, Dr Lally’s method of referencing surveys under-estimated the effective or implied MRP when estimated relative to the spot risk-free rate. Providing weight to methods that do not reflect observed behaviour will not derive the best estimate of the TAMRP.

Estimating TMR (and implied MRP) using the Siegel 2 method

Our proposal is for the Commerce Commission to adopt the UK regulatory practice of placing primary reliance on the Siegel 2 methodology, which assumes that there is a negative relationship between the MRP and the spot risk-free rate. CEPA described the Siegel 2 method (i.e., to estimate the implied MRP from the TMR) which the Commerce Commission used to estimate the TAMRP in 2019 as follows:⁶²

The Siegel 2 method assumes the real market return is stable over time. Therefore, to estimate MRP, the historic [sic] average market return is converted to a current nominal figure using a current inflation forecast and then the current RfR is deducted.

The NZCC estimates the arithmetic average market return using historical data from 1900-2018 (7.9%). This figure is then converted to a current nominal expected market return using an expected inflation rate of 2% (midpoint of RBNZ inflation target range). The result is 10.06%. Then the current RfR is deducted. Using the three-year rate [approximately 0.80%] results in MRP of 9.5%.

$$\mathbf{MRP(Siegel\ 2) = [(1 + LMr) * (1 + i) - 1] - Rf(1 - Tc)}$$

LMr = long term average [real] return on the equity market %

i = current inflation forecast

Using DGM and survey evidence as cross-checks

We further propose that whilst the Siegel 2 method should be the primary method, like UK regulators the Commerce Commission could estimate the TMR (and then derived the implied TAMRP) using the following methods as cross-checks:

- *Forward-looking DGM* – this approach first estimates a TMR and then subtracts the spot risk-free rate to estimate the MRP. Using this approach in 2019, the Commerce Commission’s consultant, Dr Lally, obtained an TAMRP estimate of 7.3 per cent.

⁶¹ NZCC, (19 November 2019), Public Fibre input methodologies: Draft decision - reasons paper, p.291.

⁶² CEPA, (16 June, 2021), *Relationship between RFR and MRP*, Australian Energy Regulator (AER), p.21.

- *Surveys of TMR used (practitioners / academics)* – here we note that in 2019 Dr Lally reported only the MRP derived from survey evidence (6.4 per cent) and did not first obtain the TMR that respondents applied and then deduct the spot risk-free rate to obtain the implied TAMRP.

The TMR approach results in a less volatile – and more accurate – estimate of the WACC

Our view is that the weight of evidence presented in section 3.5 above indicates that the Siegel 2 methodology, cross-checked by reference to DGM and survey data, will provide the most accurate and least volatile regulated WACC over the long term. In particular, it will provide a more accurate and less volatile rate of return requirement than the Commerce Commission’s current approach which averages 5 methods, where 3 of them are likely to provide an under-estimate of the market required rate of return when interest rates are historically low, and an over-estimate when interest rates are at historical highs.

3.7 Conclusion on the Total Market Return approach

In this section we mentioned how a lag in the application of the Commerce Commission’s TAMRP approach, using a 7.5 per cent value estimated by Dr Martin Lally in September 2019 increased the volatility of Chorus’ cash flows as the final regulatory determination was made some time later when the already low risk-free rate had fallen further still. This compounded the main problem with the TAMRP approach, which is it that the Market Risk Premium estimated is disconnected from the Total Market Return, which the evidence suggests has not fallen in line with the precipitous decline in risk-free rates of return over the last 15 or so years. This creates volatility when applied in a regulatory context, but also material inaccuracy.

For almost a decade, regulators in the UK and Italy have been applying the TMR approach to reduce the volatility of the WACC during a period in which risk-free rates fell to record lows. The spot risk-free rate has now risen around the world, but it is not clear whether current levels will be maintained or exceeded. To reduce the uncertainty that arises because of a WACC approach that assumes a 1:1 relationship between the TMR and the spot risk-free rate,⁶³ it is recommended that instead the TMR is directly estimated, with the implied MRP being derived as a residual by subtracting the spot risk-free rate. While estimation of the TMR is subject to error, there is greater error in estimating the MRP.

Our review of the extensive debate that has taken place since 2013 in Australia indicates that the key objections to adoption of the TMR approach are not well grounded:

- QTC has referenced a number of academic studies as well as statements by senior researchers in central banks that there was a break in the relationship between stocks and bonds around the turn of the century, with the systematic risk of bonds becoming moderately negative. This has provided bonds with an insurance quality that has reduced their yields independently of movement in the risk of the market as a whole, i.e. independently of TMR.
- We also found that since the break around 2000 there has been a relatively reliable relationship between MRP and the risk-free rate, but not between TMR and the risk-free rate (which is the assumption underpinning the AER’s current approach).

⁶³ This is for the classical CAPM; under the Brennan-Lally CAPM the (investor) tax term provides some dampening.

- Finally, contrary to the views expressed by the AER, QTC and Synergies have found that since 2013 market participant (independent experts and survey respondents) views on TMR have not followed the risk-free rate in the manner assumed by the AER's current approach.

Shifting to a TMR approach would be consistent with the views of two out of the three consultants engaged by the AER recently who advised that the TMR approach should form the core component of the methodology to derive the MRP for regulatory purposes. This would also be consistent with the approach of all UK regulators. Shifting to the TMR approach would be expected simultaneously to increase the accuracy of the WACC estimation, and also to reduce the volatility in the regulatory WACC – and so customer prices – and so be expected to provide additional tangible benefits to both shareholders and customers.