

Revised Draft Guidelines

Submission to Commerce Commission

August 2009

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1 Executive summary

PricewaterhouseCoopers (PwC) was engaged by Powerco Limited (Powerco) to review the Commerce Commission's (the Commission) Revised Draft Guidelines on its approach to estimating the cost of capital, and to prepare a submission in response. The Commission's revised Draft Guidelines were issued on 19 June 2009 after it had considered earlier submissions, and the recommendations of a panel (the Panel) of academic advisers: Professor Julian Franks, Associate Professor Martin Lally, and Professor Stewart Myers, who reported in 2008.

Whilst we are in agreement with several of the issues pertaining to the over-arching framework for estimating the cost of capital, we disagree with the revised Draft Guidelines in some fundamental respects. The key areas of disagreement, and some key areas of agreement, are highlighted in this Executive Summary.

The Brennan-Lally CAPM approach

The Commission has recommended the continued use of the simplified Brennan-Lally CAPM as the central approach to estimating the required rate of return. We agree with the continued use of the Brennan-Lally model when it is applied to companies of average risk, as it is widely applied by practitioners in New Zealand and is well understood. However, the Commission should recognise the failings of the CAPM when applied to low beta companies, which failing will be exacerbated when using the tax adjusted Brennan-Lally CAPM. Moreover, the model should only continue to be applied as long as the cost of capital derived in this way continues to be widely accepted and the taxation assumptions underpinning the model remain accurate.

Risk free rate - CAPM

This section addresses the appropriate risk free rate for applying in the CAPM to estimate the cost of equity. Issues associated with the cost of debt are addressed separately below.

The Commission has proposed that there should be one risk free rate used in the CAPM, and has further proposed that this term should be set to the length of the regulatory period.

We agree with the Commission's view that the same risk free rate should be used in the two places that it enters the CAPM – that is, as the risk free benchmark and as an input into the market risk premium. We further note that an implication of the Commission's decision to be consistent with the risk free rate that is employed in the CAPM is that the choice of term for the risk free rate will no longer risk systematically delivering windfall gains or losses. That is, for a firm with equity of average risk, the estimate of its cost of equity will be unaffected by the choice of term for the risk free rate on average, with any differences caused by the choice of term reflecting

differences between the current and historical average shape of the yield curve and the use of a beta that differs to one.

We do not agree with the Commission that the term of the bond that is used as a proxy for the risk free rate should equate to the length of the regulatory period. A clear conclusion from the Panel advising the Commission is that theory is indeterminate on this matter. As noted above, the Commission's acceptance of the principle of consistency means that it cannot conclude that using a risk free rate that matches the term of the regulatory period is necessary to avoid windfall gains or losses. Rather, in our view, it would be appropriate for the Commission to follow the dominant practice of finance market practitioners and apply a long term bond rate when using the CAPM. We therefore recommend that the Commission adopts a 10 year term for the risk free rate. This approach has recently been accepted by the Australian Energy Regulator (AER).

Market risk premium

With respect to the Market Risk Premium (MRP) the Commission has endorsed the approach recommended by a majority of the Panel, which is to place major reliance on historical MRP estimates, and to look at international data. However, the Commission inconsistently considers that a 7 percent Tax Adjusted MRP (TAMRP) is still appropriate for use in the simplified Brennan-Lally CAPM. This is not consistent with the empirical evidence, the lessons of the Global Financial Crisis (GFC), and recent regulatory precedent. The evidence that the Commission has relied upon to propose a figure of 7 percent for the MRP is out of date (being only up to 2004).

Two out of three of the experts on the Panel advising the Commission expressed a preference for much greater emphasis on the historical MRP compared with forward looking measures. Professors Myers and Franks recently urged the UK airports regulator (the Civil Aviation Authority, or CAA) to apply a higher MRP due to the re-pricing of risk evident in the GFC. In verbal evidence before the CAA Professor Franks stated that the GFC has resulted in a 'permanent re-pricing of risk in the equity markets'.¹ It is therefore surprising that the Panel, apparently without considering the latest market information, has advised the Commission that the 7 percent MRP, which was applied prior to the GFC, is still appropriate in these circumstances.

The methodology applied by the Commission's consultant, Associate Professor Martin Lally, in the Commission's gas pipeline inquiry in 2008 to derive a 7 percent TAMRP was based on data and analysis dating as far back as 1998. It gave very little weight to historical estimates of the MRP, and relied on the average of estimates (which was biased downwards by outlier observations thrown up by dubious

¹ CAA (2009), *Stansted Price Control Review – Oral Hearings*, Monday, 9 February, p.32.

methodologies) rather than the median, which was closer to 7.5 percent than 7 percent.

In current circumstances:

- Simply by applying the recommendations of professors Myers and Franks to attach most weight to historical estimates would raise the MRP estimate well above 7 percent; and
- Estimation of a forward looking MRP today must be higher than a similar estimate undertaken one or two years ago.

The Commission has also ignored the recent findings of the AER, which has examined the implications of the GFC. Unlike the Commission, the AER considered the most recent evidence available to it (up to 2008), and formed a view that market conditions over the next 10 years justified lifting the MRP applied in Australia from 6 percent to 6.5 percent. The implications for New Zealand's MRP are as follows:

- *Regulatory precedent:* The AER's findings imply a comparable Tax Adjusted MRP value of 7.5 percent using Associate Professor Lally's methodology (including his 0.6 percent adjustment for the New Zealand-Australia risk differential).
- *Historical data to 2008:* Adjusting the latest historical MRP data for the world's 8 largest stock markets to a TAMRP basis indicates a value of 8.6 percent (again applying a 0.6 percent relative risk adjustment).

On the basis of the most up-to-date evidence we recommend that a TAMRP of at least 7.5 percent be applied by the Commission.

Beta

We note that the Panel and the Commission have recommended applying debt betas if international empirical evidence suggests that is a significant factor. We would advise against using a non-zero debt beta. Like practitioners, very few regulators assume a non-zero debt beta. In addition, empirical evidence for a significant debt beta is generally lacking (as shown by Professor Myers, who recently found BAA's debt beta to be zero). If debt betas were to be applied, then any reference to pre-existing asset betas must be re-stated, as those estimates are based on a zero debt beta assumption.

With respect to the estimation of equity betas, we note that any estimates are bound to be imprecise, which suggests that caution should be applied. With respect to electricity, we agree with the Commission's previous approach to deriving an asset beta for New Zealand electricity distributors. In particular, given the absence of sufficient domestic comparators, the Commission commenced with estimates of asset betas for comparable US distributors and then has adjusted for the effect on systematic risk flowing from the differences in the regulatory regimes. This is a sensible and pragmatic approach under the circumstances, although

consideration should also be given to beta evidence from other countries.

We caution on the application of econometric techniques to infer the systematic risk of divisions of a listed electricity or gas business (as presented in Appendix A of the Draft Guidelines) as this approach is likely to be difficult to apply, and can be subject to high estimation error. We are also concerned by the Commission's rejection of Bayesian adjustments to beta with almost no discussion, even though professors Franks and Myers recommended that some form of Bayesian adjustment to betas should be undertaken.

Cost of debt

Within the framework of incentive regulation the Commission's objective should be to derive a cost of debt that would be incurred by an efficient firm in the position of the regulated business. The key questions that must be answered in order to obtain such a cost of debt estimate are:

- *Should a benchmark or actual cost of debt be applied?*

The first question is whether a benchmark gearing level and debt cost or actual gearing level and cost of debt is to be employed. The Commission is not clear on this point. Our reading of the Draft Guidelines is that the Commission wishes to undertake a benchmark debt approach, and this should be stated more clearly. The Commission's intended methodology for estimating a benchmark cost of debt is not clear, and is an area where more detail could be provided. We disagree with the Commission's apparent intention to apply actual debt costs for regulated businesses over the past two years when benchmarking the cost of debt.
- *What is the gearing level?*

Assuming that the decision is to pursue a benchmark (incentive regulation) approach, the next question is what the benchmark level of gearing should be. We note that use of actual gearing will blunt incentives. We are also concerned that the current 40 percent benchmark gearing assumption for electricity appears low compared with the 60 percent that has been applied by UK and Australian regulators.
- *What benchmark credit rating should be assumed?*

The benchmark credit rating should reflect the credit rating that an efficient firm can sustain if it has the assumed benchmark level of gearing. This should be determined on the basis of market evidence. We are concerned that the Commission appears to wish to pre-empt this matter by adopting a 'strong investment grade credit rating' as a target, without reference to the benchmark gearing level. Whilst it is likely that this benchmark rating will be A- or BBB+, the Commission should be guided by market evidence and confer with the ratings agencies on this matter. That is, setting a

benchmark rating of A- may be inconsistent with the benchmark gearing level that is adopted.

- *What is the term of debt?*

We do not agree with the Commission's principle of consistency in the application of the same term to debt as to the risk free rate used in the CAPM. The benchmark term of debt should be based on observed market practice for comparable firms. We disagree with the Commission's stated intention to assume that the term of debt is the same as the regulatory period, as it is based on a false assumption about regulated firms' abilities to use swaps to match the effective term of debt to the regulatory period and is uninformed by observed debt financing practice. When the AER examined this issue in some detail recently, it concluded that 'there is no persuasive evidence to depart from the 10-year term assumption in calculating the debt risk premium.'² If the Commission were to adopt a similar empirical approach to the AER, and consider actual business practice, we believe it would be likely to reach a conclusion that a 10 year term is appropriate.

- *What data sources should be used?*

The Commission's intention to draw on debt margin data that is up to two years old is of concern, as is the robustness of the methodology being suggested to derive an estimate of the cost of debt that a benchmark firm would incur. The Commission does not mention that the Bloomberg service provides fair value market yields for A rated 'plain vanilla' corporate bonds in New Zealand, which could be used as a source of data (subject to any comparability issues).

Finally, we agree with the Commission that compensation for debt issuance costs is a legitimate expense, and that it should be provided to regulated businesses either as an allowance in the cost of debt or through the cash flows, assuming that in either case the upfront cost is converted into an annuity to take account of the time value of money associated with the difference between these outlays and compensation. On balance we consider that allowance as a component of the cost of debt used in the WACC is to be preferred as it will be more straight-forward to apply.

Plausible range of the WACC

On the question of establishing a 'plausible range' around a central estimate of the WACC we are in agreement with the Commission, since each of the parameters comprising the WACC is subject to severe estimation error. Given the asymmetric negative social outcomes from under-estimating the cost of capital compared with over-estimating it, we agree that a point estimate for the WACC

² AER (2009), *Final decision: Electricity transmission and distribution network service providers – Review of the weighted average cost of capital (WACC) parameters*, May, p.165.

should be chosen from the higher end of the plausible range. We also agree with the Commission, and professors Lally and Myers, that there is likely to be little additional benefit from pursuing a Monte Carlo modelling approach to WACC range estimation, providing the range can be derived analytically (by formulae). However, where this is not the case Monte Carlo techniques will be useful.

Asymmetric risk, distress and resource constraints

We agree with the Commission's (and the Panel's) view that asymmetric risks are real, potentially significant and warranting compensation. The Commission's dichotomisation of asymmetric risk is appropriate:

- *Type I (catastrophes outside normal operations)*
Type I risks can be approached through an actuarially determined revenue component provided into an *ex ante* fund, combined with an *ex post* adjustments.
- *Type II (risks due to competitive entry or demand changes)*
The Commission suggests that the regulatory framework can compensate the regulated business for the threat of stranded assets. Type II risk must be compensated for *ex ante*, in order to encourage optimal investment.

We do not fully agree with the Commission's views on resource constraints. Since market price adjustments may not be sufficient to remedy resource constraints, compensation will not be automatically provided through adjustments to revenue, and therefore specific compensation may be required for investment opportunities foregone.

2 Methodology

Recommendation 1: The simplified version of the Brennan-Lally CAPM should continue to be applied to companies of average risk (equity beta of unity), as long as the cost of capital derived in this way continues to be widely accepted and the taxation assumptions underpinning the model remain accurate.

2.1 Introduction

Our approach has been to review the Commission's Revised Draft Guidelines, and analyse their contents under a number of specific headings. We have considered the Commission's statements on issues in the context of the recommendations made by the Panel, as well as evidence contained in submissions, previous analysis by the Commission and its advisers, and regulatory precedents in New Zealand, Australia and the UK.

Throughout this submission, when we have made references to the recommendations of professors Franks, Lally and Myers (FLM) we have denoted it as: (FLM recommendation number). When we have made reference to positions held by the Commerce Commission in the Revised Draft Guidelines, we have denoted them as: (CC paragraph number(s)).

2.2 The Brennan-Lally model

The Commission recommends the continued use of the simplified Brennan-Lally model as the central approach to the estimation of the required return on equity (CC 101). We are in general agreement with this recommendation when it is applied to companies of average risk, as the model is well understood by all parties, and is widely applied by practitioners. However, the Commission should recognise the failings of the CAPM when applied to low beta companies, which failing will be exacerbated when using the tax adjusted Brennan-Lally CAPM. Moreover, our agreement assumes that the model is applied consistently, and the cost of capital derived in this way continues to be widely accepted, and the taxation assumptions underpinning the model remain accurate.

In the case of low beta companies the Commission should consider one or more of the following:

- Use of the classical CAPM, as either a cross-check or the primary basis for assessing the WACC;

- Allowing an increment to the WACC;
- Choosing a WACC from from the upper end of its assessed WACC range;
- Allowing a mean reversion-type adjustment to the beta.

3 Risk free rate - CAPM

Recommendation 2: The same risk free rate should be used in the two places it enters the CAPM.

Recommendation 3: Since an equity beta of approximately unity provides regulatory revenues that will not systematically over- or under-compensate owners if bonds with a different term to the regulatory period are used in the CAPM, the Commission should not be concerned that a longer period than the regulatory period is applied.

Recommendation 4: Given that theory is indeterminate on the matter, and standard commercial practice is to apply a long term bond rate in the CAPM equation, it is recommended that the Commission adopts a 10 year term.

3.1 Term of the risk free rate

3.1.1 *The Commission's approach*

The Commission has framed its discussion of the appropriate term for the risk free rate in terms of a choice between two approaches to obtain an N-period cost of capital:

- Using the N-period interest rate as the intercept in the CAPM and defining the MRP as the difference between expected stock market returns and expected returns on N-period bonds. The historical MRP would measure average annual returns on the market vs. N-period bonds.
- Estimate the MRP as the difference between the expected market returns and returns on one-year bonds, and use an N-period forecast of average future one-period interest rates as the intercept in the CAPM.

The Commission concludes that these approaches would yield the same result on average, since the average term premium on New Zealand government bonds has averaged close to zero. Hence, the first option is preferred by the Commission (CC 142).

The Commission recommends applying the same period to the estimation of the cost of equity as to the estimation of the cost of the cost of debt (CC-147). We agree with this recommendation, which we consider should be for a period of 10 years (refer below)..

The Commission also concludes that the approach of setting N to match the longest government bond maturity available in New Zealand (10 years) will provide windfall gains or losses depending on the term structure of interest rates, which will violate the NPV=0 condition. Therefore, the Commission recommends matching N to the length of the regulatory period, rather than standardising to 10 years (CC 146). The Commission assumes (CC 147) that 'while firms may borrow for periods longer or shorter than the regulatory cycle if they wish', 'any interest rate risk associated with doing so could be offset in the interest rate swap market.'

We have addressed the issues of the risk free rate on equity and debt separately, as they raise different conceptual issues. We do not agree with the Commission's conclusions about N being set to equal the length of the regulatory period for the equity component of the cost of capital. It is based on false assumptions about commercial practice, and finance theory.

3.2 The risk free rate - equity

We agree with the Commission's decision to apply consistency between the term of the risk free rate and the Market Risk Premium (MRP). The implication of this is that there will be no systematic breach of the NPV=0 principle if bonds that have a different term to the regulatory period are used. Assuming that a firm has close to average risk (i.e. a beta of approximately unity), and in addition that the expected term structure of interest rates is the same as in the past, then the term of the bond will not affect the estimated cost of equity.

We also note that the academic position on the risk free rate that should be applied in the CAPM is a far from settled matter. The divergence of academic views on this issue is reflected in the varying opinions of the Panel. Associate Professor Lally (FLM 11, 13) considers that having two risk free rates in the CAPM is appropriate, and wishes to set the first risk free rate to match the regulatory period. On the other hand, professors Franks and Myers (FLM 12) recommended the use of only one risk free rate, but standardisation on 5 years (FLM 14), or the length of the regulatory period (FLM 15).

Our view is that theory is indeterminate on this matter, and as a result the Commission should give some weight to the standard practice of finance practitioners. There is abundant evidence that the dominant practice among finance practitioners is to use long term bonds. For example, Bruner, Eades, Harris and Higgins found that 70 percent of US firms use Treasury bond yields with maturities of 10 years or longer in their CAPM analysis.³ The Commission, by giving weight to standard practice, will be better able to promote

³ Robert F. Bruno, Kenneth Eades, Robert S. Harris, and Robert C. Higgins (1998), 'Best Practices in Estimating the Cost of Capital: Survey and Synthesis', *Financial Practice and Education*, Spring/Summer, pp.13-28.

acceptance of the regulatory approach in commercial circles, which will aid the regulated firms in their financing.

It is also apparent that long term bond yields are more stable over time than short term bonds, and their use in the regulatory CAPM is likely to produce a more stable estimate of the cost of equity.

3.3 Conclusion on the term of the risk free rate - equity

We agree with the Commission's draft decision to maintain consistency between the term of the risk free rate and the MRP. However, we disagree with the Commission on the issue of the term of the risk free rate to apply in the CAPM. Since an equity beta of approximately unity provides regulatory revenues that will not systematically over- or under-compensate owners if bonds with a different term to the regulatory period are used in the CAPM, the Commission should not be concerned that a longer period than the regulatory period is applied.

Academic opinion on the issue of the term of the risk free rate is indeterminate, while the vast majority of practitioners apply a long term bond. Application of longer term is therefore likely to be more understandable to business, and could make it easier for regulated businesses to obtain finance. We therefore recommend that the Commission adopts a 10 year period for the risk free rate when considering the CAPM.

4 Market risk premium

Recommendation 5: In estimating the Tax Adjusted Market Risk Premium (TAMRP), most weight should be placed on long term historical data, as suggested by two members of the Panel, professors Franks and Myers.

Recommendation 6: Associate Professor Lally's TAMRP estimate of 7 percent cannot be relied on, as it was obtained by placing equal weight on a variety of different estimates of doubtful reliability, and is flawed in a number of other ways.

Recommendation 7: Estimation of a forward looking MRP today must be higher than an estimate undertaken one or two years ago, as the Global Financial Crisis (GFC) has unfolded (*ex ante* measures must certainly be higher).

Recommendation 8: By reference to the most recent long-term historical data for the 8 largest equity markets in the world, an equivalent TAMRP of 8.6 percent is indicated, while referencing to the recent Australian Energy Regulator's (AER) decision implies a TAMRP of 7.5 percent.

Recommendation 9: Given the weight of international evidence, regulatory precedent, and the impact of the GFC, the Commission should raise the regulatory TAMRP to at least 7.5 percent.

4.1 Methodological issues

4.1.1 *The Commission's viewpoint*

The Market Risk Premium (MRP) is one of the most important determinants of the rate of return in the CAPM framework, but cannot be observed. The MRP can only be estimated indirectly, and estimates are typically inaccurate. The Commission has adopted a preliminary estimated figure of 7 percent for the Tax Adjusted Market Risk Premium (TAMRP) in conjunction with the simplified Brennan-Lally CAPM (CC 164), noting that:

'The Commission's preliminary view is that it should continue to use the estimate of 7 percent for the market risk premium. The Commission will fully consider any submissions that provide robust analysis as to the sustained (rather than transitory) effects of the recent financial market turmoil.'

4.1.2 MRP estimation and the Global Financial Crisis

MRP estimation methodologies

The Commission noted that its current practice when estimating the MRP is to draw on international estimates (e.g. from the US and the UK) and consider both backward-looking and forward-looking methodologies (CC 79). We have seen that two out of three members of the Panel support primary reliance on historical data. However, the Panel's conclusion was:

'Although some submitters on the Draft Guidelines (Professor Bowman; CRA) have called for increasing the Commission's⁴ present MRP estimate, the Panel considers that the Commission's present MRP estimate of 7% (for the simplified Brennan-Lally CAPM) is reasonable. Professor Franks points out that the Commission's estimate is higher than those generally adopted by regulators in the US and the UK, but is within appropriate bounds given the nature of the New Zealand economy.'

We note that two out of the three academics engaged by the Commission to advise on WACC issues, have advised that primary weight should be applied to historical MRP estimates (FLM 23). We concur with this view, which also appears to be the approach that is favoured by the Commission (NZCC 159). The Commission has said that it will also look at *ex ante* estimates as a cross-check on the historical estimates, and has not ruled out the use of New Zealand data. We agree that, generally, low weight should be applied to *ex ante* studies. While the theory of *ex ante* forecasting may have merit, it is not possible to accurately derive the key assumptions needed to reliably estimate the *ex ante* MRP, which is highly sensitive to small changes in these assumptions. However, in the current GFC environment up-to-date *ex ante* MRP estimates may be informative.

There is no evidence that the Panel or the Commission have considered studies using underlying market data for New Zealand beyond 2004, or recent international data, even though Dimson, Marsh and Staunton (2008) was referenced in the paper.⁵ Therefore, it is difficult to judge on what basis the Panel could be comfortable with a TAMRP estimate of 7 percent. With regard to Professor Franks' observation that the Commission's estimate is 'higher than those adopted by regulators in the US and UK', we have three observations (other than the obvious difference in MRP definition with allowance for taxes).

⁴ Elroy Dimson, Paul Marsh and Mike Staunton (2009), *Credit Suisse Global Investment Returns Sourcebook 2009*, Credit Suisse Research Institute, Switzerland, p.27.

⁵ Elroy Dimson, Paul Marsh and Mike Staunton (2008), *Global Investment Returns Yearbook 2008*, ABN-AMRO and London Business School.

- First, US regulators do not generally employ the CAPM and therefore there is no regulatory MRP that is readily observable;
- Secondly, the approximately 4.5 percent MRP commonly applied by UK regulators has to be viewed relative to what estimates of the MRP of the UK market have been. The historical MRP in the UK has been approximately 5 percent, so the regulatory MRP has actually been set close to that historical level; and
- Thirdly, historical estimates of the MRP in Australia and New Zealand have been significantly higher than UK historical estimates. This fact is recognised by Professor Franks.

The Panel's views on the Global Financial Crisis

One of the Panel members, Professor Stewart Myers, has recently provided an opinion on the MRP in the UK in connection with the Civil Aviation Authority's (CAA) review of price control at London's airports. Professor Myers critiqued the CAA's low proposed range for the UK MRP, arguing that it would be 'imprudent in today's volatile and fragile financial markets, where credit spreads have increased dramatically.'⁶ While Professor Myers was in no doubt that 'markets will calm down in the longer run', he felt that a higher MRP was appropriate in the current market. The mid-point of his preferred range of 4-6 percent for the UK market is approximately the current historical UK MRP of 5 percent.

Professor Franks adopted an even stronger view that there has been a permanent re-pricing of risk, as is apparent from the evidence he gave more recently in Oral Hearings before the Civil Aviation Authority (CAA):⁷

'For example, on the ERP, I think the Competition Commission and I think the advisers took the view that what was called the credit crisis was temporary and I think I am almost remembering the words of the advisers – given it was temporary, you could ignore it – and I think we felt at the time and looking at the transcript of the evidence to the CAA when we appeared last time we felt that that was not temporary and that there was a permanent re-pricing of risk. Today we will say that even more strongly. There is a consensus that there has been a permanent re-pricing of risk in the equity markets and in the credit markets. If I had been advising the Competition Commission, and I advise Ofcom, and, as you know, Ofcom have changed the ERP, although to be fair some are subsequent to the decision of the CC. I would have gone for a higher ERP at that time than the Competition Commission.'

⁶ Stewart C Myers (2008), p.10.

⁷ CAA (2009), *Stansted Price Control Review – Oral Hearings*, Monday, 9 February, p.32.

At the same hearings Professor Franks also made a telling point about the relative weights that have been applied in the past to historical MRP estimates compared with forward looking methodologies, and the need to change the emphasis back to greater weight on the historical record in the wake of the Global Financial Crisis (GFC):⁸

'I think up to the credit crisis there was a view that the ERP based on historic returns was not appropriate. We had entered the golden age of stability where the current Prime Minister when he was Chancellor said he would abolish the business cycle. You are no longer going to see that volatility. Now we know that, with hindsight, that is not correct. It is like earthquake insurance – when you expect an earthquake every seven years and for nine or ten years there are no earthquakes and you think: goodness me, the price of earthquake insurance is too high, let's reduce it, i.e. the ERP is too high, let's reduce it. We now know that to disconnect the ERP so significantly from historical terms I think in retrospect is a mistake...'

4.2 Empirical estimates of the MRP

4.2.1 PricewaterhouseCoopers (2002)

A study undertaken by PwC in 2002 concluded that the most recent data at the time indicated a TAMRP of 7.5 percent.⁹ Sensitivities were provided to demonstrate the effect on the estimate of changing the period of analysis. This showed there was a significant step-up in the rolling average (from 1925) realised excess returns over bond yields between 1980 and 1985, from a former level of 6-7 percent to a level of approximately 8 percent. Realised returns in the New Zealand market in the last few years have slightly increased then decreased the historical average based estimate of the TAMRP.

For a number of years now, PwC has consistently applied a TAMRP of 7.5 percent in its New Zealand corporate advisory valuation work, as has been pointed out in various submissions to the Commission (e.g. the review of Telecom New Zealand's interconnection services in 2004-5.¹⁰) On this basis, in the past we have always recommended that a TAMRP of 7.5 percent should be applied by the Commission.

⁸ CAA (2009), p.38.

⁹ PricewaterhouseCoopers (2002), *New Zealand Equity Market Risk Premium*, September.

¹⁰ PricewaterhouseCoopers (2005), *Telecom New Zealand Limited – The Weighted Average Cost of Capital for Interconnection Services*, 9 June.

4.2.2 Lally (2008), and Lally and Marsden (2004)

In the recent review of the weighted average cost of capital for gas pipeline businesses, the Commission's adviser, Associate Professor Martin Lally relied heavily on data from New Zealand, the US and 'other' countries. As shown in Table 1 below, the data sets compiled by Associate Professor Lally converged to an overall TAMRP estimate of 7% if the focus is on the average premium.¹¹

Table 1: Lally (2008)- Estimates of the Market Risk Premium (TAMRP)

Methodology	New Zealand	United States	Other
Historical MRP (Ibbotson)	7.7	8.4	8.2
Merton	8.1		
Survey	8.0	5.7	
Cornell	5.4	6.6	
Siegel	6.4	7.3	6.6
Median	7.7	7.0	7.4
Mean	7.1	7.0	7.4

Source: Lally (2008), p. 25

However, there are a number of difficulties with the data base and methodology employed by Associate Professor Lally:

- The sources that were relied upon are not all up to date, being based on data and analysis from as far back as 1998;
- The time period covered does not include the last few years of severe market dislocation, which can be expected to have raised, and then lowered, the historical MRP estimates significantly, and these are the results that most of the Panel (and the AER in Australia) place most weight on. For example, Lally' reports that the New Zealand TAMRP estimate of 7.3% (Lally and Marsden, 2004) for 1931-2002 increased to 7.7% when updated for 1931-2004 by Marsden (2005);¹² If the series were updated to 2007, it is likely the TAMRP would have increased but the addition of 2008 would have reduced it

¹¹ Martin Lally (2008), *The Weighted Average Cost of Capital for Gas Pipeline Businesses*, 28 October, pp.25-26.

¹² M. Lally and A. Marsden, (2004), 'Tax-Adjusted Market Risk premiums in New Zealand: 1931-2002', *Pacific-Basin Finance Journal*, Vol.12 (3), pp.291-310; A. Marsden, (2005), 'Historical and Siegel estimates of the Market Risk Premium in New Zealand,' ISCR presentation on *The Regulatory Cost of Capital II: What is the Market Risk Premium?*

(as has been seen in Australia, and is shown below). Neither the Panel nor the Commission appears to have fully analysed the most up-to-date data.

- The idea that all methodologies are equal, and should be weighted equally is of concern, as it adds a considerable degree of arbitrariness to the process. It would be unthinkable to apply such an approach to say, estimation of the equity beta, and it is just as untenable in relation to the MRP. The methods providing lower estimates (such as the so-called 'Cornell' and 'Siegel' methodologies, are not reliable). Furthermore, two of the financial experts on the Panel felt that the greatest weight should be placed on historical evidence, which in Associate Professor Lally's methodology attracts a very low weight; and
- The average premium of 7 percent is biased downwards by outlier observations from methodologies that are questionable. If the median TAMRP had been considered, a number closer to 7.5 percent would have been justified even using Associate Professor Lally's methodology.

We note that the Panel supported looking at international data when considering New Zealand's MRP (FLM 21) and that the Commission agrees with this approach (NZCC 163). However, Associate Professor Lally's methodology appears to suggest that there is a 'consensus MRP' (adjusted for the Brennan-Lally model) of 7 percent, with the New Zealand MRP being equal to that of the US and other countries. There are several problems with this approach.

- The most comprehensive evidence of world MRPs provided by Dimson, Marsh and Staunton (DMS) indicates a considerable variation in country MRPs, which suggests that market characteristics could be important.¹³ On the other hand, variations in observed historical MRPs could merely reflect statistical imprecision in the data. It is not possible to discriminate between these hypotheses. However, Associate Professor Lally believes that his simple approach of choosing a number of different estimation methodologies can derive a 'grand mean' MRP estimate of 7 percent for New Zealand, the US and the rest of the world.
- Associate Professor Lally's suggestion that the New Zealand MRP is at the same level as the US (the 'grand mean' of 7 percent) is inconsistent with his proposal in 2003 that a risk margin of 0.6 percent should be added to the tax adjusted Australian MRP to account for the additional risk of the New Zealand market.¹⁴ This implies that Associate Professor Lally considers the US market (and the rest of the world) to have a higher risk than the Australian market, which is a position that

¹³ Elroy Dimson, Paul Marsh and Mike Staunton (2009), *Credit Suisse Global Investment Returns Sourcebook 2009*, Credit Suisse Research Institute, Switzerland.

¹⁴ Martin Lally (2008), *International comparison of regulatory costs of capital for gas distribution businesses*, p.12.

he has not justified theoretically or empirically. A more reasonable and consistent approach would be to add a New Zealand country risk margin to the US MRP estimates (and to the estimates from other large, developed countries) and then to consider the resulting means and medians.

4.2.3 *Estimating the impact of global financial crisis*

The Commission's approach

The Global Financial Crisis struck international financial markets in the second half of 2007 and is still having pronounced effects on market perceptions of risk, and liquidity. It is disappointing that the Commission has virtually ignored the impact of the GFC, and has referred to it only once (obliquely) as 'the recent market turmoil' (CC 164). This appears to be a significant understatement of the importance of recent events in financial markets and real economies worldwide. However, there are other places in the Draft Guidelines where the Commission hints that there has been a severe dislocation in the markets. For instance, it notes that (CC 122) 'spreads between government bond yields and swap rates (and AAA rated corporate bond yields) have widened recently, apparently as a consequence of what some have described as a 'flight to liquidity''.

Moreover, it is now apparent that, in credit markets at least (where expected returns are more visible), risk was significantly underpriced for several years preceding the GFC. Accordingly experts' MRP estimates, in particular regulatory precedents, from that period are now likely to be too low.

It is a concern that the Commission has paid very little attention to the impact of the GFC, which has been considered in such detail in the recent WACC review undertaken by the AER in Australia and which was published one month prior to the Commission's Draft Guidelines.

The AER's approach to estimating the MRP

The AER's approach was quite different to that pursued by the Panel. It recognised that in stable financial markets an MRP could be set at a level that would not need to be adjusted for several regulatory determinations, since the long term estimate of the MRP would suffice to provide an equity return that reflects the current market for funds:¹⁵

'However, due to the global economic and financial crisis, relatively stable market conditions do not currently exist... the AER has taken into account current conditions to the

¹⁵ AER (2009), p.190.

extent these conditions are expected to prevail over the time of reset determinations affected by this review [5 years]. In other words, as the AER is reviewing the WACC parameters now – including ‘locking in’ a value for the MRP – to the extent that current conditions (at the time of this review) are expected to be maintained until the time of the determinations [a]ffected by this review, then current conditions remain a relevant consideration in determining what value should be ‘locked-in’ for the MRP.’

The AER considered a range of evidence, including historical estimates of the MRP, independent expert reports, surveys, and broker reports. Like professors Franks and Myers, it decided to ‘place primary weight on long term historical estimates of the MRP, though also placing some weight on other measures’ (FLM 23). The AER considered that it is not appropriate to look at historical data in an overly mechanistic manner, as the impact of even a single unusual year could bias the results. It found that the range of estimates based on historical series of differing durations (1883-2007/8, 1937-2007/8, 1958-2007/8) yielded significantly different ranges, with:

- Historical MRP estimates of 5.7% to 6.2% based on time series ending in 2007; and
- Historical MRP estimates of 6.6% to 7.2% based on time series ending in 2008.

The AER also considered the fact that the previously adopted MRP value of 6% was at least partly based on market surveys suggesting that 6% is the most commonly applied MRP in the market. Based on the evidence, the AER considered that prior to the GFC, 6% was a fair estimate of forward looking long term MRP. However, the AER considered that with the uncertainty that is apparent in the current market conditions:¹⁶

- ‘That the prevailing medium term MRP is above the long term MRP, but will return to the long term MRP over time; or
- That there has been a structural break in the MRP and the forward looking long term MRP (and consequently also the prevailing) MRP is above the long term MRP that previously prevailed’.

The AER considered that it is not possible to know, which of the above scenarios by itself, or in combination, has acted to influence the current MRP in the market for funds, but was of the opinion that the weight of evidence lay behind the need to raise the MRP above the 6% that had previously been applied. While the AER, in the interest of creating regulatory certainty, was not in favour of a significant increase in the MRP, it concluded that there was persuasive evidence to increase the MRP to a value of 6.5% for the period of the reset determinations that are to take place over the

¹⁶ AER (2009), p.238.

next 5 years, and considered to have an effect on the market for 10 years.

New Zealand equivalent of Australian regulated MRP

Neither the Panel, nor the Commission, has made any reference to Australian data or analysis of the MRP, which we consider to be highly relevant. The Australian stock market is the 8th largest in the world, and is an important benchmark for New Zealand due to the proximity of the economies, and their similar political and institutional composition.¹⁷

In a recent paper, the Commission's adviser, Associate Professor Lally, undertook a comparison of international regulatory costs of capital for gas distribution businesses. He concluded that 'it seems clear that the Australian market has a lower variance than that of New Zealand,' therefore the MRP should be less than the 7 percent applied in New Zealand by the Commission.¹⁸ To quantify the differential, Lally applied the following estimate of the MRP in the Officer version of the CAPM (φ_0) to convert to the tax adjusted version applied by the Commission (φ):

$$\varphi = \varphi_0 - D_m I_m U + R_f T$$

where,

D_m is the market cash dividend yield

I_m is the market ratio of imputation credits to cash dividends

U is the utilisation rate on imputation credits

R_f is the risk free rate

T is the rate of corporate taxation

As shown in Table 2 below, applying the Lally estimates for the Essential Services Commission (ESC) on gas in Victoria yields an estimated comparable MRP of 6.4 percent, which is still lower than the 7 percent applied by the Commission, but in Associate Professor Lally's view, justified by the higher risk of the New Zealand market compared with the Australian market. Thus the risk differential was

¹⁷ There is empirical evidence that there exist risk linkages between the Australian and New Zealand markets, although this is now somewhat dated. See, Timothy J. Brailsford, (1996), 'Volatility Spillovers Across the Tasman,' *Australian Journal of Management*, Vol. 21, (1), June, pp.13-27.

¹⁸ Martin Lally (2008), *International Comparison of Regulatory Costs of Capital for Gas Distribution Businesses*, Report to the New Zealand Commerce Commission, 28 October, p.12.

estimated at 0.6 percent by Associate Professor Lally. In the third column of Table 2 we have revised the result substituting the 6.5 percent MRP (Officer CAPM) now applied by the AER, and find that if the same New Zealand-Australia risk margin is applied, a New Zealand MRP of 7.5 percent is implied.

Table 2: New Zealand vs Australian regulatory MRP

	ESC 2005 (Lally)	AER 2009 (Lally)
ϕ_0	0.060	0.065
D_m	0.040	0.040
I_m	0.360	0.360
U	1.000	1.000
$D_m I_m U$	0.014	0.014
R_f	0.061	0.061
T	0.300	0.300
$R_f T$	0.018	0.018
Φ (estimate)	0.064	0.069
NZ risk margin	0.006	0.006
NZ MRP (Φ)	0.070	0.075

Source: Lally (2008), AER (2009) with Lally (2008) assumptions applied

4.2.4 Latest international evidence on MRP

The most recent and comprehensive data on market risk premiums in 17 countries around the world over the period 1900 to 2008 is contained in the *Credit Suisse Global Investment Returns Sourcebook (2009)* authored by DMS.¹⁹ The study did not include New Zealand in the 17 countries it reviewed. The MRP over bonds for Australia was 7.5 percent, which was higher than the average of 6 percent for the rest of the largest 8 stock markets accounting for approximately 80 percent of world market capitalisation.²⁰

¹⁹ Elroy Dimson, Paul Marsh and Mike Staunton (2009), *Credit Suisse Global Investment Returns Sourcebook 2009*, Credit Suisse Research Institute, Switzerland.

²⁰ However, the market weighted average MRP of the top 7 group was 6.2 percent. While Australia has a dividend imputation framework the MRP was estimated assuming a classical basis, and is therefore an under-estimate of the classical MRP in the absence of imputation.

In order to convert the MRPs reported for countries with classical tax systems, we have applied the following formula:

$$\varphi = \varphi_0 + R_f T$$

In Table 3 below, we show the results of converting the historical classical MRPs for the top 8 equity markets in the world over the period 1900 to 2008. For consistency with Table 2, which applies Associate Professor Lally's methodology to Australian regulatory decisions, we have assumed the same risk free rate of 6.1 percent, and New Zealand risk premium (0.6 percent) applies throughout. This can be considered a conservative assumption given that the risk differential between New Zealand and the average country in the group of 8 might be expected to be greater than the 0.6 percent that Associate Professor Lally assumed between New Zealand and Australia, particularly as a result of the GFC.

Table 3: New Zealand TAMRP relative to MRPs of world's Top 8 stock markets

	US	UK	JAP	FR	GER	SWI	CAN	AUS	Top 8
MRP (φ_0)	0.059	0.050	0.092	0.057	0.081	0.030	0.053	0.075	0.062
R_f	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061
T	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
$R_f T$	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
TAMRP(est.)	0.077	0.068	0.110	0.075	0.099	0.048	0.071	0.093	0.080
NZ-risk	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
NZ TAMRP	0.083	0.074	0.116	0.081	0.105	0.054	0.077	0.099	0.086

Source: Dimson, Marsh and Staunton (2009), p.27, Lally (2008), and PwC

Table 3 shows that on average the historical TAMRP for the largest 8 equity markets since 1900, suitable for use in the simplified Bernnan-Lally CAPM model has been 8 percent. When adjusted for an assumed New Zealand risk premium of 0.6 percent, this historical TAMRP estimate for New Zealand rises to 8.6 percent.

4.3 Conclusion on MRP

While Associate Professor Martin Lally has been silent on this issue, many financial experts, including the two other members of the Panel, professors Myers and Franks, have deduced that there has been a step-change in the MRP as a result of the GFC. Professor Franks believes there has been a permanent increase in the MRP that is being demanded in equity markets. It is therefore curious that professors Myers and Franks have concluded that the TAMRP of 7 percent, which was adopted during a period of relatively low market

volatility, and is lower than the 8 percent TAMRP that was applied in the Airfields decision of 2001, should continued to be applied in circumstances of heightened market risk.

Merely by changing the emphasis in the assessment of the MRP towards historical measures, as has been forcefully argued by two out of three Panel members (especially in their recent submissions and appearances before the CAA in the UK), would justify an upward adjustment in the regulatory MRP previously estimated by Associate Professor Lally from its current value of 7 percent.

Taking account of the AER increasing the MRP for regulation of Australian electricity networks businesses from 6 percent to 6.5 percent, a similar adjustment in the previously adopted MRP of 7 percent (applying the simplified Brennan-Lally model), implies an MRP adjustment to 7.5 percent. An MRP of 7.5 percent has been used for general commercial valuation purposes by PricewaterhouseCoopers since 2002.

Taking account of the relative risk of the New Zealand market that has been recognised by the Commission's adviser Associate Professor Lally, the latest evidence suggests that on relativities with the 8 largest equity markets in the world, the historical TAMRP for New Zealand can be expected to be 8.6 percent.

We submit that on regulatory precedent, commercial practice, and the most recent world market evidence interpreted in the context of the GFC together imply that a regulatory MRP of a minimum of 7.5 percent is justified.

5 Beta

Recommendation 10: The debt beta term should be ignored, as there is very little regulatory precedent, and empirical evidence indicates that it is not likely to have a material impact on the equity beta estimate.

Recommendation 11: If debt betas are applied, then any reference to pre-existing asset betas must be re-stated, as the earlier estimates were based on a zero debt beta assumption.

Recommendation 12: With respect to electricity, given the absence of sufficient domestic comparators, the approach formerly applied by the Commission, which looked at US electricity betas and adjusted for differences in the regulatory regime, is a reasonable and pragmatic approach in the circumstances.

Recommendation 13: Econometric estimation of divisional betas for multi-divisional gas and electricity firms should be treated with caution.

Recommendation 14: Bayesian adjustments to beta estimates should be considered as additional information.

5.1 Estimation of debt beta

The Commission has examined the issue of debt betas, which most practitioners treat as having a value of zero. The Commission believes that at times when debt betas are high there can be a significant influence on equity betas. Therefore, the Commission proposes to review evidence on whether the debt beta is positive and significant, and incorporate it when it is (CC 189). However, the Commission also intends to draw on published evidence relating to the US and other countries to 'inform its view on the magnitude of (New Zealand) debt betas. We urge that caution should be exercised in applying evidence on debt beta from the US and other countries to New Zealand.

We note, however, that in connection with the UK investigation of the cost of capital for Stansted airport, recent estimates of debt beta for US firms in the BBB to credit rating categories has been estimated in the range of 0.052 to 0.078. A member of the Panel, Professor Myers suggested that the simplest way to measure the debt beta to apply to BAA bonds was to estimate it from the rates of return on

those bonds in the same way that equity betas are estimated. The answer he found was zero.²¹

Practitioners rarely apply a debt beta when estimating equity betas. There is relatively little regulatory precedent for the practice in the UK and Australia. In the UK the energy and water regulators assume that debt beta is zero, while Ofel/Ofcom says it will apply a non-zero debt beta when the debt premium rises above 100 bp. In practice, it has never applied a non-zero debt beta. This leaves the CAA as the only UK regulator recommending application of a non-zero beta after making an adjustment for default risk and recovery rates in default.

For regulatory consistency and predictability we believe it would be far better to ignore debt betas. If debt betas were to be applied, however, it is important to note that any references to pre-existing asset betas should be re-stated to be consistent, since the Commission's existing analysis has assumed zero debt betas.

5.2 Estimation of equity beta

The Commission notes that estimates of firm-specific betas are statistically very imprecise, and that a methodology to improve the reliability of estimates is to estimate an industry-wide beta based on a portfolio of comparable businesses (CC 169). This approach appears to be consistent with the recommendation of Professor Myers (FLM 27), who spelled out this methodology in more detail. We agree that this may be a useful methodology to estimate beta provided appropriate comparable businesses can be found. However, analysing the average of the comparable business individual betas is also useful to provide another view, particularly where the comparable businesses are drawn from a number of countries. This is the approach that was suggested by Associate Professor Lally (FLM 28). However, we are not persuaded that a weighted average of beta estimates necessarily provides a superior estimate of the industry beta.

The Commission has agreed with the Panel's view that anomaly events in the estimation period should be taken into consideration (FLM 29, CC 171). We agree with this as a general principle, but notes that considerable judgement is required. Taken to the extreme, it would be possible to argue that almost every period is anomalous. For example, the 'technology bubble' had significant effects on beta estimates around the turn of the Century; in recent years (prior to the global financial crisis) there was exceptionally low market volatility; and since the credit crisis emerged over 2007-2008, there has been very high market volatility.

The Commission has also agreed with professors Myers and Lally (FLM 30) that for mature firms, plots of rolling 5 year betas should be estimated (CC 173). We agree with this recommendation, and would

²¹ Stewart C Myers (2008), *Cost of Capital for Heathrow and Gatwick*, BAA/Q5/612 appendix three, p.11.

add that more information is likely to be more valuable than less. Hence, it would be useful to provide such rolling estimates for as long a period as possible for all firms in the sample, noting differences in regulation, business composition etc.

We express caution about the application of econometric techniques to derive characteristics of particular divisions of multi-divisional gas and electricity firms, as discussed in Appendix A of the Revised Draft Guidelines. The object of such an analysis is to inform the estimation of a pure-play beta for divisions. It has been applied by PwC in the UK in the disaggregation of BT's beta, and the outcomes were heavily qualified.²² In some industries it would not be possible to find sufficient valid observations and consistent delineation between divisions, as would likely be the case for integrated gas and electricity businesses. Differing regulatory frameworks as well as market risk parameters would also need to be controlled for. Hence, any results from such an analysis could not be applied mechanistically. However, in some situations it may be useful.

In the absence of sufficient appropriate domestic comparators, the Commission previously applied a pragmatic approach to beta estimation in the electricity distribution industry. This approach commenced with the estimation of an asset beta based on a large number of observations for listed US electricity industry participants. This estimated asset beta was then adjusted for the systematic risk of differences in high powered incentive regulation (New Zealand) compared with the low-powered (US) regulatory framework. We agree with the Commission's former approach, and consider it to be sensible and pragmatic in the circumstances.

Once a sample of comparable companies, most preferably within the same industry, has been identified it is our view that rigorous econometric techniques should be applied to estimate equity betas (including allowance for the effects of thin trading and analysis of betas over time). This sample data should then be the basis for the final beta estimate. It would be inappropriate for the Commission to then be swayed by the beta estimates of others for essentially the same sample of companies – while material variations in estimates may warrant examination, the results from the appropriately selected and analysed sample should be the preferred source of beta estimates for those sample companies.

5.3 Bayesian adjustment to beta estimates

Given the degree of uncertainty surrounding the estimation of beta, we are concerned that Bayesian adjustments to beta estimates have been all but ignored by the Commission. The Commission has recognised that large statistical imprecision in individual-company

²² PricewaterhouseCoopers (2005), *Disaggregating BT's Beta, A report prepared for Ofcom by PricewaterhouseCoopers LLP*, June. In that report the individual betas for mobile, fixed, and ICT businesses were inferred from regressions using data for 56 telecommunications companies across 29 countries.

beta estimates would suggest an industry estimate is more appropriate, while cross-sectional variation across 'true betas' would push it to consider firm specific estimates. In practice, it would be difficult to distinguish between the two sources of variation.

We note that both professors Franks and Myers (FLM 33) recommended that some form of Bayesian adjustment should be applied to the Commission's beta estimates. Professor Franks, for example, is persuaded by the international empirical evidence that equity betas have mean-reverting properties. Associate Professor Lally, on the other hand (FLM 32), recommended that the Blume adjustment should not be made, and that the Vasicek adjustment is 'undesirable if beta estimates are sought for more than one firm in an industry.'²³ It appears that the Commission has been persuaded against making Bayesian adjustments by the minority opinion of Associate Professor Lally.

²³ M. Blume, (1971), 'On the Assessment of Risk,' *Journal of Finance*, Vol. 26, pp.1-10; and M. Blume, (1975), 'Betas and their Regression Tendencies,' *Journal of Finance*, Vol. 30, pp.785-95.

6 Cost of debt

Recommendation 15: The Commission should review and clarify the methodology it proposes to apply in estimating the cost of debt.

Recommendation 16: The benchmark (optimal) market gearing of the regulated industry should be estimated from market observations.

Recommendation 17: The Commission's use of a 40 percent optimal gearing level for electricity should be reviewed, as it seems low relative to optimal gearing levels assumed by Australian and UK regulators.

Recommendation 18: Having estimated the optimal gearing, the Commission should then assess the corresponding credit rating based on market evidence.

Recommendation 19: The Commission should carefully examine the debt financing practices of regulated businesses, which is likely to demonstrate that the appropriate period for the term of the risk free rate on debt is close to 10 years.

Recommendation 20: It is not appropriate to draw upon actual debt costs over a period of years passed, while the Bloomberg service should be considered as a source of data on the benchmark current cost of debt.

6.1 Introduction

The objective of the regulator should be to derive the cost of debt that would be incurred by an efficient firm in the position of the regulated business. In order to estimate the cost of debt faced by a regulated business the Commission needs to come to a view on the following issues:

- *Should a benchmark or actual cost of debt be applied?* In order to provide incentives to regulated businesses to undertake efficient financing practices, it is advisable to apply a benchmark cost of debt, rather than actual debt costs. If a benchmark cost of debt approach is chosen then additional decisions are required.
- *Gearing level?* It is first necessary to establish the benchmark (optimal) level of gearing, which is revealed by businesses operating in the regulated industry. Given the approximate level of regulated revenues that may be expected, the gearing level will be a key determinant of the credit rating.

- *Credit rating?* The credit rating that is appropriate for the assumed benchmark level of gearing can be determined by reviewing available evidence for comparator businesses with public stand-alone credit ratings.
- *Term of debt?* In order to estimate a benchmark cost of debt for a given credit rating it will be necessary to establish a benchmark term for the debt. This should be assessed by reference to the behaviour of comparator businesses.
- *Data sources?* The final question that must be answered is what sources of data should be referenced to estimate the cost of debt, given that the key characteristics have been determined.

In this chapter we first review the Commission's position on these key questions, and then provide further perspectives on the issue.

6.2 Estimating the cost of debt

6.2.1 Benchmark or actual debt?

The Commission has stated that it is prepared to benchmark to the actual cost of debt observed in regulated businesses over the past two years unless the level of gearing is extreme (CC 220,221). We agree with the Commission that a benchmark approach should be adopted, but disagree with the idea that actual cost of debt over a period of two years prior to the decision could be relied upon to form the benchmark. While it appears that the Commission wishes to adopt a benchmark cost of debt approach, it has not clearly spelled out the methodology that would be applied. The questions of gearing, credit rating and debt margin are all interconnected. If a commercial optimal gearing level is not chosen, the credit rating applied by the Commission will not be commercial, and the cost of debt that is derived on this basis will not be appropriate either. The Commission has not clearly articulated how it would derive a benchmark cost of debt that is appropriate to the benchmark regulated business.

6.2.2 Gearing level

The Commission states (CC 197) that in some industries, such as electricity transmission, where there is only one firm, it 'would be natural to use the firm's actual leverage ratio, provided the capital structure is consistent with a reasonable investment grade corporate credit rating.' While in industries having more than one firm, use of a notional gearing level is advised by the Commission.

We question whether a 40 percent level of gearing is optimal in electricity distribution. In Australia, under a similar regulatory framework a gearing level of 60 percent has been applied, which is based on observations of actual gearing over a number of years.

In summary, we believe that optimal market gearing levels should be applied, as this is the correct approach, which can be derived from finance theory. In the case of debt, unless there has been a severe dislocation in the debt market, it is generally appropriate to use the book value of debt as a proxy for the market value.²⁴ This is standard practice in commercial valuations.

6.2.3 Credit rating

The Commission has recommended that the allowed cost of debt should be set at a level that is consistent with cost of debt that would be paid by a business with an investment grade rating (CC 208). We agree that the investment grade rating is likely, with a likely rating of BBB+ or A- at the optimal gearing level, although it is not possible to be completely prescriptive.²⁵

It is important for the Commission to be in touch with the credit rating agencies. In the recent case of the AER's consideration of WACC parameters for the Australian electricity transmission and distribution businesses, its draft report suggested that an A- credit rating was appropriate for a 60% geared business. However, after reviewing the evidence contained in stakeholder submissions, and having greater contact and interaction with Standard & Poor's, the AER reversed its previous draft determination and retained a BBB+ rating.²⁶ This case demonstrated the misleading results that can be produced when attempting econometric analysis without adequately robust data.

6.2.4 Term of debt

The term of the debt assumed in the estimation of the cost of debt should be reflective of observed market practice. We do not agree with the Commission's conclusions about the term of debt being set to equal the length of the regulatory period for the debt component of the cost of capital. This is based on false assumptions about commercial practice, and the ability of regulated businesses to offset risks in the interest rate swap market.

This issue has recently been the subject of some detailed inquiry by the Australian Energy Regulator (AER) in connection with the review of WACC parameters for electricity transmission and distribution network providers.²⁷ The AER started from the position of wishing to satisfy the NPV=0 condition, and a desire to 'ensure that the

²⁴ This is a practical issue, since generally the effort required to estimate the market value of debt is not worth the extra precision (because the market and book values are generally close). However, if there is a valid market price of equity, it is relatively simple to calculate the value of equity.

²⁵ The Commission's footnote 61 notes that the benchmark should be comfortably investment grade.

²⁶ AER (2009), pp. 345-392.

²⁷ Australian Energy Regulator (2009), *Final decision: Electricity transmission and distribution network service providers – Review of the weighted average cost of capital (WACC) parameters*, May.

outcome does not unreasonably increase refinancing risk for the sector.²⁸ This approach led the AER to observe and consider what is done by businesses in practice. Thus, the AER believes the question of determining ‘the appropriate benchmark term of the debt risk premium is ultimately an empirical question.’²⁹ As a result, the AER looked at the actual practice of regulated businesses in relation to debt financing, and obtained statements from the Treasurers of regulated businesses. The Treasurers indicated that long term debt with staggered maturities is preferred, as this reduces re-financing risk. A key insight that emerged from that process was the statement made by Alastair Watson of SP AusNet:

“We can easily hedge against changes in the BBSW and we commonly do so but we can not hedge the credit margin. So while the hedging helps with managing the risks of the whole market interest rates moving, our hedging commonly leaves us exposed to changes in the margin between the BBSW and the rate at which we borrow.”³⁰

Hence, the credit spread, which is determined at the time the debt is actually issued, cannot be effectively hedged. This is an important finding, as it means that the actual cost of debt incurred by regulated businesses will be exposed to market forces based on the actual term of borrowing. It also means that the practices of government owned businesses cannot be relied upon, as they have greater ability to access debt markets compared with privately owned businesses.

The AER accepted that the weighted average term of debt at issuance is most relevant in determining the debt risk premium. The AER found that the weighted average term of debt portfolios of four regulated, privately owned Australian energy businesses was 10.14 years, confirming that on average, these businesses refinance every 10 years.

Having regard to this evidence, which, as demonstrated in more detail in Appendix A, is based on actual conditions in the debt market and the strategies applied by regulated businesses, the AER concluded:³¹

‘...there is not persuasive evidence to depart from the 10-year term assumption in calculating the debt risk premium.’

While the AER recognised that in the current market there might be a trend to shorter maturities, because of lower liquidity, ‘it is reasonable and appropriate to take a cautious approach and adopt a longer term perspective on the benchmark term assumption.’ We expect that the Commission, by investigating debt market practices

²⁸ AER (2009), p.150.

²⁹ AER (2009), p.152.

³⁰ AER (2009), p. 153.

³¹ AER (2009), p.165.

of regulated businesses in New Zealand and Australia will come to a similar conclusion.

In Appendix A we have described the approach used by the AER to establish the term of debt assumption based on commercial practice. It is not appropriate to apply an assumption that the term of the debt for a benchmark business will equate to the regulatory period, as this will tend to under-compensate the firm if the benchmark term is found to be longer than the regulatory period, as has been the case in Australia.

6.2.5 Data sources

The Commission has stated that it may 'draw upon evidence of the actual debt costs of the regulated businesses', provided the debt:

- Has been issued over the past two years;
- Is plain vanilla;
- Of similar maturity to the regulatory assumption on term; and
- Is of a reasonable investment grade (Standard & Poor's/Moody's ratings of A-/A3 or BBB+/Baa1).

These conditions are unlikely to be met in the majority of cases that the Commission will be considering, and there is a danger that the debt premium estimates will be out of date. The Commission states that it may look at the debt premiums being paid by firms in other industries (CC 222), however little comfort is provided about the objectivity and robustness of the estimation procedure that might be applied by it.

The Bloomberg service is not mentioned in the Commission's Draft Guidelines. We note that the Bloomberg service provides fair value market yields for A rated corporate bonds in the New Zealand market, which can provide an indication of the debt cost faced by firms in the market. Consistent with the approach favoured by the Commission, Bloomberg adjusts its data to reflect the cost of plain vanilla financing. It should also be noted that Bloomberg standardises its presentation of fair value yields so that the yield and coupon are the same. Nonetheless, Bloomberg data would still need to be scrutinised to ensure sufficient comparability between the companies in its sample and the regulatory firm of interest.

The Commission has also stated that it is in favour of providing compensation for debt issuance costs as a legitimate expense, and is in favour of providing this compensation in the form of an adjustment to allowed cash flows rather than as an addition to the cost of debt (CC 78). Under this approach we note that it is important that the amortised debt issuance costs are appropriately grossed up over time by the WACC, or else there will be a shortfall in the benefit to a regulated business compared with its up-front outlays in connection with debt issuance costs.

On balance we consider that allowance for debt issuance costs should be as a component of the cost of debt used in the WACC, since this will be more straight-forward to apply.

7 'Plausible range' of the WACC

Recommendation 21: The Commission should continue to choose its point estimate from the upper portion of the 'plausible range' of cost of capital estimates in order to account for uncertainty associated with the process.

7.1 Establishing a 'plausible range'

The Commission has set out its standard approach to dealing with statistical error in the estimation of individual WACC parameters (CC 233), and its agreement that the social costs of potentially underestimating the WACC require the Commission to err on the side of caution (CC 241). The Commission's approach is to:

- Derive or estimate standard errors around the WACC parameters;
- Make reasonable estimates about the degree of correlation between them; and
- Combine them to derive a standard deviation for the WACC.

This statistical distribution is then to inform a judgement about the 'plausible band' within which the true WACC parameter is likely to lie (CC 236).

7.2 Choice of a 'point estimate'

The Commission's Revised Draft Guidelines state that it often selects a WACC estimate above the midpoint of the range on a case-by-case basis. This approach is consistent with the advice provided by the Panel (FLM 49), and is an approach that we agree with given the significant uncertainty surrounding WACC parameter estimates.

Where the WACC parameters can be assumed to be normally distributed with zero correlation, we are in agreement with the Commission (CC 238), and professors Lally and Myers (FLM 52), that there is unlikely to be any additional value from applying Monte Carlo modelling relative to the approach already undertaken. However, where one or more of the WACC parameters have non-normal distributions, truncated distributions and / or non-zero correlations then Monte Carlo simulation will provide a practical tool for estimating the WACC range.

8 Asymmetric risk, distress and resource constraints

Recommendation 22: As suggested by the Commission, Type I risks can be approached through an actuarially determined revenue component going into an *ex ante* fund, combined with an *ex post* adjustment when necessary.

Recommendation 23: Type II risks, such as stranded asset risk require *ex ante* compensation in order to promote efficient investment.

Recommendation 24: Since market price adjustments may not be sufficient to remedy resource constraints, compensation will not be automatically provided through adjustments to revenue, and therefore specific compensation may be required for investment opportunities foregone.

8.1 Compensating for asymmetric risks

The Commission has agreed with the advice of the Panel, which was that asymmetric risks are real and potentially significant, and should be compensated (FLM 56,CC 271). We also agree with this approach as a general principle. The Commission divides asymmetric risks into two categories:

- *Type I asymmetric risks:* These are risks of a catastrophic outcome that lies outside the normal operations of the business (eg. Natural disasters); and
- *Type II asymmetric risks:* These are risks that arise through the threat of competitive entry or expansion, which place a cap on upside earnings but not the downside that firms continue to be exposed to.

Type I asymmetric risks

The Panel recommended that Type I asymmetric risks could be handled by establishing a reserve fund (FLM 57). That is, an appropriate insurance premium would be charged, and a fund would be built on the basis of an actuarial calculation of risks over a given risk period horizon. We note that such an actuarially determined fund can never fully compensate for unanticipated outcomes. The Commission (CC 250) has seen benefit in the approach suggested by the Panel, which is to compensate with *ex post* adjustments if the

provisions in the reserve fund prove inadequate. We agree with this approach.

In their advice, professors Myers and Lally (FLM-60) made a valid point in stating that asymmetric risk must be viewed as being separate from the normal distribution in the WACC parameters, and rate of return requirement. That is, it needs to be recognised that by choosing a rate of return that is at the higher end of that distribution (or 'plausible range'), the regulator is not compensating for asymmetric risk. We agree with this position, but note that the Commission does not appear to have formally responded to it.

Type II asymmetric risks

While recognising that 'regulation can cap profits without providing commensurate insulation from downside risk' (CC 244,260), the Commission has also suggested that the regulatory framework can shield the regulated firm from other Type II risks, such as the risk of stranded assets. We note, however, that compensation for stranded asset risk needs to be provided *ex ante* in order to have the desired effect of promoting efficient investment.

Professor Myers (FLM 63), Lally (FLM 64), and Franks (FLM 65) all recommended that *ex ante* compensation for Type II risks should be achieved through an adjustment to the cash flows of the regulated business. In the Revised Draft Guidelines the Commission has presented both *ex ante* cash flow compensation, and compensation through the WACC as alternative approaches, and has not expressed a preference. We agree with the Panel that *ex ante* compensation is best achieved through an adjustment to the cash flow.

8.2 Distress costs

The Commission has agreed (CC 279) with the position of the Panel (FLM 70), which was that there should be no compensation for the cost of financial distress. That is, firms that have over-gearred relative to the optimal gearing level for should not be 'bailed out', due to the moral hazard problem that this generates. We agree with this position in principle. However, it should be recognised that a financial catastrophe, such as the GFC, could potentially catch out firms that have been prudently geared in normal circumstance, but need to re-finance at the very time that markets have closed. We consider that this situation would qualify as Type I asymmetric risk.

Professor Myers (FLM 187) provided the case of PG&E's bankruptcy during the California energy crisis as an example of a conservatively financed business that was forced into bankruptcy by a 'perfect storm of adverse events'. The Commission has said that these events are best handled on a case by case basis (CC 281), however, it would provide comfort to regulated businesses if the principles that would be applied in such a process were clearly spelled out.

Associate Professor Lally (FLM 71) submitted that by using the promised rather than expected debt yields, the regulator will recognise financial distress costs. Hence, for the businesses regulated by the Commission, it is expected that the use of promised yields (provided by such services as Bloomberg) provides some recognition of financial distress costs on average. However, as noted by the Commission, if the bonds are investment grade the probability of default will be very low, and promised and expected payments on debt (or bonds) will be so close that the promised and expected yields will be almost identical.

8.3 Resource constraints

The Commission also looked at the potential for resource constraints, by forcing the rationing of credit or skilled labour, raising the opportunity cost of a current project. The Commission concluded that compensation for this additional opportunity cost should be considered on a case-by-case basis.

The Commission notes that constraints on a pool of scarce resources 'may generate a real opportunity cost for the firm' (CC 285), but considers that the market price of these resources could be expected to adjust so as to eliminate the constraint (CC 286), and since these additional costs would feed through the cost structure, they would be compensated by higher regulated prices. However, the Commission's belief that a key technical human resource constraint can be solved by price rises is flawed due to the time lags involved in skilling human resources. While additional costs in such circumstances should be fed through to the cost base, new projects may not be taken up, or may be delayed due to critical resource constraints. Hence, it is possible that both cost pass-throughs and payments for higher opportunity costs would be justified.

Appendices

Appendix A

The AER's approach to assessing the term of the risk free rate

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Appendix A The AER's approach to assessing the term of the risk free rate

In its recent review of WACC parameters for electricity transmission and distribution network service providers, the Australian Energy regulator (AER) adopted the view that the weighted average term of debt at issuance is most relevant in determining the debt risk premium.³² As noted in the main text of this submission, the AER found that the weighted average term of debt portfolios of four regulated, privately owned Australian energy businesses was 10.14 years, confirming that on average, these businesses refinance every 10 years.

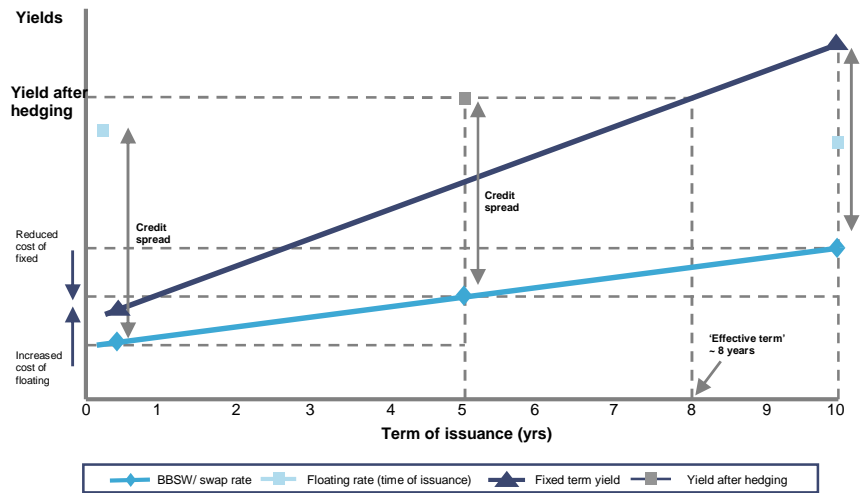
Next, the AER looked at the hedging practices of these regulated businesses and found that:

- The base interest rate component of *fixed rate debt* is swapped from a duration period of the term to maturity (say 10 years) to the regulatory period (5 years);
- The base interest rate component of *floating rate debt* is swapped from a 3 month maturity to the length of the regulatory period (5 years);
- The credit spread component, which is unchanged with hedging, has a duration of the full 10 year term of the debt; and
- After hedging the total yield of fixed and floating debt are approximately equivalent.

The base interest rate cost of 10 year floating rate debt increases with hedging, while the base interest rate cost of 10 year fixed rate debt reduces. However, the credit spread component of the yield is not affected, and as a result the all-up yield after hedging is considerably higher than the yield on 5 year debt. As shown in Figure A-1, this higher yield translates to an effective term of approximately 8 years (i.e. the resultant yield would be observed for debt with a term of 8 years, or 80% of the actual term at issuance).

³² Australian Energy Regulator (2009), *Final decision: Electricity transmission and distribution network service providers – Review of the weighted average cost of capital (WACC) parameters*, May

Figure A-1: Floating rate vs fixed rate debt – after hedging

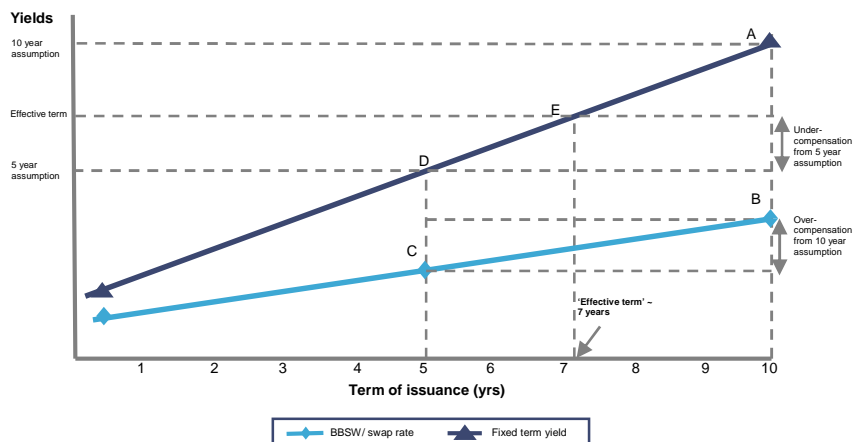


Source: AER (2009), p. 163

With respect to the four energy distribution businesses examined by the AER it was found that the weighted average effective term of the debt portfolio after hedging was 7.37 years (significantly less than the average term at issuance of 10.14 years). The AER concluded that:

- On average the 10-year term assumption for the cost of debt would *overcompensate* the regulated business because of the gain from hedging out the term premium on the base interest rate component of the debt. That is, the term premium paid on the base interest rate component is hedged to match the regulatory period of 5 years.
- On the other hand, a debt term assumption matching the regulatory period of 5 years will *under-compensate* the regulated business, because it is still exposed to the premium paid on the credit spread component of the interest cost (which it cannot hedge against).

Figure A-2: Benchmark term assumption for the cost of debt



Source: AER (2009), p. 165

In Figure A-2 the over-compensation for the cost of debt to the regulated business due to the effective term being shorter than the actual term (i.e. from A to E) can be approximated by the term premium on the base interest rate component (i.e. B to C, which is the increase in the BBSW rate between 5 and 10 year maturity terms). This is the over-compensation that would be provided due to a 10 year assumption, rather than a 5 year assumption (the regulatory period).

However, the over-compensation from a 10 year period assumption is approximately matched by the under-compensation the regulated business would suffer from a 5 year term assumption. This is due to the fact that the cost of debt is higher (by the distance D to E) on the effective term (approximately 7 years) than for 5 years due to the credit spread component that cannot be altered by hedging. Hence, the value of over-compensation due to application of a 10 year term (B to C) will be approximately equal to the value of under-compensation from applying a 5 year term (E to D).

Having regard to this evidence, which is based on actual conditions in the debt market and the strategies applied by regulated businesses, the AER concluded:³³

...there is not persuasive evidence to depart from the 10-year term assumption in calculating the debt risk premium.

³³ AER (2009), p.165.