

# The Risk-Free Rate and the Market Risk Premium



QUEENSLAND  
TREASURY  
CORPORATION

SUBMISSION TO THE QUEENSLAND COMPETITION AUTHORITY

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## Summary of QTC's views

QTC's views on the risk-free rate and market risk premium (MRP) are as follows:

- QTC supports the use of yields on Commonwealth Government Securities (CGS) as the risk-free rate to be used in the Capital Asset Pricing Model (CAPM).
- The most appropriate term for the risk-free rate is ten years, and this term is considered appropriate irrespective of the length of the regulatory period. Providers of equity to regulated businesses face risks which extend well beyond the five-year term of the regulatory period. It is appropriate for equity providers to be compensated for committing capital for longer periods of time, and this is more likely to be achieved by using a ten-year term to calculate the regulated cost of equity.
- A ten-year term and averaging period for the risk-free rate and debt risk premium should be used to calculate the regulated cost of debt.
- Satisfying the Net Present Value Principle ('NPV=0') principle in practice requires the best estimate of the cost of equity to be made, which means it must reflect the risks that are faced by the equity providers when providing funding for assets with economic lives of up to 50 years. Using this principle to conclude that the term must equal the regulatory period is not supported by market evidence of equity prices for regulated businesses.
- A full reset of the cost of capital parameters once every five years based on estimates made during short averaging periods exposes consumers and regulated businesses to unnecessary risks and volatility in prices between regulatory periods. The current approach of combining the prevailing CGS yield with a stable MRP results in inappropriate volatility, and other approaches which produce more stable results over time would be in the interests of consumers and investors.
- QTC supports the use of multiple methods and data sources to estimate the MRP. As the MRP is the market price of risk, the way in which the individual estimates are used should be informed by an assessment of the current level of investor risk aversion in the market. An approach which combines a stable MRP with a volatile prevailing risk-free rate will likely overstate or understate the cost of equity at any given time, with consequences for investors and consumers including volatile prices and investment distortions.
- To reduce the potential for investment distortions, it is important for the best estimate of the cost of equity to be made for each regulatory period during the life of the assets.
- Most survey data does not provide sufficient information on how the total cost of equity is likely to be estimated by market participants. Survey evidence which does provide this information indicates a five-year MRP of 7.6 per cent assuming a zero value for imputation credits.

# The risk-free rate

## Choice of proxy

QTC supports the use of yields on Commonwealth Government Securities (CGS) as the risk-free rate to be used in the Capital Asset Pricing Model (CAPM).

There are several factors which have led to a significant fall in CGS yields over the last few years, including an increase in demand from offshore investors for relatively safe and liquid AAA-rated assets and the Basel III capital requirements. These factors, when combined with a low supply of CGS relative to demand, have pushed CGS yields to historically low levels as shown in Figure 1.

FIGURE 1: HISTORICAL TEN-YEAR YEAR CGS YIELDS



Source: Reserve Bank of Australia, monthly averages

Since the start of the global financial crisis (GFC) in mid-2007 the ten-year CGS yield has fallen from 6.4 per cent to 3.4 per cent. The yield reached a low of 2.8 per cent in June 2012.

Although the fall in yields over the last few years does not mean that CGS yields are mispriced, it does have important implications for the expected returns on other assets relative to these low CGS yields. This can be most clearly seen by examining the observable risk premium on state government bonds relative to CGS.

Figure 2 displays the margin between the QTC 14 June 2021 ('QTC 2021 bond') bond yield and the interpolated CGS yield for the same maturity date. As the principal and interest payments on this particular QTC bond are explicitly guaranteed by the Commonwealth Government and the State Government of Queensland, the yield margin cannot be attributable to credit risk or expected losses due to default. Like CGS, the QTC 2021 bond can be held by financial institutions to meet the Liquidity Coverage Ratio (LCR) under the Basel III capital requirements.

FIGURE 2: DAILY YIELD MARGIN BETWEEN THE COMMONWEALTH AND STATE GOVERNMENT GUARANTEED QTC 2021 BOND AND CGS



Source: QTC data

The yield margin in Figure 2 is a clean measure of the liquidity premium that investors place on CGS relative to the QTC 2021 bond<sup>1</sup>. The current margin is 0.68 per cent and the average margin since September 2009 is 0.60 per cent<sup>2</sup>.

Prior to the start of the GFC the average margin between ten-year QTC and CGS yields was approximately 0.25 per cent, and this reflects a period when QTC bonds were only explicitly guaranteed by the State of Queensland. As a consequence, part of the historical 0.25 per cent margin reflects compensation for credit risk (ie, changes in value due to changes in credit spreads) and expected losses due to default. In QTC's opinion, the liquidity premium component of the historical average margin is approximately **0.15** per cent<sup>3</sup>.

These data demonstrate that the average CGS liquidity premium relative to QTC bonds since September 2009 is approximately four times higher than the pre-GFC average. The liquidity premium displays considerable variation over time, reaching levels in excess of 1.0 per cent as recently as 2012.

The same relationship can be expected to exist for the CGS liquidity premium relative to less liquid assets such as equity, although the absolute size of the premium will be much larger than the premium relative to the more liquid QTC 2021 bond.

#### *Negative relationship between the liquidity premium and the CGS yield*

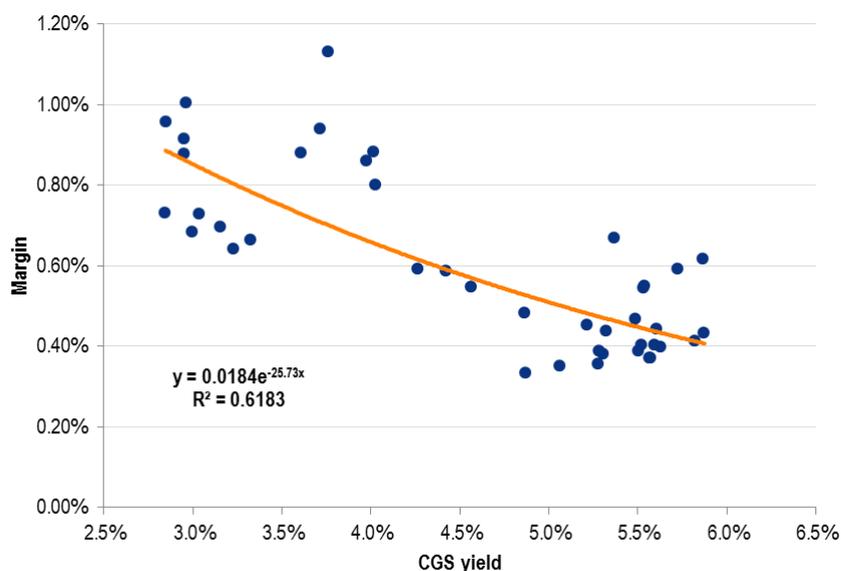
Figure 3 displays the relationship between the yield margin and the CGS yield. The liquidity premium that investors attach to CGS tends to be high when the CGS yield is low and vice-versa. Based on monthly data between September 2009 and February 2013 the correlation between the yield margin and the CGS yield is **-0.76**.

<sup>1</sup> The CGS liquidity premium is reflected in a lower CGS yield (and therefore a higher price) relative to the yield on the QTC 2021 bond.

<sup>2</sup> As the application for the Commonwealth guarantee on domestic bonds was approved in September 2009, there is no spread data available prior to this date.

<sup>3</sup> QTC also has on issue a 2021 bond that is explicitly guaranteed only by the State Government of Queensland. The liquidity component of the yield margin to CGS on this bond (based on the data in Figure 2) makes up about two-thirds of the total yield margin.

FIGURE 3: MONTH END CGS YIELD VS. YIELD MARGIN BETWEEN THE COMMONWEALTH AND STATE GOVERNMENT GUARANTEED QTC 2021 BOND AND CGS (SEPTEMBER 2009 TO FEBRUARY 2013)



Source: QTC data

This relationship is consistent with the behaviour of CGS yields during ‘flight to liquidity’ periods where an increase in risk aversion causes investors to sell assets that are less liquid to buy highly liquid assets such as CGS. The supply and demand dynamics of this process will place downward pressure on CGS yields and will cause the margin between the expected return on less liquid assets and CGS yields to increase.

The expected return on less liquid assets may also fall during these periods, but not by as much as the fall in CGS yields. This results in an increase in the required risk premium on these assets relative to CGS yields.

Even though the QTC 2021 bond has the same level of credit and default risk as a CGS, it does not share the same liquidity attributes, and these attributes are valued most by investors during periods of heightened risk aversion when CGS yields tend to be relatively low.

### Implications of low CGS yields

While QTC does not consider CGS yields to be mispriced, it is clear that the factors which have driven CGS yields to their current levels have not caused the expected returns on other assets to fall by the same amount, including assets with the same level of credit and default risk as CGS.

The implication is that the CGS liquidity premium relative to less liquid assets such as equity is also likely to be much higher than its pre-GFC levels and long-term average values. If the prevailing CGS yield is used in the CAPM to determine the expected return on equity, the MRP must also reflect the prevailing CGS liquidity premium.

This requirement follows from the definition of the MRP, which is the expected return on the market portfolio minus the risk-free rate. It is standard practice to use a broad equity index as a proxy for the market portfolio, and to use CGS yields as a proxy for the risk-free rate. It follows that the MRP cannot be invariant to changes in the CGS liquidity premium because equities do not share the same liquidity attributes as CGS. Any change in the CGS liquidity

premium will not be matched by an equal change in the expected return on the less liquid market portfolio.

## The term of proxy

In QTC's view the most appropriate term for the risk-free rate to be used on the CAPM is ten years, and this term is considered appropriate irrespective of the length of the regulatory period. A ten-year term for the risk-free rate and debt risk premium should also be used determine the regulated cost of debt.

The NPV=0 principle requires the present value of the regulated cash flows to equal the initial investment. While this is correct over the life of the assets, the utility of this model is limited when the regulatory period covers only a small fraction of the asset's life. The NPV=0 principle relies on assumptions which do not capture the constraints and risks faced by investors in practice, and conclusions must be tested against market evidence. QTC does not agree that satisfying the NPV=0 principle in practice requires the term of the risk-free rate to match the length of the regulatory period.

Satisfying the NPV=0 principle in practice requires the best estimate of the cost of equity to be made, which means it must reflect the risks that are faced by the equity providers when providing funding for assets with economic lives of up to 50 years.

As the equity providers are committing funds for periods well in excess of five years, QTC considers that cost of capital parameters based on a ten-year term are more appropriate, notwithstanding the reset of regulated revenues once every five years.

### Risks faced by equity providers

Equity providers to regulated businesses tend to be long-term investors such as infrastructure and superannuation funds. These investors commit funds on a long-term basis and, as a consequence, face risks which extend well beyond the five-year term of the regulatory period.

Even though regulated revenues are reset every five years, an equity provider to a regulated business is still committing funds for a much longer time period, and compensation for this commitment should be reflected in the regulated cost of equity and the regulated revenues.

Basing the cost of equity on a five-year risk-free rate assumes that an equity provider to a regulated business is in the same position as the owner of a five-year bond. In reality, the bond holder has a degree of flexibility at maturity which the equity provider does not have. At maturity, the bond holder receives their original investment in cash, and this provides options for re-investment or for alternative investments to be pursued.

The equity provider is not in this position at the end of each five-year regulatory period, because the investor cannot assume that their investment can be redeemed at its initial value. There is no evidence that the market value of equity converges with the assumed value of equity in the regulated asset base (RAB) at each regulatory reset, because in practice, share prices in regulated businesses are influenced by factors beyond the regulatory period. In any case, most listed businesses own a portfolio of regulated networks with different regulatory periods, and an investor in these businesses has no expectation that their equity value will

converge with the assumed value of equity in the RAB.<sup>4</sup> If the investor's investment horizon was determined by the regulatory period, combining multiple networks with different regulatory periods in a single listed vehicle would be inefficient – yet it is the dominant model in Australia. Even within the regulatory period, the investor faces the risk that their investment is diluted if the business is required to issue new equity at a large discount to reduce its leverage at a time when share prices are depressed. Under the CAPM, the individual investor's experience and expectations are paramount, and analysis using a model which focusses only on the risks faced by the regulated business is likely to overlook some of the risks borne by individual investors, which are relevant to the required rate of return.

In addition, any decision to divest will involve costs which are not faced by the owner of a maturing bond. There is an expectation that the equity provider will continue to commit funds for a much longer period of time irrespective of how frequently the regulated revenues are reset.

The margin between five- and ten-year risk free rates reflects the extra compensation required by investors for committing funds for an additional five year period. By committing funds for even longer time periods, QTC considers that equity providers are in a position which is more similar to the owner of a ten-year bond rather than a five-year bond. This favours the use of a ten-year term for the risk-free rate and MRP<sup>5</sup>.

A ten-year term is also consistent with the term used to determine required rates of return for businesses that are not subject to economic regulation. These rates of return will be reflected in the prices which prevail in competitive markets. As a key objective of regulation is to replicate competitive market outcomes, this also favours the use of a ten-year term to determine the cost of capital for regulated businesses.

### Implications for the term of the risk free rate

In QTC's view, the use of a ten-year risk free rate in the CAPM does not violate the NPV=0 principle, because it provides compensation for the risks that are faced by equity providers when committing funds across multiple regulatory periods. Compensation for these risks will not be provided if a five-year risk-free rate is used to estimate the cost of equity.

### Appropriate term to maturity for the regulated cost of debt

In QTC's view, the regulated cost of debt should equal the cost of debt produced by a prudent and efficient benchmark debt management strategy. The characteristics of the strategy should be based on sound financial risk management principles such as keeping refinancing risk at an acceptable level, rather than arbitrary factors such as the length of the regulatory period. The benchmark strategy should be capable of being implemented in practice and be consistent with the debt financing and risk management strategies used by businesses that are not subject to economic regulation.

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<sup>4</sup> At any point in time, at least one regulated network owned by the company would be mid-way through its regulatory period, when the value of the debt and equity in that network would be different to the value of the RAB because discount rates had changed from their starting value. The term of the regulatory period would only be relevant to the shareholder's investment horizon if it was certain that each regulated network in the portfolio would be sold for cash at the end of its respective regulatory period, and the cash returned to shareholders. Individual investors in listed network companies do not have this expectation, and thus their investment horizon is not linked to any one of the regulatory periods.

<sup>5</sup> In this regard, even a ten-year term is likely to be too short to fully capture the risks faced by the equity providers. This provides an even stronger reason for not using a five-year risk-free rate.

QTC's position on the cost of debt is consistent with conclusion reached by the Australian Energy Market Commission (AEMC) on how the regulated cost of debt should be determined:

*'... the long-term interests of consumers are best served by ensuring that the methodology used to estimate the return on debt reflects, to the extent possible, **the efficient financing and risk management practices that might be expected in the absence of regulation.**'<sup>6</sup>*  
*[emphasis added]*

A detailed submission outlining QTC's views on the regulated cost of debt will be made following the release of the QCA's cost of debt discussion paper.

### Consistency with the market risk premium

As discussed previously, it is QTC's view that the same ten-year risk-free rate should be used as the first term in the CAPM and to calculate the MRP.

### The averaging period

A full reset of the cost of capital parameters once every five years based on estimates made during a short arbitrary averaging period exposes consumers and regulated businesses to unnecessary risks. The timing of the averaging period can have a significant effect on the cost of capital allowance and the prices paid by consumers.

### Cost of debt

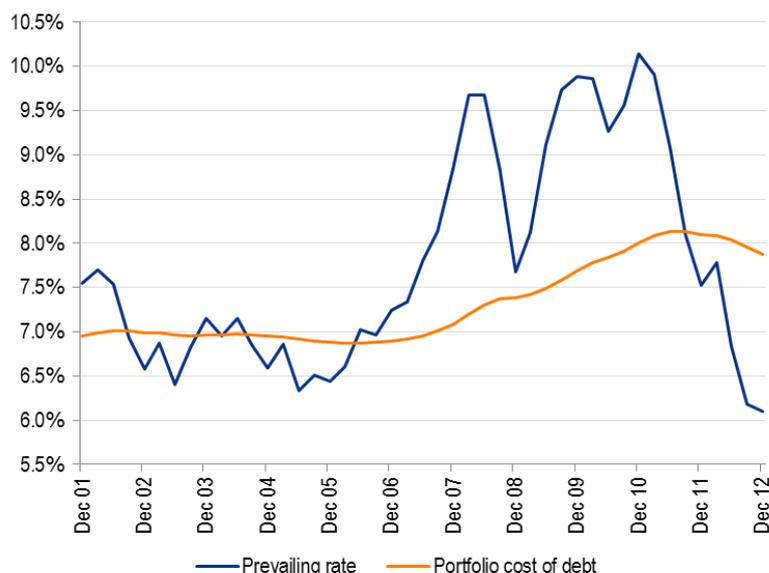
A full reset of the cost of debt parameters at any frequency implies the use of an imprudent and inefficient debt financing strategy. It is QTC's view that a ten-year trailing average of the ten-year fixed corporate cost of debt is a more appropriate approach because it 'replicates' the cost of debt produced by a diversified portfolio of fixed rate debt instruments with equally spaced maturity dates out to ten years.

Unlike the current approach, a ten-year trailing average will produce a more stable cost of debt that is largely protected from short-term volatility in the cost of debt parameters. Figure 4 shows the cost of debt produced by a portfolio of fixed rate debt with equally spaced maturity dates out to ten years.

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<sup>6</sup> AEMC (November 2012), Final Rule Determination, *Economic Regulation of Network Service Providers, and Price and Revenue Regulation of Gas Services*, p. 76

FIGURE 4: PORTFOLIO COST OF DEBT VERSUS THE PREVAILING COST OF DEBT



Source: Bloomberg, QTC data

The significant increase in volatility between 2007 and 2010 had a relatively small effect on the portfolio cost of debt.

Recent changes to the National Electricity Rules (NER) allow the benchmark cost of debt to be calculated using three different approaches, and two of these can make use of longer-term averaging periods<sup>7</sup>. The new rules also allow the cost of debt to be updated annually.

### Cost of equity

The NPV=0 principle will only be satisfied if the best estimate of the prevailing cost of equity is made at the start of each regulatory period.

It does not follow that the risk-free rate calculated over a short averaging period immediately prior to the start of each regulatory period will always achieve this outcome. Unless the MRP reflects the same level of risk aversion that is reflected in the risk-free rate during the averaging period, the estimated cost of equity will not reflect prevailing market conditions.

This view is consistent with decisions made by the Australian Competition Tribunal and the Independent Pricing and Review Tribunal (IPART).

### Australian Competition Tribunal decision

When deciding on whether the historically low risk-free rate of 4.3 per cent calculated during the Australian Energy Regulator's (AER's) proposed averaging period for EnergyAustralia et al should be used with a 6.0 per cent MRP to determine the cost of equity, the Tribunal concluded:

*'The Tribunal considers that an averaging period during which interest rates were at historically low levels is unlikely to produce a rate of return appropriate for the regulatory period.'*<sup>8</sup>

<sup>7</sup> National Electricity Rules, clause 6.5.2(j)

<sup>8</sup> Application by EnergyAustralia and Others (includes corrigendum dated 1 December 2009) (2009) ACompT 8 (12 November 2009), paragraph 114

The proposed averaging period was close to the start of the next regulatory period, however the Tribunal concluded that the risk-free rate calculated during this averaging period was unlikely to produce an appropriate rate of return. That is, combining a 4.3 per cent risk-free rate with a 6.0 per cent MRP would not have produced the best estimate of the prevailing cost of equity.

The Tribunal directed the AER to use an earlier averaging period to calculate the risk-free rate. The average ten-year CGS yield during this averaging period was 5.8 per cent.

It should be noted that the current ten-year CGS yield is 0.9 per cent lower than the average yield that was rejected by the Tribunal in 2009 and 2.4 per cent lower than the average yield that was eventually used to determine the regulated cost of equity for EnergyAustralia et al.

### IPART's use of longer-term averaging periods

Recent pricing reviews by IPART have considered longer-term averaging periods when estimating the risk-free rate and other cost of capital parameters.

In explaining its final cost of capital decision for the Sydney Desalination Plant, IPART stated:

*For this review, we consider that the value of the risk free rate is currently well below long term averages and that there is a high level of market uncertainty. We consider the risks in setting a 5-year determination in the current conditions are more significant than under normal market conditions.'*

.....

*Therefore, to guide our decision-making on the point estimate for the WACC, we estimated the long term averages of the risk free rate, inflation rate and the market risk premium. We found that using these long term averages, the WACC range would be 5.9% to 7.8% with a midpoint of 6.7% .... This midpoint is 80 basis points higher than the midpoint of the range we determined for the WACC using short term averages for these parameters, but still within this range.'*<sup>9</sup>

IPART adopted a similar approach in its review of prices for the Sydney Water Catchment Authority:

*The risk free rate has been affected by market volatility and prolonged weak market conditions. The change in these factors has potentially created a disparity between the risk free rate (for which we use short-term average data) and the market risk premium (for which we use long-term average data). In the current market circumstances, there is some evidence to support the view that expectations for the market risk premium have risen as bond yields have fallen. However, it is difficult to measure these short-term variations in expectations for the market risk premium.*

*To guide our decision making on the point estimate for the WACC we estimated the long-term averages of the risk free rate, debt margin, inflation adjustment and the market risk premium. We found that using these long-term averages, the WACC would have a midpoint of 5.6%. This midpoint is 100 basis points higher than the midpoint of the range we estimated for the WACC.'*<sup>10</sup> [emphasis added]

<sup>9</sup> IPART (December 2011). *Review of water prices for Sydney Desalination Plant Pty Limited from 1 July 2012*, pp. 93-94

<sup>10</sup> IPART (June 2012). *Review of prices for the Sydney Water Catchment Authority from 1 July 2012 to 30 June 2016*, p. 118

IPART's approach suggests that when uncertainty over the value of the prevailing MRP is higher than usual, using longer-term averages of the MRP *and* the risk-free rate is likely to produce a better estimate of the cost of capital compared to values estimated over a short averaging period.

These decisions are of particular relevance to the current cost of capital review as IPART is also guided by the NPV=0 principle when making pricing decisions. It would seem that IPART does not consider that having regard to longer-term averaging periods for the risk-free rate is inconsistent with satisfying this principle.

## The market risk premium

The MRP is defined as the difference between the expected return on the market portfolio and the risk-free rate. It is the additional return that investors require to invest in the risky market portfolio rather than the risk-free asset.

It is important to keep in mind that the MRP measures the market price of risk, which is directly related to the level of investor risk aversion. Any market-based data or evidence which provides information on the level of risk aversion should be considered when assessing different MRP estimates and determining the appropriate weights to apply. This information is likely to be of most value when different estimation methods are producing a wide range of MRP estimates, as is currently the case<sup>11</sup>.

### QCA's current methodology

QTC supports the use of multiple methods for estimating the MRP as all estimation methods have strengths and weaknesses. However, the simple averaging approach is unlikely to be effective when there are significant differences between the individual MRP estimates.

During normal market conditions, historical and forward-looking estimation methods are likely to produce similar MRP estimates. A simple average of these estimates might produce a reasonable outcome during these periods, however this is when the benefit of considering multiple methods is relatively low.

When two methods produce materially different estimates, it is likely that one estimate does not reflect prevailing market conditions. For example, the 2008 stock market return caused the historical average MRP calculated from 1958 to fall from 6.7 per cent to 5.7 per cent. At the same time, most forward-looking MRP estimates and other observable risk premiums were significantly higher than their long-term average values. In this type of scenario, equally weighting the historical and forward-looking estimates is unlikely to produce an MRP that reflects the current market price of risk.

When faced with a wide range of MRP estimates, QTC considers that other information should be considered to gain a better understanding of the prevailing level of investor risk aversion. This could include observable risk premiums such as credit and liquidity spreads, dividend yields and the slope of the CGS yield curve. Comparing current values to longer-term averages will provide some guidance on the current level of investor risk aversion.

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<sup>11</sup> The point MRP estimates in Table 3.1 of the Discussion Paper range from 4.3 per cent to 8.7 per cent.

The difference between current and longer-term average CGS yields could also be considered, as IPART has recently done.

### Use of historical data

The use of historical data is based on the premise that past returns provide information about expected returns. The QCA has regard to historical estimates of the MRP, but does not directly consider the historical return on equity.

As the MRP is defined as the difference between the expected return on the market portfolio and the risk-free rate, there may be value in calculating an implied MRP assuming that the expected return on the market portfolio equals the average historical return on equity.

The long-term historical real return on equity in Australia is approximately 8.6 per cent<sup>12</sup>. This is equivalent to a nominal return of 11.3 per cent based on current inflation expectations of 2.5 per cent. Using this as an estimate of the expected return on the market portfolio implies an MRP of **8.1** per cent based on a current five-year CGS yield of 3.2 per cent.

QTC considers that this information could be taken into account when estimating the MRP to be used in the CAPM, and to check the reasonableness of the resulting cost of equity estimates.

### Siegel historical averaging

The purpose of Siegel historical averaging is to adjust the historical MRP to account for the effects of unexpected inflation. This adjustment is based on the premise that unexpected inflation has reduced the historical real yield, but not the historical real return on equity.<sup>13</sup>

Historical unexpected inflation is estimated based on the average real yield (ie, the average nominal risk free rate net of actual inflation) minus an estimate of the expected long run real yield (ie, the average yield that would have applied to an inflation-linked risk free asset).

#### *Material difference between Discussion Paper and Lally estimates*

Based on an Ibbotson MRP estimate of 6.2 per cent, the Discussion Paper contains an updated Siegel-adjusted MRP of 4.3 per cent, which represents a net reduction for unexpected inflation of **1.9** per cent. The Discussion Paper does not provide specific values for the average real yield and the expected long run real yield used to determine this adjustment.

In recent advice to the AER, Associate Professor Martin Lally arrived at a net reduction of **1.1** per cent based on an average real yield of 2.5 per cent and an expected long run real yield of 3.6 per cent<sup>14</sup>. If these figures are applied to the Ibbotson estimate of 6.2 per cent, the Siegel-adjusted MRP would be 5.1 per cent, which is 0.8 per cent higher than the estimate in the Discussion Paper of 4.3 per cent.

The reason for the difference between the Discussion Paper and Lally estimates is unclear. The size of the difference is large in absolute and relative terms, which suggests that it is difficult to produce an accurate estimate of historical unexpected inflation. Attempting to make an

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<sup>12</sup> Gregory, A. (2013). *The AER Approach to Establishing the Cost of Equity – Analysis of the Method Used to Establish the Risk Free Rate and the Market Risk Premium*, para 20

<sup>13</sup> QCA Discussion Paper, p. 22

<sup>14</sup> Lally, M. (2013). *Review of the AER's methodology for the risk free rate and the market risk premium*, p. 29

adjustment may simply add further uncertainty to an estimate that is already subject to estimation error. Similar concerns have been raised by McKenzie and Partington:

*'[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.'*<sup>15</sup>

Other reasons for exercising caution in using Siegel-adjusted MRPs have been raised by Lally and Marsden:

*'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.**'*<sup>16</sup> [emphasis added]

The reference to Dimson 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.

*Do investors form expectations based on Siegel historical estimates?*

The main reason for estimating an historical MRP is because investors are likely to consider past outcomes when forming expectations about future rates of return. If investors have regard to the Siegel-adjusted MRP, then it is possible that it will be reflected in current equity prices and expected returns.

The survey data used by the QCA (Fernandez 2011) lists the references cited by some respondents to justify their MRP estimates. Of the 2,228 respondents that provided a reference, only ten referred to Siegel (0.4 per cent). In the most recent survey (Fernandez 2012) the number of references to Siegel was only nine out of 1,653 (0.5 per cent).

The survey data suggests that investors do not use Siegel-adjusted MRPs when estimating expected returns, possibly because of the difficulty in making an accurate estimate of historical unexpected inflation. Rather, the average MRP of 5.9 per cent from the 2012 survey suggests that investors assign a large weight to the unadjusted historical MRP, which is approximately 6.0 per cent<sup>17</sup>.

Based on these considerations, it is QTC's view that the Siegel-adjusted MRP should not be used when determining the MRP to be used in the CAPM.

<sup>15</sup> McKenzie, M and G. Partington (2013). *Review of the AER's overall approach to the risk free rate and market risk premium*, p. 19

<sup>16</sup> Lally, M. and A. Marsden (2002). *Historical market risk premiums in New Zealand: 1931 – 2000*, p. 18

<sup>17</sup> As shown in a later section, this does not mean that the respondents can be assumed to always combine their MRP estimates with the prevailing risk free rate when using the CAPM to calculate the required return on equity.

## Cornell method

The Discussion Paper states that the Cornell method estimates of the forward-looking MRP are ‘unequivocally’ biased upward because the long run growth in aggregate dividends for all firms cannot exceed the growth rate in GDP<sup>18</sup>.

If this is the case, QTC considers that it would be useful for the QCA to propose an adjustment to its long run dividend growth rate assumptions to reduce the perceived bias. This will allow stakeholders to better understand the appropriate unbiased estimate of the forward-looking MRP implied by current market prices.

QTC also considers that it would be useful if further details were available on the inputs used in the Cornell analysis, such as the current dividend yield, short-term dividend growth rates, the value and tenor of the risk-free rate, and an explanation of how the assumed value of imputation credits has been taken into account.

## Use of survey data

The QCA currently gives a 25 per cent weighting to the results from a survey conducted by Fernandez (2011), which reported an average MRP for Australia of 5.8 per cent. The most recent survey shows a slight increase in the average MRP to 5.9 per cent.

The context of the survey and the specific questions asked are outlined below:

### EXHIBIT 1. Mail sent on March and April 2011

*We are doing a survey about the Market Risk Premium (MRP) that companies, analysts and professors use to calculate the required return to equity in different countries. We will be very grateful to you if you kindly reply to the following 3 questions. Of course, no companies, individuals or universities will be identified, and only aggregate data will be made public.*

*Best regards and thanks,*

*Pablo Fernandez*

*Professor of Finance. IESE Business School. Spain*

*3 questions:*

- 1. The Market Risk Premium that I am using in 2011 for my country \_\_\_\_\_ is: \_\_\_\_\_%*
- 2. The Market Risk Premium that I am using in 2011 for USA is: \_\_\_\_\_%*
- 3. Books or articles that I use to support this number:*

The survey questions provide no information on *how* the respondents intend to use their MRP estimates to determine the required return on equity. An assumption is made that the respondents will always use their MRP estimates in conjunction with the prevailing risk free-rate, irrespective of the level of the risk-free rate.

In QTC’s view, this is not a valid assumption, and as shown in the following section there is evidence that practitioners adjust the CAPM inputs or give greater weight to different estimation methods (eg, the dividend growth model) if cost of equity estimates are made when

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<sup>18</sup> QCA Discussion Paper, p. 11

the risk-free rate is very low. Furthermore, recent decisions by IPART have used longer-term historical averages for the MRP and the risk-free rate to estimate the cost of capital.

*Ernst & Young report on the market cost of equity*

Ernst & Young (EY) prepared a report for the Victorian gas businesses on the cost of equity estimates produced by a range of independent valuation experts during 2012. Unlike the survey data discussed above, the EY report provides information on the total cost of equity that valuation experts use, rather than just the MRP.

The implied market cost of equity based on 17 expert reports prepared during 2012 is presented in Appendix C of the EY report. These estimates have been compared to the 'standard' cost of equity that would have been produced at the time of each report if the prevailing ten-year CGS yield was added to a 6.0 per cent MRP.

In considering the quality and value of the information in the expert reports, EY noted:

*'The independent expert reports are prepared by accredited independent experts, working within an explicit regime of regulation, comprising both formal statutory rules and less formal guidelines, which require that the experts be accountable for the results of their work.'*

*'The cost of equity provided in independent expert reports is the evidence of expert capital market practitioners acting independently in accordance with defined standards of independence, and based on documented and explicitly justified analysis.'*<sup>19</sup>

EY also confirmed that many of the valuation reports were used to support successful market transactions. Despite the relatively small sample size, the quality of the evidence in the expert reports is in QTC's view superior to the anonymous responses provided in the Fernandez survey because of the framework for independent expert reports and the ability to interrogate the risk-free rate applied along with the MRP and any other adjustments.

The average market cost of equity for the expert reports is **1.2** per cent higher than the cost of equity calculated using the standard approach (10.7 per cent versus 9.5 per cent). The standard approach resulted in an average risk-free rate of 3.5 per cent being added to a 6.0 per cent MRP. These estimates assume a zero value for imputation credits.

QTC notes that although the average MRP estimate for the 17 expert reports is 6.3 per cent, this does not explain the 1.2 per cent difference with the cost of equity produced by the standard approach, which is based on an MRP of 6.0 per cent.

QTC has estimated the implied risk-free rate that is consistent with market cost of equity and MRP for each expert report. The average implied risk-free rate is **4.4** per cent, which is 0.9 per cent higher than the average prevailing risk-free rate at the time of each report.

Some experts used longer-term averages rather than prevailing rates to estimate the risk-free rate. For example, Grant Thornton stated that:

*'Given the current volatility in the global economy due to the uncertainty associated with European debt markets, we have observed the yield on the 10 year Australian Commonwealth Government*

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<sup>19</sup> Ernst & Young (2012). *Market evidence on the cost of equity. Victorian gas access arrangement review 2013–2017*, para. 41 and 50

*Bond over a longer period. Based on the average yield for the period 1 January 2011 to 12 December 2011, we have adopted risk free rate of 5%.’<sup>20</sup>*

The average ten-year CGS yield during December 2011 was 3.9 per cent.

Alternatively, an average MRP of 7.2 per cent could have been used in conjunction with the average prevailing CGS yield of 3.5 per cent to produce the same 10.7 per cent average cost of equity from the expert reports.

#### *Conclusions on survey data*

In QTC’s view, the average MRP of 5.9 per cent from the Fernandez (2012) survey is likely to underestimate the true MRP that market participants are likely to use with the prevailing risk-free rate in the current market. For example, it is common to observe in equity analyst reports that a longer-term value for the risk-free rate is used to estimate the cost of equity in conjunction with a long-term MRP.

The implied MRP based on a sample of cost of equity reports prepared by independent valuation experts in 2012 suggests an MRP of 7.2 per cent measured relative to ten-year CGS yields. As the QCA currently uses a five-year term for the risk-free rate, the MRP needs to be increased to 7.6 per cent to reflect the average yield margin between five and ten-year CGS of 0.4 per cent during 2012. Further adjustments may be required to reflect the value assigned to imputation credits.

Finally, QTC notes that the independent experts did not apply adjustments for historical unexpected inflation when determining their MRP estimates. This provides further support for QTC’s view that a Siegel adjustment is not required when estimating the MRP to be used in the CAPM.

#### Recent cost of capital decisions by IPART

In reviewing the MRP approaches and values used by other regulators, the Discussion Paper observes that:

*IPART has consistently applied a range of 5.5% to 6.5% in recent determinations on the basis of Ibbotson historical averaging. IPART has also stated that it believes that using a long term historical average adequately takes into account any impact on excess returns of recent financial market events such as the GFC.’<sup>21</sup>*

This does not fully reflect how IPART has used longer-term averaging to estimate the cost of capital:

*‘Consistent with our past decisions, we decided to use an MRP estimate of 5.5% to 6.5% to calculate the range for the WACC. This helps maintain a consistent regulatory environment. **We have addressed the potential problem of combining a long-term average for the MRP and a short-term average for the risk free rate by having regard to the long term averages for both in choosing a WACC at the top end of the current range.**’<sup>22</sup> [emphasis added]*

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<sup>20</sup> Grant Thornton (January 2012), *Independent Expert Report for oOh!media Group Limited*, Appendix B

<sup>21</sup> QCA Discussion Paper, p. 12

<sup>22</sup> IPART (June 2012), Sydney Water Catchment Authority, p. 129

*In the current market circumstances, there is some evidence to support the view that expectations for the market risk premium have risen as bond yields have fallen. However, it is difficult to measure these short-term variations in expectations for the market risk premium.’<sup>23</sup>*

*We have taken account of the disparity between long- and short-term market parameters by **selecting a point estimate for the WACC which is closer to the WACC calculated using long-term averages.**’<sup>24</sup> [emphasis added]*

While IPART did continue to use an MRP within a 5.5 per cent to 6.5 per cent range, it did not use these estimates in conjunction with the prevailing risk-free rate to determine the cost of capital. Rather, IPART adopted a pragmatic approach at a time when estimating the prevailing MRP was considered to be more difficult than usual. This involved having regard to longer-term average values of the risk-free rate and MRP.

IPART has also stated that ‘the assumptions and parameters used in estimating the WACC are consistent with those used in commercial corporate valuation’.<sup>25</sup> IPART’s approach is also consistent with the approach used by the independent experts sampled in the EY report.

## Risk-free rate, market risk premium and the Global Financial Crisis

The QCA has presented its views on a March 2012 report prepared by the Competition Economists Group (CEG) for Envestra, SP AusNet, Multinet and APA titled “Internal consistency of the risk free rate and MRP in the CAPM”.

QTC does not agree with the QCA’s conclusion that CEG believes the currently low CGS yields ‘undercuts their suitability as a proxy for the risk-free asset in the CAPM’<sup>26</sup>.

In QTC’s view, the main points raised in the CEG report are as follows:

- The fall in CGS yields since 2008 has not been matched by a commensurate fall in the yield on low risk state government bonds and higher risk corporate bonds. This suggests that required risk premiums relative to CGS are higher than their pre-GFC levels.
- The factors which have contributed to the fall in CGS yields, such as a flight from risky assets to risk-free assets, increased demand due to the Basel III capital requirements and a relatively low supply of CGS, have not caused the required returns on risky assets such as equity to fall by the same amount. This also suggests that required risk premiums relative to CGS are higher than their pre-GFC levels.
- If an increase in risk aversion leads to an increase in demand for CGS, this will place downward pressure on CGS yields. It follows that the same increase in risk aversion must also be reflected in the prevailing value of the MRP, which is the market price of risk and directly related to the level of investor risk aversion.
- An MRP of 6.0 per cent is consistent with long-term historical average values and reflects the value adopted by Australian regulators prior to the GFC. Using this value in

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<sup>23</sup> IPART (June 2012), Sydney Water Catchment Authority, p. 188

<sup>24</sup> IPART (June 2012), Sydney Water Catchment Authority, p. 123

<sup>25</sup> IPART (June 2012), Sydney Water Catchment Authority, p. 117

<sup>26</sup> QCA Discussion Paper, p. 15

conjunction with a CGS yield that reflects a much higher level of risk aversion will underestimate the prevailing cost of equity.

- If estimating the prevailing value of the MRP is too difficult in certain market conditions, an alternative approach is to calculate the average CGS yield over a longer-term period and use this in conjunction with a longer-term historical MRP estimate. This is more likely to produce estimates of the risk-free rate and MRP that reflect similar levels of risk aversion (ie, the estimates will be internally consistent).
- During periods of heightened risk aversion, there is a strong negative correlation between CGS yields and required risk premiums. The relevance of this point does not require a negative relationship to exist in general or to apply across all time periods.

CEG's conclusions are not based on a stated or implied view that CGS yields are an unsuitable proxy for the risk-free rate in the CAPM. CEG do not state or imply that CGS yields are mispriced, nor do they propose an alternative proxy for the CAPM risk-free rate that is based on something other than CGS yields.

CEG's main point is that the factors which have caused a significant fall in CGS yields over the last few years cannot be expected to have caused the required return on risky and less liquid assets such as equity to have fallen by *exactly* the same amount:

*I consider that the overwhelming empirical and contextual evidence suggests that the observed low yields on Commonwealth Government Securities (CGS) are as a result of a general flight to safety by investors exacerbating a pre-existing scarcity premium. **The current low yields do not signal that investors perceive the economic environment as being less risky. Indeed, the opposite is the case and the fall in CGS yields is symptomatic of greater perceived risks by investors in many classes of assets. The current historically low CGS yields are not a sound basis for concluding that required returns on risky assets are also at historically low levels.***<sup>27</sup> [emphasis added]

### CEG's analysis of state government bond yield spreads

CEG presents a graphical analysis of the yield margins on state government bonds relative to CGS and overlays a time series of the ten-year CGS yield<sup>28</sup>. The analysis demonstrates that over the last few years, yield margins have been significantly higher than pre-GFC levels and that a negative relationship exists between the yield margins and the CGS yield.

Lally does not accept CEG's conclusion that higher yield margins are evidence of a higher MRP. Lally considers that the higher yield margins could be due to factors unrelated to the MRP such as<sup>29</sup>:

- an increase in the expected loss due to default, and/or
- an increase in the illiquidity premium on state government bonds.

The first point can be ruled out based on Figure 2 of this submission, which shows the yield margin on a QTC bond which has the same level of credit and default risk as a CGS. Consistent with CEG's analysis, the average yield margin over the last few years is significantly

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<sup>27</sup> CEG (March 2012), *Internal consistency of the risk free rate and MRP in the CAPM – a report prepared for Envestra, SP AusNet, Multinet and APA*, p. viii

<sup>28</sup> CEG (March 2012), Figure 10, p. 24

<sup>29</sup> Lally, M. (August 2012). *The risk free rate and the market risk premium*, p. 10

higher than pre-GFC levels and displays a strong negative correlation with the CGS yield (Figure 3).

The second point assumes that the illiquidity premium is not compensation for systematic risk, and therefore does not affect the MRP. In responding to this claim in a subsequent report, CEG stated:

*'The spread between CGS and required equity returns (ie, the MRP) is affected by anything that affects investors' required yields on one asset but not the other. CGS are the most liquid assets in the Australian economy, state government debt is the second most liquid and shares in listed companies are much less liquid than either of these. If spreads to CGS for state government debt have been driven up by over 100 basis points due to a heightened liquidity premium then spreads to CGS for equities (ie, MRP) will have been driven up by multiples of this.'*<sup>30</sup>

The return premiums required by investors to invest in less liquid assets such as state government bonds and equities are measured relative to the same CGS yields. As such, both premiums will be affected by changes in the value that investors attach to the superior liquidity of CGS.

Furthermore, the timing of changes in illiquidity is also a relevant consideration for investors, and as Damodaran observes:

*'... the cost of illiquidity in the aggregate can vary over time, and even small variations can have significant effects on equity risk premiums. In particular, the cost of illiquidity seems to increase when economies slow down and during periods of crisis, thus exaggerating the effects of both phenomena on the equity risk premium.'*<sup>31</sup>

If equities in aggregate tend to become more illiquid in undesirable states of the world such as economic downturns and periods of crisis, then exposure to variations in illiquidity (ie, liquidity risk) should be viewed as a systematic risk.

### **Relationship between liquidity premiums and dividend yields**

Figure 5 displays the relationship between the Commonwealth and State Government guaranteed QTC yield margin to CGS and the dividend yield on the ASX200. The dividend yield can be used as a proxy for the level of investor risk aversion implicit in current equity prices.

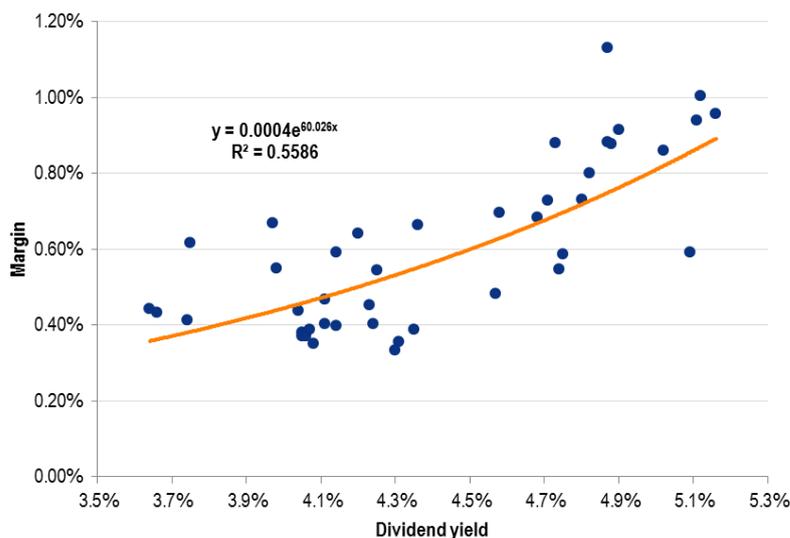
Higher CGS liquidity premiums relative to the QTC 2021 bond (which tend to occur when the CGS yield is low) are associated with higher dividend yields and vice-versa. This suggests that changes in the value that investors attach to the superior liquidity of CGS will also be reflected in the required risk premium on equities.

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<sup>30</sup> CEG (November 2012), *Response to AER Vic gas draft decisions. Internal consistency of MRP and risk free rate*, para 174

<sup>31</sup> Damodaran, A. (2012), *Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2012 Edition*, p. 11

FIGURE 5: MONTHLY DIVIDEND YIELD VS. YIELD MARGIN BETWEEN THE COMMONWEALTH AND STATE GOVERNMENT GUARANTEED QTC 2021 BOND AND CGS (SEPTEMBER 2009 TO FEBRUARY 2013)



Source: RBA, QTC data

### Flight to quality, flight to liquidity and the risk-free rate

CEG argues that a flight to quality and liquidity is one reason why the required risk premiums relative to CGS on a range of assets have increased as CGS yields have fallen:

*‘A common interpretation for the increase in spreads between CGS and other higher risk/ less liquid assets (including by the RBA) is that there has been a flight to the safety and liquidity of AAA rated government debt – **which has pushed down the yield on this asset but not all other assets.**’<sup>32</sup> [emphasis added]*

In commenting on the effects of a flight to quality on CGS yields, Lally states:

*‘Furthermore, the CAPM does not require (whether explicitly or implicitly) that the risk free rate be invariant to changes in the risk of other assets or to investors’ aversion to such risks. Thus, even if the risk of equities has increased or investors have become more averse to such risks, leading to heightened demand for CGS and therefore a lower yield on them, this does not preclude CGS from being a suitable proxy for the risk free rate. Such changes in risks or risk aversion (the ‘flight to quality’) are simply part of the financial landscape.’<sup>33</sup>*

CEG does not argue that increased demand for CGS as a result of a flight to quality makes it an unsuitable proxy for the risk-free rate. Rather, flight to quality periods will be associated with an increase in demand for CGS, but not for risky and less liquid assets.

By definition, the increased demand for CGS during a flight to quality period will not be matched by an increased demand for risky and less liquid assets. In fact, the opposite is true as investors will be *selling* risky and less liquid assets, thereby creating an increase in the supply of these assets in the market. The supply and demand dynamics of this process will cause the

<sup>32</sup> CEG (March 2012), para 85

<sup>33</sup> Lally (August 2012), p. 7

margin between the lower CGS yields and the expected returns on risky and less liquid assets to increase. In the case of equity, this means the MRP will increase.

Lally's views are re-stated in the Discussion Paper:

*In addition, the CAPM does not require that the risk-free rate be invariant to changes in the risk of other assets (e.g. equities) or to changes in investors' aversion to these risks. **Consequently, even if such changes in risk or risk aversion behaviour have led to a 'flight to quality', such an effect is not relevant to the CAPM** (Lally, 2012b: 6-8).'<sup>34</sup> [emphasis added]*

It is unclear how changes in risk aversion would not be relevant to the CAPM, given it derives expected returns from the market price of risk. In QTC's view, risk aversion and the impact of 'flight to quality' events are relevant to the CAPM.

Under the CAPM the expected return on an asset is based on its sensitivity (ie, beta) to the difference between the expected return on the market portfolio and the risk-free rate. Changes in risk aversion will directly affect the amount of compensation that investors require to invest in the risky market portfolio rather than the risk-free asset. The CAPM cannot be applied without first understanding the level of risk aversion and then ensuring that each CAPM parameter is consistent with that level of risk aversion.

### Correct compensation over the asset life

In responding to CEG's view that a regulated business will be under-compensated if the cost of equity is based on a 6.0 per cent MRP and a relatively low risk-free rate, Lally states:

*However, the critical feature of the compensation is that it should be provided over the life of the regulated assets rather than over each regulatory cycle within the life of the assets, and there are trade-offs involved here, ie., an estimation process that yields the best results over the life of the regulated assets might yield inferior results over any regulatory cycle, and should therefore still be preferred.'*<sup>35</sup>

This view may not be consistent with the Australian Competition Tribunal decision discussed previously:

*The Tribunal considers that an averaging period during which interest rates were at historically low levels is unlikely to produce a rate of return appropriate for the regulatory period.'*<sup>36</sup>

The Tribunal's decision suggests that the best estimate of the cost of equity should be made for each regulatory period during the life of the asset. It is not appropriate to rely on a *possible* averaging out of outcomes over multiple regulatory periods to correct for any 'inferior results' during a particular regulatory period.

The view that compensation only needs to be appropriate over the life of assets and not in each regulatory period also has implications for consumers, as it is more likely to lead to volatile prices which either understate or overstate the economic cost of service provision at a particular point in time. While regulated businesses are capable of hedging part of the risk associated with fluctuating rates of return, most consumers would be unaware that they are

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<sup>34</sup> QCA Discussion Paper, p. 26

<sup>35</sup> Lally (August 2012), pp. 12-13

<sup>36</sup> *Application by EnergyAustralia and Others (includes corrigendum dated 1 December 2009)* (2009) ACompT 8 (12 November 2009), paragraph 114

exposed to the risk that prices may be reset at a period of very low or very high CGS yields. If there is evidence to suggest that expected returns on equity are more stable than the CGS yield with a long run MRP, it would be in the interest of consumers to fully investigate this option.

### What does a 6 per cent MRP represent?

Although a range of estimation methods and data sources are considered, the Discussion Paper indicates that final MRP estimate has consistently been 6.0 per cent, which is in line with most long-term historical estimates of the MRP. The same market price of risk has been used to estimate the regulated cost of equity before and after the start of the GFC, which implies that the level of investor risk aversion has not changed over this period.

The evidence presented in this submission suggests that the CGS liquidity premium over the last few years has been significantly higher than its pre-GFC level, and that increases in this premium tend to coincide with low CGS yields. The CEG report examines the required risk premiums on a wider range of assets and reaches the same conclusion.

Basing the MRP on a simple average of historical and forward-looking MRP estimates is unlikely to produce an accurate estimate of the cost of equity when there are significant differences between the individual MRP estimates, as is currently the case.

For example, the average Cornell method estimate in the Discussion Paper is 2.7 per cent higher than the final rounded MRP estimate of 6.0 per cent, and the lowest Cornell estimate is 1.6 per cent higher. These forward-looking estimates appear to be capturing the relatively high CGS liquidity premium discussed in this submission, and are consistent with the market cost of equity estimates used by independent valuation experts during 2012.

The effect of these estimates on the rounded MRP has been largely offset by the very low Siegel-adjusted MRP of 4.3 per cent and a survey-based estimate of 5.9 per cent that is inconsistent with recent market-based evidence on how practitioners estimate the total cost of equity, especially when the risk-free rate is relatively low. This market-based evidence indicates that a forward-looking MRP of at least 7.6 per cent relative to the five-year CGS yield is more appropriate.

In QTC's view, the rounded MRP estimate of 6.0 per cent is essentially an estimate of the long-term historical MRP. This estimate does not reflect the higher forward-looking MRP estimates which are implicit in current equity prices. It is also inconsistent with the evidence presented in this submission which shows that the CGS liquidity premium over the last few years has been significantly higher than its pre-GFC levels. An increase in the CGS liquidity premium will cause the MRP to increase because equity does not share the same liquidity attributes as CGS.

The factors which have led to a significant fall in CGS yields over the last few years cannot be expected to have caused the expected return on equity to fall by exactly the same amount. Using a 6.0 per cent MRP and the prevailing CGS yield to populate the CAPM is unlikely to produce an appropriate estimate of the prevailing cost of equity.