Weighted average cost of capital for SEQ water retailers

8 SEPTEMBER 2014

Summary of QTC's views

QTC's views on the QCA's proposed weighted average cost of capital (WACC) methodology for SEQ water retailers are as follows:

- A full reset of the WACC each year based on the prevailing 1-year risk-free rate will contribute to higher water utility prices at a time when consumers are likely to face higher mortgage repayments or rents due to the positive correlation between the standard variable mortgage rate and 1-year risk-free rate.

- QTC does not support the use of a 1-year risk-free rate to estimate the cost of equity. Compared to the standard market and regulatory practice of using a 10-year risk-free rate, using a 1-year risk-free rate will:

  - amplify the well-documented 'low/high' beta bias in the Capital Asset Pricing Model (CAPM), which will increase the risk of under-estimating the cost of equity, and

  - significantly increase the risk of under-estimating the cost of equity during periods of heightened risk aversion and flight-to-quality periods.

- The QCA uses a 10-year risk-free rate in all of the methods used to estimate the market risk premium (MRP). As a consequence, some of the estimates should be adjusted if the QCA uses a 1-year CGS yield in the first term of the CAPM.

- The Wright method should be used to produce an estimate of the expected return on the market portfolio, and should receive at least the same weight as the Ibbotson historical averaging method.

- The Siegel historical averaging method should not be used. The size of the adjustment for unexpected inflation is uncertain, and there is no evidence to suggest that the Siegel-adjusted MRP is regularly used in practice by investors and valuation experts. As such, these estimates are unlikely to be reflected in market prices.

- QTC disagrees with the draft decision to retain an 'on the day' approach to calculate the cost of debt. This approach is inconsistent with well-established financial risk management principles and implies the use of a debt management strategy that cannot be implemented in practice.

- The proposal to fully reset the 10-year debt risk premium (DRP) on an annual basis is inconsistent with the observed debt management practices of regulated and un-regulated businesses whereby a small percentage (eg, 10 per cent) of the total debt balance is refinanced and repriced each year.

- QTC agrees that a capital intensive monopoly business that provides an essential service, such as water and sewerage services, is likely to have relatively stable revenues that are not

very sensitive to the economic cycle. It follows that the WACC methodology, and in particular the cost of debt approach, should produce outcomes that are consistent with these characteristics.

▪ QTC is aware that the final WACC report for the water retailers will be considered by the QCA Board on 18 September 2014, which is before the due date of 10 October 2014 for submissions to the draft decision on the trailing average cost of debt approach. As such, it would be appropriate for the QCA to confirm that the cost of debt approach it intends to apply to the water retailers will be determined after the trailing average submissions have been considered.

General comments

Implications of a full WACC reset each year

QTC has concerns over the practical outcomes that are likely to occur if water utility revenues are set in accordance with the QCA's proposed WACC methodology.

In particular, a full reset of the WACC each year based on the prevailing 1-year CGS yield will result in water utility prices moving in line with short-term interest rates. Figure 1 displays the yield on a 1-year Commonwealth Government Security (CGS), which is a proxy for the QCA's risk-free rate, and the official cash rate (OCR) as set by the Reserve Bank of Australia. The correlation between the two rates is +0.92:

FIGURE 1: 1-YEAR CGS YIELD VS OFFICIAL CASH RATE
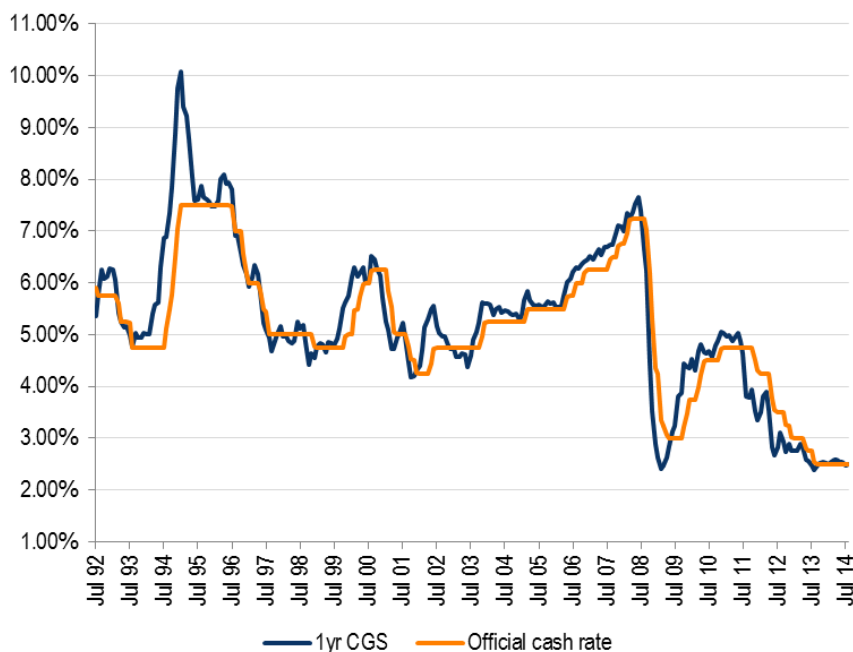
Source: RBA, monthly data

The standard variable mortgage rate is also linked to the OCR, and recent experience suggests that lenders are quick to pass on rate rises in full, but are much slower to pass on rate cuts.

If used for pricing purposes, the QCA's WACC methodology will contribute to higher water utility prices at a time when consumers are likely to face higher mortgage repayments or rents due to the positive correlation between the 1-year CGS yield the and standard variable mortgage rate. As consumers are already exposed to rising short-term interest rates, QTC

considers it inappropriate for the QCA's WACC methodology to effectively increase this exposure.

Revenue characteristics of natural monopolies

QTC agrees with the QCA's description of the revenue characteristics of a natural monopoly that provides an essential service:

> *'In general, capital intensive natural monopolies that provide essential services, such as water and sewerage services, are likely to have relatively stable revenues that are not very sensitive to the economic cycle. Therefore, the systematic risk of these entities should be relatively low.'* [1]

If used for pricing purposes, the proposed WACC methodology will produce annual revenues that are volatile and more sensitive to the economic cycle, which is the opposite of what is expected based on the above description.

What constitutes an abuse of monopoly power?

In QTC's view, there is a significant difference between abusing monopoly power and disagreements over how the WACC should be estimated. For example, the WACC methodologies used by regulators such as the Australian Energy Regulator (AER), the Independent Pricing and Regulatory Tribunal (IPART) and the QCA will produce different WACC estimates for a benchmark firm with the same asset beta and level of gearing.

If a water retailer were to use a WACC of 25 per cent for pricing purposes, and offered no explanation for how this value was determined, this would be a clear abuse of monopoly power. However, if the water retailer uses a WACC that is consistent with the approaches used by other regulators, but different from the QCA's estimate, it is unclear how this difference would be viewed by the QCA. Unless the water retailer had selectively chosen different approaches and parameters from different regulators to maximise revenues, it would be difficult to argue that monopoly power was being exercised.

The QCA suggests that the water retailers can determine their own prices and pricing structures within 'broad pricing principles'. It is unclear if the these principles are intended to apply to the WACC that is used for pricing purposes.

In the absence of a clearly defined approach for distinguishing between an abuse of monopoly power and a disagreement over how the WACC should be calculated, the water retailers will be exposed to considerable regulatory uncertainty. This outcome is inconsistent with the intended light-handed nature of the performance monitoring arrangements.

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[1] QCA (August 2014), *Long-term framework for SEQ water retailers – weighted average cost of capital (WACC) Position Paper*, p. 19. Hereafter, the 'QCA Position Paper'.

The cost of equity

Term of the risk-free rate

QTC continues to support the use of a 10-year CGS yield to estimate the cost of equity, and considers a 10-year term to be consistent with commercial and regulatory practice.

Consequences of using a 1-year term for risk-free rate

QTC acknowledges that the QCA is unlikely to change its view on the term of the risk-free rate in the cost of equity. Although QTC's does not agree with this view and continues to support a 10-year term, it is necessary to consider the practical consequences of the QCA's proposal to use the prevailing 1-year CGS yield in the cost of equity. It is also important to ensure that the QCA's MRP estimate is internally consistent with the 1-year CGS yield used in the first term of the CAPM[2].

Amplifying a known bias in the CAPM

There is empirical evidence which suggests that the relationship between beta and actual returns and beta is 'flatter' than the relationship between beta and the expected returns produced by the CAPM. This means that the CAPM tends to under-estimate (over-estimate) the cost of equity when the equity beta is less (greater) than 1.0.

The 'low/high' beta bias is particularly important for the water retailers as the QCA has proposed an equity beta of 0.65. Furthermore, the bias will be amplified if a 1-year CGS yield is used in the first term of the CAPM due to the (typically) positive slope of the CGS yield curve between 1- and 10-years[3]. This is likely to result in the cost of equity being under-estimated, even during normal market conditions.

Increased risk of under-estimating the cost of equity during periods of heightened risk aversion

QTC's views on the behaviour of CGS yields and required risk premiums during periods of heighted risk aversion and flight-to-quality periods was provided in our submission to the QCA's first discussion paper[4].

The main points from that submission are summarised below:

- The MRP measures the market price of risk, which is directly related to the level of investor risk-aversion.

- The factors that cause CGS yields to fall during periods of heighted risk aversion and flight-to-quality periods are unlikely to cause the expected returns on risky/less liquid assets to fall by the same amount, if at all.

- The increased demand for CGS during periods of heightened risk aversion and flight-to-quality periods will not be matched by an increase in demand for risky/less liquid assets. In fact, the opposite is true as investors will be selling risky/less liquid assets, thereby increasing the supply of those assets in the market. The supply and demand dynamics of this process will cause the margin between the lower CGS yields and the expected return on risky/less liquid assets (such as equities) to increase.

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[2] These additional considerations do not mean that QTC supports the use of a 1-year risk-free rate.
[3] As the empirical evidence suggests that the relationship between beta and CAPM expected returns is too steep, using a 1-year CGS yield will make the relationship even steeper, thereby amplifying the low/high beta bias.
[4] QTC (March 2013), *The risk-free rate and the market risk premium*, pp. 16-20

It is important to keep in mind that these observations were made in the context of using the 10-year CGS yield as a proxy for the risk-free rate. Figure 2 shows the 1-year CGS yield and the slope of the CGS yield curve between 1- and 10-years:

FIGURE 2: 1-YEAR CGS YIELD AND THE CGS SLOPE BETWEEN 1- AND 10-YEARS
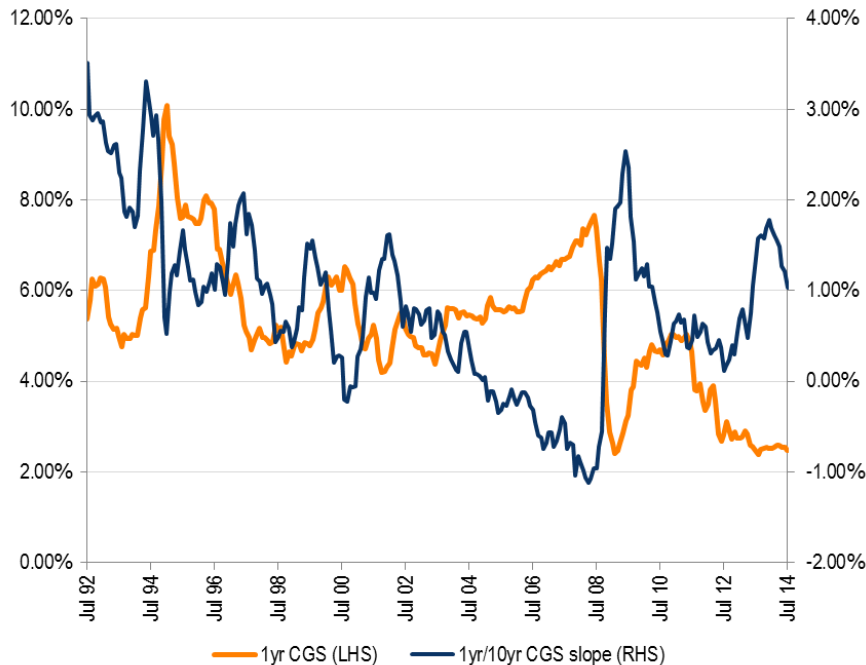
Source: RBA, monthly data

During periods of heightened risk aversion, the yield curve tends to steepen as the 1-year CGS yield falls by more than the 10-year CGS yield. This is particularly evident between 2008 and 2010[5].

The QCA uses a 10-year CGS yield in all of the methods used to estimate the MRP, and proposes to pair this estimate with the 1-year CGS yield to estimate the cost of equity. However, the 1- and 10-year CGS yields behave very differently during periods of heightened risk aversion, and this will increase the risk of the cost of equity being under-estimated during these periods

In QTC's view, a more accurate estimate of the cost of equity will be produced if a 10-year CGS yield is used, which is consistent with how the QCA estimates the MRP. If the QCA uses the prevailing 1-year CGS yield, most of the individual MRP estimates should be adjusted to be consistent with this yield.

The market risk premium

Inconsistent use of risk-free rates

The QCA notes an apparent inconsistency between using two different risk-free rates within the CAPM (ie, a 1-year CGS yield for the first term and a 10-year CGS yield to estimate the MRP). In addressing the inconsistency the QCA states:

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[5] The correlation between changes in the 1-year CGS yield and changes in the slope of the CGS yield curve is -0.5.

'The relevant term for the market risk premium should correspond to the across-investor holding period between successive portfolio reassessments. This term could be as short as one year or as long as 10 years (or possibly even longer). As this period is uncertain, pragmatic considerations with respect to data availability have supported using a 10-year rate to estimate the market risk premium.' [6]

The issue of data availability is only relevant to estimation methods that require historical risk-free rates, such as Ibbotson historical averaging. There are no such issues for the Cornell and Wright methods, and the MRPs used by independent valuation experts.

As the QCA uses a 10-year CGS yield in all of the methods used to estimate the MRP it is necessary to adjust some of the estimates if a 1-year CGS yield is used in the first term of the CAPM. Specifically:

- For the Cornell and Wright methods, the prevailing 1-year CGS yield should be deduced from the estimate of the expected return on the market portfolio to calculate the MRP.

- If the QCA chooses to only consider the MRPs used by independent experts, rather than the total cost of equity for the average firm, the MRPs should be adjusted by the margin between the prevailing 1- and 10-year CGS yields.

These adjustments are consistent with the approach adopted by Lally in advice provided to the New Zealand Commerce Commission in 2008 (refer Appendix A).

Ibbotson historical averaging

QTC supports the use of Ibbotson historical averaging to estimate the historical MRP.

Siegel historical averaging

QTC does not support the use of Siegel historical averaging to estimate the historical MRP.

The size of the adjustment for unexpected is uncertain, and the process of adjusting the historical yields during the period when unexpected inflation was considered to be high significantly increases the volatility of the adjusted MRP. Furthermore, there is no evidence to suggest that the Siegel-adjusted MRP is regularly used in practice by investors and valuation experts. As such, these estimates are unlikely to be reflected in market prices.

Making adjustments to historical data

In recent advice to the AER, McKenzie and Partington recommended that, despite the Siegel's arguments having merit, a downward adjustment to the Ibbotson MRP should not be made:

'[W]e think there is merit in the arguments of Siegel (1992, 2002) … that the historic estimate of the MRP is biased upwards. Since it is not clear what the precise magnitude of the bias is, however, we do not recommend adjusting the historic estimate downwards when it is to be used as an input to determining the current regulatory MRP.' [7]

Lally and Marsden have also expressed concerns regarding the use of Siegel-adjusted MRPs to estimate the cost of capital:

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[6] QCA (August 2014), *Final decision – Cost of capital: market parameters*, p. 49. Hereafter, the 'QCA Cost of Capital Paper'
[7] McKenzie, M and G. Partington (February 2013), *Review of the AER's overall approach to the risk free rate and market risk premium*, p. 19

> *'If one were to adopt these lower Siegel type estimates of the market risk premium, the implications for the cost of capital and capital budgeting would be significant. However, as pointed out by Dimson et al (2002)*, **past equity returns may also have been higher if the economic and other factors that gave rise to very low real bond returns had not arisen**. *Thus Siegel's (1992) arguments must be treated with some caution.'* [8] *[emphasis added]*

The reference to Dimson et. al is important as it suggests that *even if* an accurate estimate of historical unexpected inflation could be made, it does not follow that this estimate should be added to the historical average real yield without making an increase to the historical real return on equity.

Use of the Siegel-adjusted MRP in practice

The available evidence suggests that investors and valuation experts to not use the Siegel-adjusted MRP in practice. For example, the MRPs reported in KPMG's 2013 Valuation Practices Survey are higher than the Siegel-adjusted MRP:

> *'Survey participants overwhelmingly are using an equity (market) risk premium (EMRP) for Australia of 6 percent, with some bias towards 7 percent.'* [9]

In addition, none of the independent valuation experts considered in Ernst & Young's 2012 report used an MRP of less than 6.0 per cent[10]. This suggests that Siegel-adjusted MRPs are not used in practice, and are therefore unlikely to be reflected in market prices and expected returns.

QCA response

The QCA considers the lack of use of the Siegel-adjusted MRP to be irrelevant because the Siegel method has been chosen on merit. In QTC's view, the relevant consideration *is* whether investors and valuation experts are likely to use or consider the lower Siegel-adjusted MRP when determining expected returns and the prices they are prepared to pay for risky assets. The available evidence suggests they do not.

QTC notes that McKenzie and Partington also consider Siegel's arguments to have merit, yet they still advised the AER to not make a downward adjustment to the Ibbotson MRP.

The Wright method

QTC supports the use of the Wright method to produce an estimate of the expected return on the market portfolio, which is a key input in the CAPM. In QTC's view, the Wright method should receive at least the same weight as the Ibbotson historical averaging method.

The Wright method does not depend on historical risk-free rates. If the QCA uses the prevailing 1-year CGS yield in the cost of equity, the same yield should be deducted from the estimate of the expected return on the market portfolio to determine the implied MRP from the Wright method.

A more detailed consideration of the Wright method is presented in Appendix C.

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[8] Lally, M. and A. Marsden (2002), *Historical market risk premiums in New Zealand: 1931 – 2000*, p. 18

[9] KPMG (2013). *Valuation Practices Survey 2013*, p. 16

[10] Ernst & Young (November 2012), *Market evidence on the cost of equity. Victorian gas access arrangement review 2013-2017*, p. 23

Dividend discount model

QTC supports the use of dividend discount models (DDM) to estimate the expected return on the market portfolio.

Regardless of which version of the DDM is used, the implied MRP should be calculated using the same CGS yield that is used in the first term of the CAPM.

Independent expert reports

QTC supports the use of independent expert reports to estimate the expected return on the market portfolio.

If the QCA chooses to only consider the MRPs used by independent experts, rather than the total cost of equity for the average firm, the MRPs should be adjusted by the margin between the prevailing 1- and 10-year CGS yields.

The cost of debt

QTC disagrees with the QCA's draft decision to retain an 'on the day' approach to calculate the cost of debt[11]. The proposed approach is inconsistent with well-established financial risk management principles, and implies the use of a debt management strategy that cannot be implemented in practice.

In QTC's view, the main objectives of the cost of debt approach are to:

- replicate the cost of debt produced by a prudent and efficient benchmark debt financing strategy

- minimise the difference between the annual cost of debt allowance and the annual cost of debt incurred by an efficiently financed benchmark firm, and

- provide incentives for the benchmark firm to undertake efficient capital expenditure, including the amount and timing of the expenditure.

The first objective reflects the broad regulatory objective of only providing compensation for efficient costs, including the cost of finance. The second objective follows from the contractual nature of interest payments on debt, and the fact that any mismatches must be funded as they occur[12]. The third objective ensures that the cost of debt approach minimises the potential for investment distortions.

In QTC's view, the QCA's proposed cost of debt approach, which results in a full reset of the total cost of debt each year, does not satisfy these objectives.

Trailing average approach

The QCA presents several reasons for why an 'on the day' approach is preferred over QTC's proposed weighted trailing average approach. A brief response is provided in the following sections, and a more detailed response will be provided in our 10 October 2014 submission.

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[11] QCA (August 2014), *Draft decision – Trailing average cost of debt.* Hereafter, the 'QCA Trailing Average Paper'.
[12] This is why QTC considers the time series properties of the cost of debt allowance to be just as important as the average cost of debt allowance over the long-term.

Economic efficiency criteria

The QCA claims that a trailing average that applies to the 10-year benchmark debt yield is not suitable for estimating the regulatory cost of debt because it violates economic efficiency criteria[13]. The AER, using the same criteria of productive, allocative and dynamic efficiency, came to the opposite conclusion:

> *'In the presence of refinancing risk, it is efficient for a service provider to hold a portfolio of debt with staggered maturity dates. The allowed return on debt under the trailing average portfolio approach reflects the financing cost of a benchmark efficient entity with such a staggered portfolio. Further, we consider the approach promotes productive, allocative, and dynamic efficiency of debt financing practices.'*[14]

Perceived relevance of the regulatory term

The QCA considers the appropriate benchmark entity to be an efficient regulated comparator, and therefore the regulatory term is an 'inherent factor' in determining the cost of debt[15].

The amount of regulated assets that are subject to a pure on the day approach has reduced significantly. For example, the AER currently regulates gas and electricity network businesses with total assets of approximately $100 billion. These businesses will have their cost of debt determined by a trailing average approach that applies to the total 10-year cost of debt. The term of the regulatory period is of no relevance to this calculation.

Furthermore, IPART no longer uses a pure on the day approach to estimate the cost of debt. IPART now assigns a 50 per cent weight to the 10-year average of the 10-year debt yield, which is effectively a trailing average without annual updates.

It QTC's view, it cannot be argued that the length of the regulatory period is an 'inherent factor' in determining the regulated cost of debt for the benchmark entity.

Perceived overstatement of the cost of debt

The QCA observes that transaction costs on interest rate swaps are less than the average margin between 1- and 10-year swap rates, and concludes that using a 10-year benchmark debt yield will typically over-state the cost of debt[16].

The QCA's analysis is incomplete as it does not address the higher interest rate risk associated with shorter-term debt.

Economic signals for new investment

The QCA expresses concerns over the using actual changes in the regulated asset base (RAB) to calculate a weighted trailing average, and considers this to be inconsistent with a benchmark approach. QTC does not agree with these concerns for the following reasons:

- The RAB is used to determine the dollar value of the cost of debt (and cost of equity) component of the annual revenues. If this is considered to be acceptable, it is reasonable to use the same data to calculate a weighted trailing average.

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[13] QCA Position Paper, p. 27
[14] AER (August 2013), *Better Regulation – Explanatory statement: Draft rate of return guideline*, p. 83
[15] QCA Position Paper, p. 32
[16] QCA Position Paper, p. 29

- Changes in the RAB (or RAB × benchmark gearing) are independent of the actual mix of equity and debt that is used to fund new investment. As such, compensation for the cost of debt is based on the benchmark debt balance rather than the actual debt balance.

Inconsistent use of risk-free rates

The QCA argues that the same risk-free rate should be used in the cost of debt and cost of equity to satisfy the NPV=0 principle. As the QCA has concluded that a 1-year risk-free rate must be used in the cost of equity, it is not possible to adopt a trailing average that applies to the total 10-year debt yield[17]:

> *'Lally (2014) considered that there was no inconsistency in using the prevailing risk-free rate in setting the regulatory cost of equity and using a trailing average cost of debt approach. Lally argued that, provided it is feasible for firms to engage in a debt strategy in which the total cost of debt or the debt risk premium is a trailing average, regulatory use of a trailing average regime will satisfy the NPV = 0 Principle.'*
>
> *However, Lally did not specifically comment on the inconsistency in the term of the risk-free rate used if the trailing average is applied to the total cost of debt.'*[18]

Lally did specifically comment on the use of different terms for the risk-free rate in the cost of equity and the trailing average cost of debt in his 2010 advice to the QCA:

> *'The fourth option would be for the firm to borrow for more than one year (ten years, for example) and use neither interest rate swap contracts nor credit default swaps to convert the ten year debt into one year debt. In this event, the total costs of debt that would be incurred by the firm each year would be the average ten year risk free rate embedded in its existing debt, the average ten year debt premium embedded in its existing debt, and the annualised debt issue costs arising from ten yearly debt issues. **Thus, the pricing strategy that would just recover costs ex ante (NPV = 0) would invoke these [ten year] debt costs along with the prevailing one year risk free rate for the cost of equity, and the same costs should then be invoked by the QCA in setting WACC for monitoring purposes.'***[19] [emphasis added]

Lally's advice does not support the QCA's claim that the same term for the risk-free rate must be used in the cost of equity and the cost of debt.

Complexity

In QTC's view, the QCA has not been consistent in applying its complexity criterion to the overall cost of debt approach. For example, a weighted trailing average is considered to be 'more complex' than the on the day approach[20]. This description is not accurate as both approaches require an average debt yield to be calculated over different time periods. A weighted trailing average involves additional steps, but these can hardly be considered to be 'complex'.

In contrast, the QCA is still proposing to use a complex and data intensive method for estimating the benchmark debt yield even though the RBA now publishes monthly estimates of 3, 5, 7 and 10-year non-financial corporate yields and DRPs for broad A and BBB credit ratings.

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[17] QCA Draft Trailing Average Paper, p. 24
[18] QCA Draft Trailing Average Paper, p. 24
[19] Lally, M. (September 2010), *The appropriate term for WACC parameters for the SEQ interim price monitoring*, p. 10
[20] QCA Draft Trailing Average Paper, p. 20

Appendix A – Required MRP adjustments

In advice provided to the New Zealand Commerce Commission, Lally proposed a series of adjustments to address the issue of using two different risk-free rates in the CAPM:

> *'Most of these [MRP] figures invoke the ten year risk free rate. This term should reflect the common investor horizon assumed within the CAPM. In the face of variation across investors, it would seem reasonable to use the across-investor average period between successive equity portfolio reassessments. Froot et al (1992, Table 1) gives "average holding periods" for a wide range of US investor classes, and the weighted average of these is 3.4 years. However, these "average holding periods" for each investor class are determined by simply inverting the average turnover rate and this will significantly underestimate the average holding period. On the other hand, an investor's average holding period will significantly overstate the period between successive reassessments of their portfolio because a reassessment will not in general induce sale of all assets currently held.*
>
> *In the face of these difficulties, the estimates of the market risk premium arising from the use of one and five year bonds are also considered. However, only the Merton, forward-looking [Cornell] and survey based estimates can be modified.'* [21]

In regards to the Cornell estimates, Lally averages the 5- and 10-year risk-free rates over a 1-month period (December 2006). The average 10-year risk-free rate is added back to the original MRP before deducting average 5-year risk-free rate to produce an estimate of the MRP measured relative to the 5-year risk-free rate[22].

The same approach was applied to the survey results, although a different 1-month averaging period was used (May 2003), presumably to align with the timing of the survey.

No adjustments were made to the Ibbotson and Siegel historical MRPs due to lack of historical 5-year risk-free rates for the relevant averaging period. This is consistent with the QCA's current approach.

Implications for the QCA

As the QCA uses a 10-year CGS yield in all of the methods used to estimate the MRP it is necessary to adjust some of the estimates if a 1-year CGS yield is used in the first term of the CAPM:

- For the Cornell and Wright methods, the prevailing 1-year CGS yield should be deduced from the estimate of the expected return on the market portfolio to calculate the MRP.

- If the QCA chooses to only consider the MRPs used by independent experts, rather than the total cost of equity for the average firm, the MRPs should be adjusted by the margin between the prevailing 1- and 10-year CGS yields.

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[21] Lally, M. (October 2008), *The weighted average cost of capital for gas pipeline businesses*, p. 24
[22] The version of the CAPM used by Lally makes a tax adjustment to the risk-free rate, so the change in the MRP is less than the difference between the average 5- and 10-year risk-free rates (see equation 4 on p. 9).

Appendix B – Analysis of the historical MRP and real return on equity

Based on Lally's analysis of the historical MRP and real return on equity, the QCA concludes that more weight should be given to the historical MRP estimates[23]:

> *'The QCA has also considered the argument from stakeholders regarding whether the return on equity is more stable than the market risk premium and consider that this is ultimately an empirical matter.... the QCA has reproduced analysis undertaken by Lally (2013a) and concluded that the market risk premium is relatively more stable than the return on equity for Australia.*
>
> **This evidence supports more weight being attributed to the Ibbotson and Siegel estimates than to the Wright estimates**. *However, the QCA will have regard to the Wright estimates in forming a view on an appropriate estimate of the market risk premium.'* [24] *[emphasis added]*

Replicating Lally's MRP calculations

QTC has replicated Lally's calculations using data up to December 2013 (Figure 3):

FIGURE 3: ROLLING 30-YEAR AVERAGES FROM LALLY (2013, FIGURE 1)
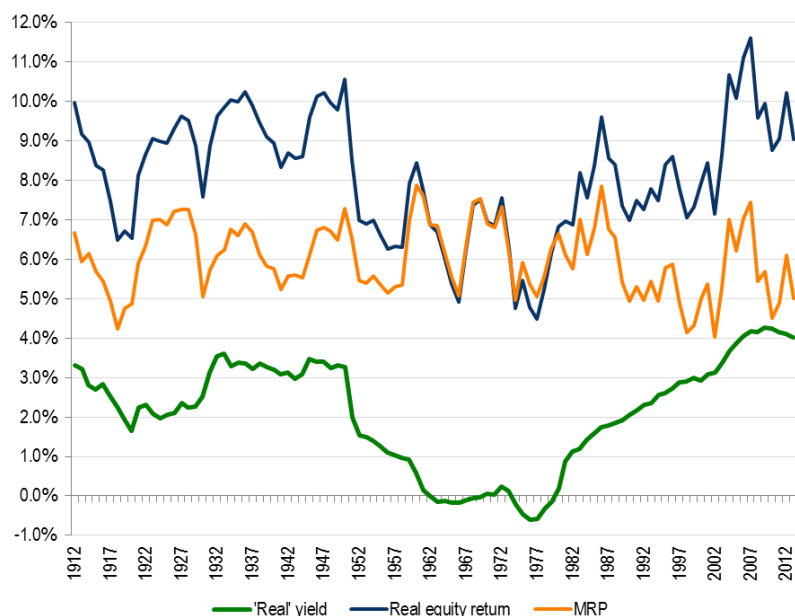
As the risk-free rate and nominal annual equity returns are deflated by the same measure of realised inflation, the MRP series in Figure 3 is effectively the same as the Ibbotson estimate. The standard deviations of the MRP and the real return on equity are 0.9 per cent and 1.5 per cent respectively.

Adjusting for unexpected inflation

Lally observes that the period between 1940 and 1990 was characterised by abnormally high inflation of 6.6 per cent per annum. The dampening effect of relatively high realised inflation on the 'real' yields is evident in Figure 2 with the 30-year rolling average becoming negative on several occasions around the middle of the sample period.

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[23] Lally, M. (March 2013), *Review of the AER's methodology for the risk free rate and the market risk premium*, p. 13.
[24] QCA Cost of Capital Paper, p. 80

The average real yield between 1883 and 2013 is 2.4 per cent. Lally proposes an improved long-term real yield estimate of 3.6 per cent based on historical data from 1883 to 1939 (3.5 per cent) and the average 10-year Commonwealth Government inflation-linked bond yield from 1986 to the present (3.7 per cent)[25]. The net effect of the adjustment is a reduction in the average historical MRP of 1.2 per cent (3.6 per cent minus 2.4 per cent).

Time series implications of adjusting the real yields

As Lally considers the effects of unexpected inflation to be concentrated in the 1940–1990 sub-period, it is not appropriate to simply increase each 'real' yield in the full 1883–2013 sample period by 1.2 per cent (and thereby reducing the MRP by 1.2 per cent). The correct approach is to:

▪ use the observed yields on 10-year inflation-linked CGS from 1986 to 2013 (ie, true real yields), and

▪ increase each real yield between 1940 and 1985 by an amount that produces an average real yield over the entire sample period of 3.6 per cent to match Lally's proposed long-term estimate[26].

These adjustments result in a significant change in the time series properties of the historical real yield and MRP, as shown in Figure 4.

FIGURE 4: ROLLING 30-YEAR AVERAGES AFTER ADJUSTING HISTORICAL REAL YIELDS FOR UNEXPECTED INFLATION
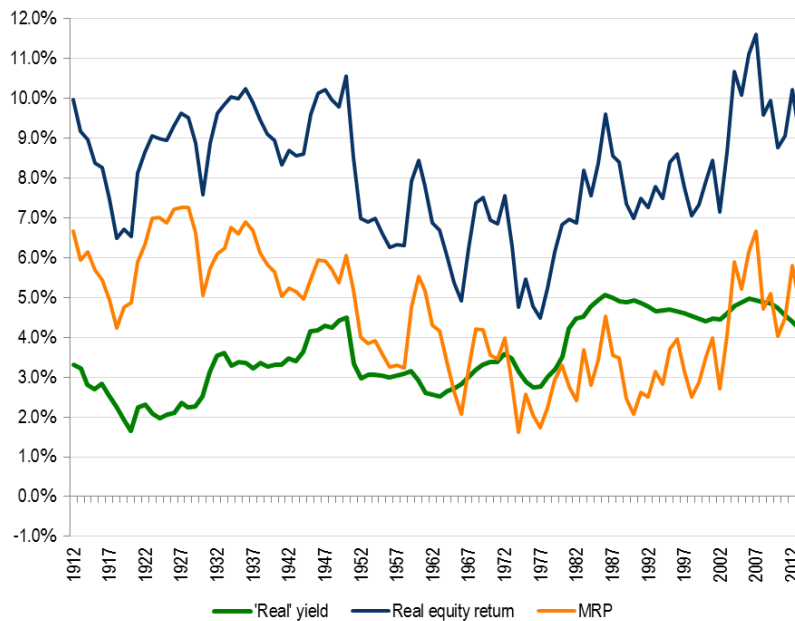
Increasing the yields between 1940 and 1985 and using the true real yields from 1986 to 2013 increases the standard deviation of the Siegel-adjusted MRP to 1.5 per cent, which is higher than the Ibbotson estimate and the same as the real return on equity[27].

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[25] Lally (October 2013), p. 30.

[26] To produce an average real yield of 3.6 per cent across the entire sample period requires increasing each real yield from 1940 to 1985 by 3.34 percentage points.

[27] The average real return on equity is 8.4 per cent, which is larger than the average Siegel-adjusted MRP of 4.8 per cent. In relative terms the standard deviation of the adjusted MRP series is significantly higher than the real return on equity.

Implications for the QCA

If the stability of the historical MRPs and real return on the market was the sole selection criteria, it would be unreasonable to give more weight to the Siegel method compared to the Wright method. However, as shown in Appendix C, the implied MRPs produced by the Wright method have a number of desirable features that are not shared by either the Siegel or Ibbotson methods.

Appendix C – The Wright method

The Wright method uses long-term historical data to make a direct estimate of the expected return on the market portfolio, which is a key input in the CAPM.

As explained by the Strategic Finance Group (SFG), the Ibbotson and Wright MRP estimates lie at the opposite end of the spectrum. The Ibbotson approach assumes that the MRP is constant whereas the Wright method assumes the real expected return on the market portfolio is constant, which results in the implied MRP varying inversely and point-for-point with changes in the risk-free rate[28].

In comparing the MRP estimates produced by the Ibbotson and Wright methods, SFG states:

> *'… in "average" market conditions, both approaches will produce similar estimates of the required return on the market and MRP. When market conditions are not average, careful consideration must be given to the relative weights to be applied to each of the two approaches. For example, in the current market conditions the Ibbotson approach implies that the required return on the market is well below its average level whereas the contemporaneous evidence from dividend discount models and independent expert reports suggests that the reverse is true. This evidence would be relevant when considering the relative weight to be applied to the Ibbotson approach in the current market circumstances.'[29]*

This suggests that the implied MRP produced by the Wright method may provide information that is not reflected in the Ibbotson estimate during certain market conditions.

Implications for the QCA

In QTC's view, there are benefits in giving explicit weight the Wright method rather than only 'having regard' to it:

- The Wright method uses historical data to make a direct estimate of the expected return on the market portfolio, which is a key input in the CAPM.

- Implementing the Wright method does not require adjustments to the historical data series.

- Most importantly, the Wright method is likely to reduce the risk of the cost of equity being under-estimated during periods of heightened risk aversion. It is also likely to reduce the risk of the cost of equity being over-estimated during periods where rising risk-free rates are not accompanied by increased inflation expectations. This is consistent with SFG's observation that:

> *'… the Wright estimate of the market risk premium varies over different market conditions – the implied MRP is lower than average during economic expansions and bull markets (the late 1990s and mid 2000s) and higher than average during financial crises (the dramatic increase in 2008). **This is consistent with the notion that the perceived amount of risk and the price of risk fall during expansions and rise during crises.** By contrast, the Ibbotson approach implies that the MRP is essentially constant across all market conditions.'[30] [emphasis added]*

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[28] SFG (January 2014), *An appropriate regulatory estimate of the market risk premium – Report for Aurizon Ltd*, p. 26
[29] SFG (January 2014), pp. 26-27
[30] SFG (January 2014), pp. 25-26, figure 4.

Based on these considerations, it is QTC's view that the Wright method should receive at least the same weight as the Ibbotson historical averaging method.

Lally provides an updated estimate of the average real market return of 9.0 per cent[31]. Based on expected inflation of 2.5 per cent, the expected return on the market portfolio under the Wright method is 11.8 per cent. If the QCA uses the prevailing 1-year CGS yield in the first term in the CAPM, the same yield should be deducted from the Wright estimate to determine the implied MRP.

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[31] Lally, M. (March 2014), *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, p. 16

Appendix D – Responses to Lally

The following sections provide responses to some of the issues raised by Lally in response to QTC's second submission on the risk-free rate and MRP[32].

Independent expert reports

Lally claims that QTC no longer supports the use of surveys (specifically, independent expert reports) to estimate the MRP based on a suggested approach in our last submission to the QCA, which only used the Ibbotson, Wright and SFG's DDM methods.

The purpose of the approach was to demonstrate that a small number of unrounded estimates of the expected return on the market portfolio can be used to produce relatively stable cost of equity estimates with the same long-term average value as adding a 6.0 per cent MRP to the prevailing 5-year risk free rate. The cost of equity estimates were formed at 6-monthly intervals between December 2002 and June 2013.

Including estimates from independent expert reports, while desirable, was not possible because a time series of the required data back to 2002 was not available.

As such, the decision to not include the results from independent valuation experts was not an oversight and QTC has not 'abandoned recourse' to those estimates.

Perpetual floating rate note analogy

Lally argues that a perpetual risk-free bond with an interest rate that is reset every 5-years will offer exactly the same interest rate as a 5-year risk-free bond.

To accept this argument one must believe that the Commonwealth Government can completely eliminate refinancing risk at zero cost, which is implausible. Eliminating (or even reducing) refinancing risk comes at a cost, and this will be reflected in a yield margin that is added to the 5-year risk-free rate. If such a bond was issued, the correct discount rate on each rate reset date would be higher than the 5-year risk-free rate.

As there are no perpetual risk-free bonds with resetting coupons on issue, it is not possible to observe the yield margin, however there can be no doubt that a positive margin would exist.

Incenta interview responses

Lally claims that the responses from some interviewees undercut the presumption that their views are authoritative. For example, using a 10-year risk-free rate because it is 'standard market practice' is considered by Lally to mean that the interviewee has no opinion on what the correct term should be. An alternative explanation is that the interviewee simply agrees with standard market practice.

Lally also claims that the use of a 10-year rate risk-free rate to value regulated businesses on a 5-year regulatory cycle by *all* interviewees undercuts their credibility. This is due to their implicit failure to understand the difference between fixed-rate and floating-rate bonds.

In QTC's view, it is highly unlikely that analysts from JP Morgan, Macquarie Bank, Morgan Stanley, Union Bank of Switzerland, Deutsche Bank, Credit Suisse, Commonwealth Bank and

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[32] Lally, M. (March 2014), *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, pp. 19-28

Bank of America Merrill Lynch do not understand the difference between fixed-rate and floating-rate bonds.

A more plausible explanation is that the interviewees understand that a perpetual bond with an interest rate that is reset every 5-years will not offer exactly the same interest rate as a 5-year bond, and that investors will require a yield premium to the 5-year rate to invest in the former.

Lally may disagree with their choice of proxy for the yield margin, but this point of disagreement does not undercut the credibility of the interviewees.