Queensland Competition Authority

Position Paper

Long-term framework for SEQ water retailers -weighted average cost of capital (WACC)

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SUBMISSIONS

This report is a draft only and is subject to revision. Public involvement is an important element of the decision-making processes of the Queensland Competition Authority (QCA). Therefore, submissions are invited from interested parties concerning its assessment of pricing principles for South East Queensland distribution/retail entities. We will take account of all submissions received.

Submissions, comments or inquiries regarding this paper should be directed to:

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The closing date for submissions is **8 September 2014**.

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Information about the role and activities of the QCA, including copies of reports, papers and submissions can also be found on our website.

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OVERVIEW

The Ministerial Direction requires QCA to recommend an appropriate treatment for determining the weighted average cost of capital (WACC) as part of its investigation of the regulatory framework parameters for the SEQ water distribution/retail entities (the water retailers) to apply from 1 July 2015.

For the 2013-15 price monitoring period, QCA estimated a benchmark WACC based on the methodology outlined in Appendix B of its Price Monitoring Final Report for 2010-11.

In parallel with this investigation, QCA is undertaking a review of certain aspects of the appropriate discount rate methodology to apply in its regulatory valuation model. Consequently, this position paper updates QCA's discount rate methodology, as applied to the water retailers, to reflect generic changes to QCA's position to date occasioned by the review.

The recommended changes are relatively minor, with the form of the discount rate and the approach to estimating most parameters either unchanged or facing minor adjustments.

In summary, the position paper recommends that no changes be made to the form of the discount rate (Officer WACC3) or the way it is applied – that is, the same single rate across all entities. Moreover, it is recommended that the asset beta (0.35), the benchmark capital structure (60% debt), the debt beta (0.11), the 'on-the-day' method for estimating the cost of debt, and the method for estimating the risk-free rate remain unchanged (except that the term of the risk-free rate is now reduced to one year to align with annual performance reviews and retailers' price adjustments).

It is recommended that relatively minor changes be made to the market risk premium (increased from 6% to 6.5% per annum), reflecting new evidence and a greater emphasis on current market conditions; and gamma (reduced from 0.5 to 0.47), with a consequential small reduction in the levered equity beta from 0.66 to 0.65.

The status of QCA's cost of capital methodology, and draft recommendations, are summarised below.

QCA cost of capital methodology for SEQ water retailers

Preceding Methodology	***Proposed changes to methodology***	***Draft Recommendations***
	Form of the discount rate	
Officer WACC3; Sharpe-Lintner CAPM; adjusted Conine leverage relationship	No change Split cost of capital subject to further review as a potential alternative approach or to check established regulatory practices (QCA 2014b)	**2.1** The form of the benchmark discount rate for the long-term regulatory framework for SEQ water retailers from 1 July 2015 to be a single nominal post-tax 'vanilla' WACC (Officer WACC3). **2.2** The same benchmark WACC to apply across all SEQ water retailers. **2.3** The benchmark WACC to be updated annually to align with the recommendations made for estimating the cost of debt. **2.4** The split cost of capital concept may be re-examined at a later date should further research find that its application to the determination of the cost of capital is both desirable and feasible.
	Risk-free rate	
Term: regulatory period Proxy: yield on Commonwealth	No change (regulatory period now one year for SEQ water retailers)	**3.1** The risk-free rate to be estimated annually from 1 July 2015 using: (a) Commonwealth Government bond nominal yields

Preceding Methodology	*Proposed changes to methodology*	*Draft Recommendations*
Government security (CGS) Averaging period: 20 trading days just prior to start of regulatory period		as the proxy for the risk-free rate (b) an averaging period of 20 business days just prior to the annual update (c) a term to maturity of one year.
Market Risk Premium (MRP)		
MRP of 6% per annum which is the mean of Ibbotson, Siegel, Cornell and survey evidence estimates	Increase in MRP to 6.5% per annum after considering additional evidence and recent market conditions	**4.1** Market risk premium of 6.5% per annum to apply from 1 July 2015.
Capital structure		
Debt-to-value ratio of 0.60	No change to established approach	**5.1** Benchmark capital structure of 60% debt, and credit rating of BBB, to apply for all SEQ water retailers from 1 July 2015.
Asset and equity betas		
Asset beta for all SEQ water retailers of 0.35, which corresponds to a leveraged equity beta of 0.66 given other parameter assumptions	Asset beta unchanged at 0.35, but leveraged equity beta falls slightly to 0.65 due to fall in gamma from 0.5 to 0.47	**6.1** Asset beta of 0.35 to apply to all SEQ water retailers from 1 July 2015. This corresponds to a levered equity beta of 0.65 at leverage of 60%.
Cost of debt		
'On-the-day' approach. Calculated at the start of the regulatory period, for the regulatory period, as estimate of the risk-free rate, plus estimate of debt premium based on a benchmark credit rating, plus allowances for debt raising costs and the costs of managing interest-rate and refinancing risk	No change to established approach	**7.1** From 1 July 2015, the benchmark cost of debt for SEQ water retailers be estimated annually using QCA's established 'on-the-day' approach comprising: (a) a risk-free component of the cost of debt estimated using the prevailing one-year risk-free rate (b) a debt risk premium component of the cost of debt estimated using the prevailing one-year benchmark (BBB) bond rate (c) an interest rate swap allowance to convert the term of the risk-free rate from 10 years to one year (d) a debt risk premium conversion allowance equal to the difference between the credit spreads for 10-year and one-year BBB-rated debt (e) an allowance for debt raising costs of 10.8 basis points per annum
Debt beta		
Used in Conine beta leveraging relationship. Assumed as midpoint between zero and upper bound determined using CAPM and corporate spread. Estimated as 0.11	No change Supported by recent evidence (PwC NZ 2012)	**8.1** Debt beta of 0.11 to apply to all SEQ water retailers from 1 July 2015.

Preceding Methodology	*Proposed changes to methodology*	*Draft Recommendations*
	Gamma	
Used in Conine beta leveraging relationship and in adjusting cash flows for effects of dividend imputation. Estimated as 0.5 (based on a distribution rate of 0.8 and a utilisation rate of 0.625)	Gamma of 0.47 (based on distribution rate of 0.84 and utilisation rate of 0.56)	**9.1** Gamma of 0.47 (based on a distribution rate of 0.84 and a utilisation rate of 0.56) to apply from 1 July 2015.

1 INTRODUCTION

1.1 Ministerial Direction

The Ministerial Direction requires QCA to recommend an appropriate treatment for determining the weighted average cost of capital (WACC) as part of its investigation of the regulatory framework parameters for the SEQ water distributors/retailers (the water retailers) to apply from 1 July 2015.

1.2 Background

Treatment of WACC for SEQ 2013-15 retail price monitoring review

The Ministerial Direction for the 2013-15 price monitoring review required QCA to advise a benchmark WACC for the SEQ water retailers by 31 January 2013, against which to monitor the WACCs applied by the water retailers (QCA 2014a).

The benchmark WACC was used by QCA to calculate the maximum allowable revenue (MAR) for purposes of price monitoring. However, the water retailers retain control over their actual WACC assumptions and prices during the 2013-15 monitoring period.

QCA estimated a benchmark WACC of 6.57% per annum (post-tax nominal) for the 2013-15 price monitoring period employing the methodology then in use as set out in Appendix B of its Price Monitoring Final Report for 2010-11 (QCA 2011).

The benchmark WACC and supporting information is published on the QCA website.

Treatment of WACC for SEQ long-term regulatory framework

Consistent with the light-handed nature of the proposed regulatory framework to allow retailers to have control over their WACCs, it is not proposed that the benchmark WACC be prescribed by QCA for use by water retailers.

However, the approaches and methodologies outlined in this paper are intended to inform water retailers on the approach the QCA considers appropriate for the determination of the WACC when monitoring retailers' performance.

QCA review of discount rate methodology

In parallel with this investigation, QCA has undertaken a review of the appropriate discount rate methodology to apply in its regulatory valuation model.

Details of the review and associated material, including research papers by specialist consultants and submissions by stakeholders, can be found in the 'Research' section of QCA's website[1].

Changes to QCA's position resulting from the review to date are outlined in succeeding sections of this paper.

[1] http://www.qca.org.au/Other-Sectors/Research

1.3 Role of the discount rate

Investors in capital markets expect to earn a return on their investments consistent with the systematic risk of those investments. In economic terms, this return represents the opportunity cost to investors of the expected return foregone on the next best investment alternative of equivalent risk – the opportunity cost of capital. The cost of capital (or rate of return) compensates owners of capital for their past investments, and provides guidance on the appropriate return required on future risk-adjusted investments.

A fundamental tenet of economic regulation is the NPV = 0 principle which requires that the present value of the regulated firm's expected efficient net cash flows equals the initial investment, given a discount rate equal to the risk-adjusted opportunity cost of capital.

If the allowed revenues are less than those that satisfy this principle, then investors will not be motivated to invest. Alternatively, if the allowed revenues are greater than those that satisfy this principle, then the additional revenue represents the excess profit that regulation seeks to prevent in the first place (Schmalensee, 1989).

Regulatory jurisdictions in Australia (including QCA) typically use the building block model to satisfy the NPV=0 principle. A discounted cash flow (DCF) method is used to set the net present value of the expected net cash flows (inflows minus outflows) to zero. The discount rate (or rate of return) used in this calculation is an estimate of the opportunity cost of capital to debt and equity investors consistent with the systematic risk of the entity's cash flows.

As noted above in section **Error! Reference source not found.**, in parallel with this investigation, QCA has undertaken a review of the appropriate discount rate methodology to apply in its regulatory valuation model. For a more detailed overview of the relationship between the NPV = 0 principle and QCA's regulatory objectives, see section 2.3.1 of QCA 2014d.[2]

1.4 Submissions

QCA has received submissions in relation to cost of capital matters from SEQ water retailers, and other interested parties, on several of QCA's papers concerning the review of its cost of capital methodology, and on QCA's other position papers on the long-term regulatory framework.

In addition, QCA held a forum on 13 December 2013 and a workshop on 29 May 2014 to provide further opportunities for consultation and stakeholder input on WACC matters.

All stakeholder submissions and views relating to water industry matters are addressed in the sections that follow and in QCA's decision papers on the cost of capital review[3].

[2] QCA's "Cost of Capital: Market Parameters" paper in turn draws upon QCA's conclusions regarding the NPV = 0 principle in its "Statement of Regulatory Pricing Principles" (QCA, 2013b).

[3] In particular, see QCA 2014d, QCA 2014e, and QCA 2014f

2 FORM OF THE DISCOUNT RATE

2.1 Background

Consistent with National Water Initiative (NWI) Pricing Principles (COAG, 2010), the weighted average cost of capital (WACC) is the general form of the opportunity cost of capital (or discount rate) most commonly used and accepted in regulatory practice in Australia, and is the weighted sum of the costs of debt and equity finance where: the weights are the market values of debt and equity expressed as shares of the entity's funding mix; the cost of debt is based on a 'benchmark' capital structure, and the cost of equity is estimated using the Sharpe-Lintner Capital Asset Pricing Model (CAPM) as follows:

$$r_e^L = r_f + \beta_e^L \left(r_m - r_f \right) = r_f + \beta_e^L .MRP$$

Where r_f is an estimate of the risk-free rate; β_e^L is an estimate of the levered equity beta, which is a measure of the non-diversifiable (or systematic) risk faced by equity holders; r_m is an estimate of the expected return on the market portfolio of all risky assets; and MRP is an estimate of the market risk premium, which is the return above the risk-free return required by investors for bearing market risk.

However, within this general definition of the WACC, there are several specific formulations depending on the nature of the cash flows being valued. For example, cash flows can be expressed as before or after tax, or in real or nominal terms. However, provided the definition of the WACC used is consistent with the nature of the cash flows being discounted, the same DCF valuation will result.

Below is a summary of the different cash flow definitions, and associated WACC derivations, commonly used by Australian regulators[4].

Table 1: Officer cash flow definitions and associated WACC derivations

Officer WACC Designation	Definition of Nominal Cash Flows	Corresponding WACC Derivation
Pre-tax nominal WACC	$X_0 = X_G + X_E + X_D$	$\frac{r_e^L}{(1-t_\varepsilon)}\frac{E}{V} + r_d \frac{D}{V}$
Post-tax nominal WACC1	$X_0 \left(1-t_c\right)$	$r_e^L \left[\frac{1-t_c}{1-t_\varepsilon}\right]\frac{E}{V} + r_d \left(1-t_c\right)\frac{D}{V}$
Post-tax nominal WACC2	$X_0 \left[1-t_\varepsilon\right]$	$r_e^L \frac{E}{V} + r_d \left[1-t_\varepsilon\right]\frac{D}{V}$
Post-tax nominal WACC3 (so-called 'vanilla' form of the WACC)	$X_0 - t_\varepsilon \left(X_0 - X_D\right)$	$r_e^L \frac{E}{V} + r_d \frac{D}{V}$
Post-tax nominal WACC4	$\left(X_0 - X_D\right)\left(1-t_\varepsilon\right) + \left(1-t_c\right)X_D$	$r_e^L \frac{E}{V} + r_d \left(1-t_c\right)\frac{D}{V}$

[4] These cash flow definitions, and associated WACC derivations, follow Officer 1994.

In Table 1 above, r_e^L is the levered cost of equity capital; r_d is the cost of debt capital; E/V and D/V are the proportions of equity and debt respectively in the entity's funding mix by market value weight; X_0 represents the net operational cash flows (earnings before interest and tax, or EBIT) expected to be distributed to debt holders, the government, and equity holders = $X_D + X_G + X_E$; γ (gamma) is the proportion of dividends distributed from Australian-taxed earnings able to be used as dividend imputation credits; t_c is the statutory corporate tax rate, and $t_\varepsilon = (1-\gamma)t_c$ is the effective corporate tax rate.

Conversion from nominal to real discount rates can be effected by using the Fisher relationship as follows:

$$(1+WACC_{nom}) = (1+WACC_{real})(1+\pi),$$

where $WACC_{nom}$ is the nominal discount rate, $WACC_{real}$ is the real discount rate, and π is the expected inflation rate.

2.2 Stakeholder submissions

Unitywater and Logan City Council submitted that the regulatory framework should contain mechanisms to smooth short-term changes in the WACC to reflect the long-term nature of water and sewerage infrastructure, and to provide greater price certainty to customers.

2.3 Other jurisdictions

Other Australian water regulators have used different approaches to calculating WACC. Regulators typically use Officer-type WACC definitions, and the CAPM model to estimate the cost of equity. However, the particular approach applied can vary from post-tax, pre-tax, real or nominal depending on whether the regulator believes it is more appropriate to deal with tax and inflation effects in the discount rate or cash flows. An exception is ICRC which does not use Officer WACC definitions, or the CAPM model, on the basis that a tax-equivalent regime is not relevant to ACTEW, and the CAPM is not suited for determining the return on equity for ACTEW (a government-owned business).

A real post-tax 'vanilla' WACC (benchmarked approach) was adopted by ESC (2013a and 2013b), ESCoSA (2013) and IPART (2013a).

(a) ESC (2013a and 2013b) obtained real parameter values by adjusting nominal values for a range of market estimates of inflation. Discretion was exercised in choosing a point estimate for the WACC towards the upper end of a feasible range of values after considering actual and likely future borrowing costs. The WACC range was calculated by adopting estimated ranges for the real risk free rate and the debt margin, and point estimates for the equity beta, market risk premium, capital structure, and value of imputation credits. CAPM has been used to calculate the cost of equity. ESC has announced a review of its WACC methodology.

(b) ESCoSA (2013) obtained real parameter values by adjusting nominal values for estimated expected inflation. Point estimate of WACC was based on point estimates of constituent parameters. CAPM was used to calculate the cost of equity.

(c) IPART (2013a) converted nominal parameter values into real values using an estimate of the expected inflation rate based on data from zero-coupon inflation-linked swaps.

Discretion was exercised in choosing a point estimate of the WACC as the upper bound of a range of values taking into account both market conditions and historical data for the average costs of debt and equity. CAPM was used to calculate the cost of equity. The approach used to calculate the draft WACC for Hunter Water differs from previous price reviews as IPART was reviewing its method of calculating the WACC at that time. Since then, IPART has finalised its review of WACC and resolved to continue to use both market conditions and historical data to calculate a point estimate of WACC. This point estimate will be chosen from within a range of WACC values derived from constituent parameter estimates, and with the deviation from the midpoint of the range determined using a statistical 'uncertainty index' and additional financial market information (IPART 2013).

Other approaches for calculating WACC have been used by ERA (2013), ACCC (2011) and ICRC (2013).

(a) a real pre-tax WACC (benchmarked approach) was used by ERA (2013). Nominal parameter values were converted into real values using an estimate of the expected inflation rate. A point estimate of WACC based on point estimates of constituent parameters was used. CAPM was used to calculate the cost of equity

(b) a nominal post-tax 'vanilla' WACC (benchmarked approach) was adopted by ACCC (2011). A point estimate of WACC based on point estimates of constituent parameters was used. CAPM was used to calculate the cost of equity

(c) a nominal 'plain vanilla' WACC was adopted by ICRC (2013). Pre- or post-tax matters were not taken into account because a tax-equivalent regime was considered not relevant to ACTEW. ICRC adopted a firm-specific (rather than a typical or benchmark) approach to determining the WACC. Therefore WACC parameters reflected actual ACTEW costs of debt and equity. A point estimate of WACC based on point estimates of constituent parameters was used. CAPM was not considered a suitable model for calculating the cost of equity.

2.4 QCA approach in recent water investigations

QCA employs the Officer WACC3 or 'vanilla' form of the discount rate. This approach defines cash flows and the discount rate in nominal, post-tax terms and modifies the cash flows, rather than the discount rate, for the tax deductibility of interest payments and the value of dividend imputation credits.

To calculate Officer's WACC3, estimates are required for the cost of levered equity, the cost of debt and the relative proportions of debt and equity capital (the capital structure).

The cost of levered equity capital is calculated using the Sharp-Lintner CAPM:

$$r_e^L = r_f + \beta_e^L \left(r_m - r_f \right) = r_f + \beta_e^L .MRP$$

The levered equity beta is derived from the asset beta using the Conine (1980) leverage model, modified for the effects of dividend imputation on the tax rate:

$$\beta_e^L = \beta_a + \left(\beta_a - \beta_d \right)\left(1 - t_\varepsilon \right)\frac{D}{E}$$

where β_a is the asset beta (see section 6), and β_d is the debt beta (see section 8).

QCA previously reviewed the version of the CAPM to be applied, including the Black (zero-beta) version (Black 1972), and decided that the Sharpe-Lintner CAPM should be retained as part of its standard approach to estimating the discount rate (QCA 2011).

The cost of debt is the sum of the estimates of the risk-free rate, the debt risk premium (DRP) for bonds with a term (R) equal to the regulatory period, the transaction costs of interest rate swaps used to convert the risk-free rate component of the (generally employed) 10-year bonds into that for R-year bonds, the transaction costs of the credit default swaps (CDS) used to convert the DRP component of 10-year bonds into that for R-year bonds, and the annualised debt raising costs associated with the 10-year bonds.

In the past, due to the absence of suitable CDS contracts in the Australian market for long-dated bonds, QCA has used the difference between 10-year and R-year bond yields as a proxy for the transaction costs of CDS. The net effect of this approach has been to use the DRP for 10-year bonds rather than R-year bonds.

Consistent with generally accepted Australian regulatory practice, QCA estimates the capital structure of the entities it regulates by benchmarking against relevant comparators.

2.5 QCA analysis

Response to stakeholder submissions

In response to Unitywater and Logan City Council, QCA has examined options for estimating the benchmark cost of debt in order to help smooth variations in prices caused by the periodic setting of interest rates (and hence the WACC) with a term matched to the regulatory cycle. This is discussed further in relation to alternatives for estimating the cost of debt in section 7.

Proposed form of discount rate

QCA proposes to continue to use a nominal post-tax 'vanilla' form of the WACC (Officer's WACC3) for benchmarking purposes because:

(a) WACC is the general form of the opportunity cost of capital (or discount rate) most commonly used and accepted in regulatory practice in Australia, and is consistent with National Water Initiative (NWI) Pricing Principles

(b) the process of generating and using a pre-tax discount rate is more complex and liable to error than for a post-tax nominal discount rate. The information used in a post-tax nominal approach is more reliable and less subject to manipulation and distortion (Davis, 2004)

(c) the nominal post-tax WACC3 formulation is easier to understand and use than other nominal post-tax and pre-tax forms

(d) a post-tax approach provides better estimates of the tax liability for regulated entities than a pre-tax approach (IPART 2011)

(e) a nominal, rather than real, approach is simpler and more transparent as most costs, taxes, depreciation and interest are expressed in nominal terms.

As noted above, although other regulators use alternative Officer WACC variants, the same valuations should result provided the definitions of cash flows and discount rates are consistent. However, QCA believes the nominal post-tax 'vanilla' formulation is easier to understand and apply, and less prone to error.

Single or multiple discount rates

The risk-free rate and the market risk premium (MRP) are market parameters in the sense that, under CAPM assumptions, they are the same for all water retailers.

On the other hand, the levered equity beta and the debt risk premium above the risk-free rate are entity-specific parameters which compensate debt and equity holders for the systematic risk of investing in the particular entity.

Given the entity-specific nature of these parameters, a question arises as to whether the nature of the business activities and services of the SEQ water retailers are sufficiently different to justify the use of different discount rates, or whether the same discount rate should be applied to all water retailers.

The answer will depend mainly on:

(a) whether the non-diversifiable business risks (as measured by asset betas) of the different water retailers are materially different

(b) whether any identified differences in the asset betas of the water retailers can be reliably quantified.

Previous studies for QCA have examined the factors likely to affect the asset betas of different regulated water retailers (for example, Lally 2004, NERA 2011).

These factors include the nature of the product or service, nature and duration of the entity's contracts, customer type, form of regulation applied, potential for growth options, monopoly power, operating leverage, entity's market weight, and capital structure.

In principle, differences in the features of water retailers may result in variations in business risk through the factors listed.

However, in this case differences in underlying business risk are expected to be small given that all water retailers are public monopolies, with similar operating and network characteristics, under the same form of regulation, and with a similar mix of retail and distribution water and sewerage services provided to (mainly) residential customers as the principal line of business.

Therefore, it is reasonable to expect that the systematic risks faced by investors in these water retailers would be similar.

Moreover, in practice it would be extremely difficult to reliably quantify the extent of any differences in systematic risk due to the paucity or inadequacy of relevant data.

For these reasons QCA applied the same benchmark WACC across all SEQ water retailers for the 2013-15 price monitoring investigation (QCA 2014a), and proposes to continue this practice for the long-term regulatory framework from 1 July 2015.

Split cost of capital

In reviewing its cost of capital methodology, QCA also investigated the split cost of capital (SCC) concept – that is, whether it was appropriate to distinguish the systematic risk of the cash flows associated with the regulated asset base on the one hand, from the risk associated with operating and new capital expenditure cash flows on the other, and to use separate costs of capital to value these differentiated cash flows.

Hypothetical modelling suggested that SCC may result in material reductions in the rate of return and the average bill per customer as compared to the methodology in use (QCA 2014b), depending on the relative proportions of lower-risk and higher-risk building block components

present in a particular case. However, this modelling was based on stylised assumptions which could not provide determinative findings.

Therefore, although SCC was found to be a useful tool for helping to understand the amount, allocation and pricing of risk, QCA concluded that it would not incorporate the approach in its cost of capital methodology at this stage because further evidence is needed to support application of the approach.

Further information on the assessment of this issue can be found in QCA's research position paper (QCA 2014b).

Progressive updates of benchmark WACC

The light-handed nature of the proposed long-term regulatory framework allows for annual price adjustments by water retailers. This implies that estimates of the benchmark cost of debt (and therefore the WACC) will need to be updated annually (section 7.5 refers).

Conclusion

QCA proposes to continue to use a single nominal post-tax 'vanilla' form of the WACC (Officer's WACC3) for benchmarking purposes as part of the long-term regulatory framework of all SEQ Water retailers. QCA does not propose to apply a split cost of capital at this time.

Moreover, QCA will apply the same WACC across all water retailers, rather than a specific WACC for each water retailer.

Should further research suggest that it is desirable and feasible to use SCC to further inform the determination of the discount rate, QCA may re-examine this issue at a later date.

Draft Recommendation

2.1 The form of the benchmark discount rate for the long-term regulatory framework for SEQ water retailers from 1 July 2015 to be a single nominal post-tax 'vanilla' WACC (Officer WACC3).

2.2 The same benchmark WACC to apply across all SEQ water retailers.

2.3 The benchmark WACC to be updated annually to align with the recommendations made for estimating the cost of debt.

2.4 The split cost of capital concept may be re-examined at a later date should further research find that its application to the determination of the cost of capital is both desirable and feasible.

3 RISK-FREE RATE

3.1 Background

The risk-free rate is the rate of return required by investors for holding an asset with zero default risk. That is, all payments are guaranteed and their timing is certain.

The risk-free rate is a component of both the cost of equity and the cost of debt.

In estimating the risk-free rate in the regulatory context, there are three primary considerations:

(a) choice of proxy: As a true 'riskless' asset does not exist, an appropriate proxy needs to be chosen. General regulatory practice in Australia is to accept the rate on Commonwealth Government bonds as the closest proxy. These bonds have very low default risk, high liquidity, and high transparency as their financial details are openly reported by the Reserve Bank of Australia. They are considered an appropriate proxy for the risk free rate in Australia by the Reserve Bank of Australia, Australian Treasury, Australian Office of Financial Management[5], market analysts, and academic researchers

(b) length of the averaging period: A suitable time period over which the risk-free rate is estimated must be determined. The choice here normally reflects a trade-off between using the most current information and managing the risk arising from using a spot rate

(c) term of the risk-free rate: The term to maturity of the bond used for benchmarking the risk-free rate needs to be chosen. Australian regulators typically use either the term that proxies the life of the regulated asset, or the term of the regulatory period.

The above issues are considered in detail in QCA 2014d, and in particular the appendix on the risk-free rate in that paper.

3.2 Other jurisdictions

Other Australian water regulators typically use the yield on a Commonwealth Government bond as a proxy for the risk-free rate. However regulators differ on the term and averaging period used to estimate the yield. An exception to this practice is ICRC (2013) which did not explicitly consider the risk-free rate because the weighted average of ACTEW's reported actual cost of borrowings was used as the cost of debt.

A Commonwealth Government bond with a 10-year term to maturity has been adopted by ESC (2013a and 2013b); IPART (2013); ESCoSA (2013); and ACCC (2011). These regulators preferred a term of 10 years, rather than the regulatory period, as this was seen as consistent with the efficient financing practices of a benchmark asset-intensive entity with long-lived water assets operating in a competitive market.

On the other hand, a Commonwealth Government bond with a five-year term to match the regulatory period was chosen by ERA (2013) to ensure regulatory compensation was consistent with the 'NPV=0' principle.

20 business days was chosen by ERA (2013) and ESCoSA (2013) as the averaging period to estimate the risk-free rate based on regulatory precedent, private sector practice, and the

[5] Advice to Australian Energy Regulator in July 2012 (AER 2013)

results of statistical testing that showed a 20-day averaging period provided the most efficient predictor of future bond yields.

ESC (2013a and 2013b) used 40 business days as this averaging period was considered to provide an appropriate trade-off between up-to-date information and higher interest-rate volatility considerations.

IPART (2013) decided to use both current market data (approximated using 40-day averages) and long-term averages (approximated using 10-year averages) to estimate the cost of debt based on the view that an efficient debt strategy is likely to be based on a mix of current market rates and historical averages.

ACCC (2011) allowed regulated businesses discretion to choose the length of the averaging period within the range of 10 to 40 days based on AER's (then) view that this represented an optimal length of time to balance the trade-off between 'volatility driven error' and 'old information driven error' (AER 2009).

3.3 Stakeholder submissions

Several stakeholder submissions were received on the risk-free rate research papers prepared by QCA as part of its review of the cost of capital methodology. The main concerns of these submissions were the appropriate length of the averaging period used to estimate the risk-free rate, and the appropriate term to maturity of the proxy bond.

Further details about QCA's consideration of stakeholder submissions can be found in QCA's Final Decision on cost of capital: market parameters (QCA 2014d) – in particular, in the risk-free rate appendix.

3.4 QCA approach in recent water investigations

QCA's approach to determining the risk-free rate includes the following main features[6]:

(a) for both debt and equity costs, the term of the risk-free rate is set equal to the regulatory period for the purpose of satisfying the fundamental regulatory principle that the present value of expected net cash flows should equal the initial investment (that is, net present value = 0)

(b) the appropriate proxy for the risk-free rate is the nominal yield of the Commonwealth Government bond whose term aligns with the regulatory period

(c) the duration of the averaging period used to estimate the risk-free rate is the 20 business days just prior to the start of the regulatory period.

3.5 QCA analysis

QCA has re-examined its method for estimating the risk-free rate as part of its review of the cost of capital.

QCA's position is to maintain its approach for estimating the risk-free rate in the following respects:

(a) using Commonwealth Government bond nominal yields as the proxy for the risk-free rate

[6] See, for example: QCA 2010, QCA 2011, QCA 2012a, and QCA 2013.

(b) applying an 'on-the-day' rate estimated as the average yield over a period of 20 business days

(c) matching the term to maturity of the Commonwealth Government bond proxy to the regulatory period.

Previous price monitoring reviews for SEQ water retailers used the term of the review as the regulatory period and set the term to maturity of the risk-free proxy equal to this period.

Although Dr Lally recommended that the term of the regulatory period should match annual price setting by the water retailers, QCA preferred to use the term of the review in order to minimise regulatory and compliance costs under light-handed price monitoring (QCA 2011).

QCA now proposes to use an annual term for the risk-free rate for both the cost of equity and the cost of debt for the following reasons:

(a) the proposed long-term regulatory framework to apply to SEQ water retailers from 1 July 2015 consists of annual performance reviews - there is no set regulatory or monitoring review period. It is intended that these annual reviews continue indefinitely unless a detailed regulatory review or price determination is triggered by unsatisfactory performance

(b) in relation to the term of the risk-free rate, a key objective of economic regulation is to ensure that the expected future cash flows of the regulated firm should equal the present value of the initial investment, using a discount rate that reflects the opportunity cost of capital (that is, NPV = 0). In this case, as water retailers set their prices annually, QCA needs to set a one-year term for the risk-free rate, for both the cost of equity and the cost of debt, to satisfy the NPV=0 principle.

QCA acknowledges the perception of inconsistency between using a relatively short term to estimate the risk-free rate and a longer term to estimate the market risk premium (MRP) when using the CAPM to estimate the cost of equity.

Satisfying the NPV=0 principle requires that the term of the risk-free rate needs to be one year in this case. On the other hand, the relevant period in the CAPM for both the first term and the MRP is the holding period between investors' successive portfolio reassessments. Although this period is uncertain, it is likely to be considerably longer than one year.

However as pointed out by Lally (2010), the lack of a credible alternative to the CAPM suggests that it should be modified so that the first term in the CAPM is the one-year risk-free rate, while a longer-term is used when estimating the MRP.

As discussed in QCA's position paper on the characteristics of the proposed long-term framework for SEQ water retailers, regulatory and compliance costs will be substantially reduced under annual performance monitoring. These cost reductions are expected to more than offset any increased costs from more frequent estimates of the risk-free rate compared with those under price monitoring.

Further information on the reasoning behind the above method for estimating the risk-free rate is contained in QCA 2014d.

Conclusion

QCA's proposes to estimate the risk-free rate for SEQ water retailers annually from 1 July 2015 using:

(a) Commonwealth Government bond nominal yields as the proxy for the risk-free rate

(b) an averaging period of 20 business days just prior to the annual update

(c) a term to maturity of one year.

Draft Recommendation

3.1 The risk-free rate to be estimated annually from 1 July 2015 using:

(a) Commonwealth Government bond nominal yields as the proxy for the risk-free rate

(b) an averaging period of 20 business days just prior to the annual update

(c) a term to maturity of one year.

4 MARKET RISK PREMIUM

4.1 Background

In the CAPM model, the market risk premium (MRP) represents the premium over the risk-free rate that investors expect to earn on the market portfolio of all risky assets:

$$MRP = r_m - r_f$$

As the MRP is a forward-looking concept, it cannot be observed directly. Therefore, in practice, the MRP needs to be estimated using one or more of a variety of measurement methods, each with its strengths and weaknesses.

4.2 Other jurisdictions

Australian water regulators have typically used an MRP estimate of 6% per annum.

ERA (2013) based its estimate of MRP on historical data, survey information of market risk practitioners, and practice of Australian regulators. The dividend growth model and similar approaches were considered unsuitable due to the high degree of forecast uncertainty and sensitivity to small changes in (problematic) assumptions.

ESC (2013a and 2013b) based its estimate on surveys of market practitioners, Australian regulatory practice, and ACCC's Water Charge (Infrastructure) Rules that require an MRP of 6 per cent be applied for Victorian businesses operating in the Murray-Darling Basin.

ESCoSA (2013) based its estimate on Australian regulatory precedent.

ACCC (2011) based its estimate on long-term historical estimates, studies of Australian market practitioners, and regulatory precedent.

IPART (2013) used both long-term averages and current market data to estimate the MRP. To estimate the cost of equity using long-term averages for the MRP, a range of 5.5% to 6.5% with a midpoint of 6% based on the historical arithmetic average of the excess market returns over risk-free rates was used. For estimating the cost of equity using current market data, six different methods were used to obtain an implied MRP range and midpoint. The current and long-term estimates of MRP and then combined with other input to calculate a WACC range and midpoint using weighting rules.

An exception to usual Australian practice is ICRC (2013) which considered an explicit estimate of the MRP not relevant as the CAPM was not considered suitable for calculating the cost of equity.

4.3 Stakeholder submissions

Several stakeholder submissions were received on the research papers on the market risk premium prepared by QCA as part of its review of the cost of capital methodology.

A number of stakeholders broadly supported the use of multiple estimation methods and data sources, including both historical and forward-looking methods, for estimating the MRP.

However, some stakeholders (including Unitywater and Queensland Urban Utilities), were critical of the QCA's specific methods and data. Their concerns focused on three areas:

(a) specific aspects of the four methods used by QCA in estimating the MRP, including their underlying assumptions, data requirements, and strengths and weaknesses

(b) the methodology, in terms of applying the estimates to determine a final estimate — in particular, the weighting of the methods, the choice of the mean or the median, and the rounding of the estimate to the nearest whole per cent

(c) the importance of additional evidence, including current levels of investor risk aversion, debt risk premiums that remain above pre-GFC levels, and current economic conditions that they claim reflect elevated market uncertainty.

Further details about QCA's consideration of stakeholder submissions can be found in QCA's Final Decision on cost of capital: market parameters (QCA 2014d) – in particular, in the MRP appendix.

4.4 QCA approach in recent water investigations

QCA uses four methods to generate estimates of the MRP[7].

(a) *Ibbotson historical averaging* – an historical averaging method that measures the nominal, historical (excess) market return above the risk-free rate, including applicable adjustments for any dividend imputation credits

(b) *Siegel historical averaging* – an historical averaging method where the market risk premium estimated from the Ibbotson method is adjusted for the effects of unanticipated inflation

(c) *Cornell dividend growth model* – a forward-looking method that applies a variant of the dividend growth model, where the market return is the rate of return that reconciles the value of the market portfolio with the present value of the expected future stream of dividends

(d) *survey evidence* – a forward-looking method that seeks an estimate of the market risk premium from academics, financial analysts, company managers, and other market practitioners.

The equally-weighted average of the estimates obtained using these four methods was calculated and rounded to the nearest whole percent to obtain QCA's previous estimate for the MRP.

Applying this approach has resulted in QCA adopting an MRP estimate of 6% per annum for its recent water investigations.

4.5 QCA analysis

QCA has undertaken a review of its methodology for estimating the market risk premium as part of its review of the cost of capital (QCA 2014d).

As all MRP estimation methods have strengths and weaknesses, QCA's methodology continues to employ a combination of available methods in order to lessen bias and lower variance in estimates.

[7] QCA's rationale for using several estimation methods, together with an outline of these methods, are discussed in QCA 2012b (Appendix B).

However, QCA has reassessed its traditional estimation methods after considering additional evidence, current market conditions, and material submitted by stakeholders (including SEQ water retailers).

QCA determined that it would not be appropriate to place equal weight on all methods, as has been done in the past. The broader set of information and estimates considered does not lend itself to the calculation of a simple average as certain pieces of information or analysis will invariably carry less weight than others.

After considering the views of stakeholders, expert opinion, and relevant evidence from several sources and sample periods, QCA considers an appropriate estimate of the market risk premium to be 6.5% per annum, based on the analysis in the appendix to QCA 2014d:

(a) Ibbotson estimates — the Ibbotson estimates provide a range of 6.0%–6.7% over all sample periods, with an estimate of 6.5% for the period 1958–2013

(b) Siegel estimates — the range for the Siegel estimate is 4.0%–6.5%, with an estimate of 5.5% for the period 1958–2013

(c) Cornell dividend growth estimates — the Cornell range is 5.5%–8.0%, with a median estimate of 6.9%

(d) surveys / independent expert reports — estimates based on survey data and independent experts' reports produces a median estimate of 6.2%, including an adjustment for dividend imputation credits

(e) conditional information — additional sources of information examined include volatility measures, corporate debt premiums, and liquidity premiums on government bonds. The QCA also considered the relationship between the risk-free rate and the market risk premium.

QCA's view is that expanding the range of information to include current market conditions supports an increase in the MRP to 6.5% per annum.

Further information on the reasoning behind the above estimate for the market risk premium is contained in QCA's Final Decision on market parameters (QCA 2014d).

Conclusion

QCA's proposes to apply a market risk premium of 6.5% per annum from 1 July 2015.

Draft Recommendation

4.1 A market risk premium of 6.5% per annum to apply from 1 July 2015.

5 CAPITAL STRUCTURE

5.1 Background

Capital structure refers to the relative market-value proportions of debt and equity that together finance the regulated entity's asset base and operations. The regulated entity's proportion of debt in the total market value of its assets (equity + debt) is termed its 'gearing' or 'leverage'.

The choice of a regulated entity's capital structure determines:

(a) the relative weights of the debt and equity components of the WACC

(b) the financial risk of the firm, with an increase in debt leading to an increase in the firm's financial risk, equity beta, and cost of equity

(c) the credit rating assigned to the regulated firm, which in turn affects the corporate spread and the cost of debt.

Typically, Australian regulatory practice does not use an entity's actual capital structure in making estimates of WACC. Instead, analysis of efficient comparator entities is undertaken to establish a suitable benchmark capital structure for the entity in question.

Use of a benchmark capital structure is considered more consistent with an incentive-based approach to regulation because the costs of financing decisions by the entity that are not as efficient as the benchmark are not passed through to customers, whereas the entity retains any benefits from adopting financing arrangements that are more efficient than the benchmark.

5.2 Other jurisdictions

The following Australian water regulators typically use a 60% benchmark leverage ratio:

- ERA (2013) based its estimate on the assumed long-term trend for Water Corporation and the average of UK publicly listed water businesses.
- ESC (2013a and 2013b) based its estimate on the observed leverage of comparable listed utility businesses, and other Australian regulators.
- ESCoSA (2013) based its estimate on Australian regulatory precedent.
- IPART (2013a) based its estimate on the leverage of comparable entities.
- ACCC (2011) based its estimate on comparable utilities in Australia and UK water businesses.

An exception to usual Australian practice is ICRC (2013) which used a forecast of ACTEW's average actual leverage ratio, rather than a benchmark, consistent with its firm-specific methodology for determining the cost of capital. However, this ratio is also 60%.

5.3 QCA approach in recent water investigations

Consistent with generally accepted Australian regulatory practice, QCA estimates the leverage of a regulated entity by benchmarking against relevant comparators; that is, entities providing similar infrastructure services at a similar risk level.

Ideally, in the case of water, the benchmark capital structure should be set by reference to a portfolio of comparable listed Australian water companies. However, as Australian water

infrastructure businesses are government owned and therefore not listed, it has been necessary to draw on a sample of domestic and international water and energy businesses (regulated and unregulated) to estimate a reasonable benchmark capital structure.

Applying this approach has resulted in QCA adopting estimates of capital structure (and related credit ratings) of 50% (BBB) for GAWB (2010), 60% (BBB+) for SunWater 2012 and Seqwater 2013, and 60% (BBB) for SEQ price monitoring 2013.

5.4 QCA analysis

QCA's approach to the determination of a benchmark capital structure and credit rating for the SEQ water retailers was discussed in QCA 2011, and was based on an analysis by Lally of a sample of Australian energy firms because of the absence of reliable market-listed water comparators (Lally 2011).

Lally concluded that suitable benchmark leverage for SEQ water retailers is 60% debt, corresponding to a BBB credit rating.

As no material changes are expected in the general operational and regulatory circumstances for SEQ water retailers from 1 July 2015, QCA proposes no change to the benchmark capital structure (60% leverage) and credit rating (BBB).

Conclusion

QCA proposes no change to the estimated benchmark capital structure (60% leverage) and credit rating (BBB) of SEQ water retailers.

Draft Recommendation

5.1 A benchmark capital structure of 60% debt, and credit rating of BBB, to apply to all SEQ water retailers from 1 July 2015.

6 ASSET AND EQUITY BETAS

6.1 Background

The asset beta (or unlevered equity beta) of an entity is a relative measure of the inherent 'business risk' of investing in the entity compared to the risk of investing in the market as a whole. It is defined as the covariance of an entity's returns (in the absence of debt) (r_a), with the returns on the market portfolio of all risky assets (r_m), expressed as a proportion of the variance of the returns on the market portfolio:

$$\beta_a = \frac{\text{cov}(r_a, r_m)}{\text{var}(r_m)}$$

The levered equity beta reflects two components of risk: the entity's inherent business risk together with the financial risk borne by equity holders from the use of debt to partially fund the business.

As the asset beta cannot be directly estimated, it needs to be derived from levered equity beta estimates using an appropriate de-levering formula.

For listed entities, the equity beta is estimated using market data of the returns to shareholders and the returns on a proxy for the market portfolio, such as a stock market index. However, when market prices are unavailable, a sample of levered equity betas of comparable entities is used to obtain a benchmark estimate of the equity beta for the entity of concern.

6.2 Other jurisdictions

Other Australian water regulators used a variety of approaches for estimating betas:

ERA (2013) used a levered equity beta of 0.65 based on a leverage ratio of 60%, and ERA's own (conservative) estimate using data from energy network businesses (updated from Henry 2009[8]).

ESC (2013a and 2013b) used a levered equity beta of 0.65 based on a leverage ratio of 60%, an assessment of Australian listed comparators, and consistency with other recent ESC water decisions.

ESCoSA (2013) used a levered equity beta of 0.80 based on regulatory precedent, and weighted towards regulatory stability.

IPART (2013a) estimated a levered equity beta range of 0.6 to 0.8 based on previous studies of a benchmark water utility. The equity beta implicit in the point WACC estimate used is 0.8. In its review of WACC, IPART decided that it will use a single beta to estimate the cost of equity using both current market data and long-term averages, and will review and determine the value of the equity beta as part of its price determination process (IPART 2013).

ACCC (2011) used a levered equity beta of 0.7 chosen at upper end of range of 0.4 and 0.7. This was based on the view that the systematic risk of energy transmission and distribution businesses is comparable to the systematic risk faced by rural water businesses, and used

[8] Henry, O.T., 2009. Estimating β. Report to ACCC. 23 April

evidence from the most recent Australian regulatory energy decisions, and estimates of betas adopted by other regulators of water businesses in Australia.

ICRC (2013) considered that an explicit estimate of the equity beta is not relevant as the CAPM is not suitable for calculating the cost of equity. ICRC has recommended that the Government decide on the appropriate cost of equity for ACTEW.

6.3 QCA approach in recent water investigations

As Australian water infrastructure businesses are government owned and therefore not listed on the Stock Exchange, QCA has drawn on samples of comparable domestic energy and international water and energy businesses to obtain reasonable estimates for benchmark levered equity betas.

The equity betas derived from the sample of comparable entities are de-levered to obtain the comparable asset betas using the capital structures of the sampled entities, and then re-levered using the modified Conine formula and the benchmark capital structure discussed in section 5.3 above, to calculate benchmark levered equity betas.

Applying this approach has resulted in QCA adopting estimates of asset and levered equity betas in its most recent water decisions as set out in Table 7.

Table 7: Asset and levered equity betas for recent QCA water decisions

Regulated Entity	*Asset Beta*	*Debt/Assets*	*Levered Equity Beta*
GAWB 2010 (urban, commercial, and heavy industrial)	0.40	50%	0.65
SunWater 2012 (irrigation)	0.30	60%	0.55
Seqwater 2013 (irrigation)	0.30	60%	0.55
SEQ 2013 (retail and distribution)	0.35	60%	0.66

6.4 QCA analysis

QCA's approach to the determination of beta estimates for the SEQ water retailers was discussed in detail in QCA 2011, and was based on an analysis of a sample of local and international comparator water and energy firms in Lally 2011. Regulated water and energy firms were included in the sample because of their perceived similar systematic risk characteristics.

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.

Noting that SEQ water retailers are subject to price monitoring, Lally suggested that SEQ water retailers should have asset betas above revenue capped firms, less than price capped firms, and similar to rate-of-return regulated firms.

Lally noted that exposure of firms to demand and cost shocks is a fundamental consideration in comparing systematic risks under different regulatory regimes.

Revenue-capped firms are not exposed to demand shocks, price-capped firms are normally exposed to demand shocks for the regulatory period, whereas rate-of-return firms are likely to be exposed to demand shocks for less than the regulatory period (because the output price will probably be reset more frequently than this in response to a demand shock).

Lally also considered that the exposure of firms to cost shocks is likely to be similar under the three regulatory regimes.

Therefore, although in all cases asset betas for water utilities should be relatively low because exposure to systematic risk is low, revenue-capped firms are likely to have the lowest asset betas followed by rate-of-return firms, and then price-capped firms with the highest asset betas[9].

In relation to price monitoring, Lally argued that commercial prudence would induce firms subject to price monitoring to raise prices in response to upward cost shocks, and their monopoly power coupled with low income elasticity of demand for water would permit them to do so.

On the other hand, concern at the prospect of price control coupled with being public sector entities would motivate them to reduce prices in response to downward cost shocks. In both cases, price adjustments are relatively frequent because prices are reset annually. Therefore, the asset betas for these firms should be higher than revenue-capped firms, lower than price-capped firms, and similar to rate-of-return firms.

Based on this reasoning and his sample of comparator entities, Lally concluded that an asset beta of 0.35 would be appropriate for the SEQ water retailers under a price monitoring regime.

More recent research for QCA by Incenta Economic Consulting in relation to Aurizon Network (IEC 2013) found that samples of comparator water and energy companies had similar mean asset betas to those formerly proposed by Lally, when estimated in a similar manner (0.34 for water, and 0.36 for energy).

QCA also considers that the incentive-based performance monitoring framework recommended to apply from 1 July 2015 has many characteristics that are similar to the price monitoring approach applied or proposed up to June 2015.

The systematic risks under these two regimes is similar because the exposure of water retailers to demand and cost shocks is similar.

Both approaches are light-handed forms of regulation which allow for flexibility in the way water retailers manage their businesses provided there is no abuse of monopoly power.

However, annual performance monitoring is probably even more light-handed than price monitoring because:

(a) performance monitoring does not include annual complex and costly prudency and efficiency reviews of capital or operating expenditures (unless specifically requested by an entity as a binding ruling)

(b) regulatory compliance and administration costs for the water retailers should be lower than for the existing price monitoring approach. Water retailers can minimise overall regulatory costs by demonstrating that they are not exercising market power

(c) the process builds on the information gathered through past price monitoring reviews

(d) water retailers are given the opportunity to provide further explanatory information before a full cost of service review is triggered. Water retailers, therefore, have some ability to manage the risk of regulatory intervention

[9] The form of regulation and its implications for the systematic risk of the regulated firm is discussed further in QCA 2012c.

(e) water retailers are able to determine their own prices and pricing structures consistent with broad pricing principles. QCA will not set prices unless absolutely necessary to ensure prices reflect prudent and efficient costs.

These factors imply that the transition from price monitoring to annual reviews of performance should lower the regulatory element of systematic risk of water retailers by allowing more flexibility in adjusting net cash flows to demand and cost shocks, and by reducing the risk of more intrusive regulatory intervention.

However, it would probably not be possible to reliably quantify the difference in risk between the two regimes[10].

Taking the above factors into account, QCA considers that an asset beta of 0.35 remains appropriate for SEQ water retailers at this time.

In addition, as discussed in section 2.5, differences in underlying business risk among SEQ water retailers (as measured by asset beta) are expected to be small given that all water retailers are public monopolies, with similar operating and network characteristics, under the same form of regulation, and with a similar mix of retail and distribution water and sewerage services provided to (mainly) residential customers as the principal line of business.

Therefore, it is reasonable to expect that the systematic risks faced by investors in these water retailers would be similar.

Moreover, in practice it would be extremely difficult to reliably quantify the extent of any differences in systematic risk due to the paucity or inadequacy of relevant data.

Therefore, QCA proposes to apply the same asset and equity betas across all SEQ water retailers.

Conclusion

QCA proposes that the appropriate benchmark asset beta to apply from 1 July 2015 for all SEQ water retailers is 0.35.

Using the Conine relationship, this corresponds to a levered equity beta of 0.65 at leverage of 60%, debt beta of 0.11, gamma of 0.47, and corporate tax rate of 30%.

Draft Recommendation

6.1 A benchmark asset beta of 0.35 to apply to all SEQ water retailers from 1 July 2015. This corresponds to a levered equity beta of 0.65 at leverage of 60%.

[10] The empirical evidence concerning the relationship between the form of regulation and the systematic risk of the regulated firm is discussed in QCA 2012c.

7 COST OF DEBT

7.1 Background

Theoretically, the discount rate for valuing debt (the cost of debt) in the CAPM model is the return expected by the providers of debt capital to reward them for bearing the systematic risk of investing in the entity. This return is the risk-free rate plus a margin to compensate for the systematic element of risky debt; that is:

$$r_d = r_f + \beta_d \left(r_m - r_f \right) = r_f + \beta_d .MRP$$

However, it is common regulatory practice in Australia to denote the cost of debt as the promised yield of benchmarked debt with a credit rating consistent with the risk profile of the regulated entity.

The credit spread (promised yield minus risk-free rate) is used to estimate the debt risk premium (rather than the debt margin as defined by the CAPM) because of the difficulties associated with estimating the component of the promised yield that rewards systematic risk.

A benchmark cost of debt is preferred to an entity's actual debt costs because:

(a) debt costs based on efficient benchmarks are more consistent with an incentive-based approach to regulation because the costs of inefficient financing decisions by the entity are not passed through to customers, whereas the entity retains any benefits from adopting more efficient financing arrangements

(b) benchmarking makes the regulatory task simpler and less costly because the regulator does not have to examine and understand the entity's financing arrangements in depth

(c) the principle of competitive neutrality requires the cost of debt of a regulated entity to be consistent with that of its efficient benchmark, which, in turn, should reflect the broad objective of regulation to replicate competitive market outcomes for comparable systematic risks.

Although QCA's approach to estimating the cost of debt is based on the efficient debt policy of a benchmark entity, water retailers have provided the following information on their actual debt management practices:

(a) Queensland Urban Utilities (QUU) and Unitywater have advised that they are funded with a portfolio of fixed rate QTC bonds. Swap contracts are not used to manage interest-rate risk. About 10% of the debt balance is refinanced each year by the progressive removal of the shortest QTC bond from the portfolio and refinancing it with a 10-year QTC bond at the end of each quarter. A facility fee of 12 basis points per annum is paid to QTC on the outstanding debt balance to cover debt management costs

(b) Logan City Council has advised that it is funded with a portfolio of fixed rate QTC bonds; it does not undertake swap transactions or refinancing arrangements; and it pays an administration fee of about 11 basis points per annum on the outstanding debt balance to QTC

(c) Redland City Council has advised that it has no debt, and capital is funded through developer contributions or surpluses

(d) Gold Coast City Council has advised that its debt is usually a 15-year fixed rate facility sourced from QTC. Gold Coast does not undertake swap transactions or refinancing arrangements.

7.2 Stakeholder submissions

In a submission on the long-term framework, Moreton Bay Regional Council (MBRC 2013) submitted that the cost of debt should be determined using a rolling debt renewal method as devised by the Queensland Treasury Corporation (QTC). According to MBRC, use of this method would help smooth variations in prices caused by the periodic setting of interest rates based on the regulatory cycle.

As part of its review of cost of capital methodology, QCA released an issues paper in March 2014 on a new methodology for calculating the regulatory cost of debt referred to as the trailing average cost of debt (TA) approach (QCA 2014c).

Submissions on this issues paper were received from Queensland Urban Utilities (QUU 2014), Unitywater (UW 2014), and Queensland Treasury Corporation (QTC 2014).

All three submissions supported the adoption of a TA approach applied to the total cost of debt for the following reasons:

(a) market practice normally involves issuing debt at different points in time with a staggered maturity profile, rather than refinancing all debt at the start of each regulatory period, which is the assumption underlying QCA's 'on-the-day' methodology.

Rather than an estimate of the cost of debt at the start of the regulatory period, the TA cost of debt is calculated as a moving weighted average of estimates of the benchmark cost of debt of a specified term (for example, 10 years).

Therefore, stakeholders argue that the TA total cost of debt approach represents a more efficient market benchmark than the 'on-the-day' approach because the regulatory cost of debt will be more closely aligned with the actual cost of debt incurred by a benchmark firm which adopts an efficient debt policy

(b) stakeholders consider that the TA approach would reduce interest rate risk that would otherwise arise from the mismatch between the allowed cost of debt and the actual debt servicing costs incurred by the benchmark firm under the 'on-the-day' approach. In turn, this would lower the variability in the returns attributable to equity holders, and reduce the risk of financial distress for the regulated firm

(c) according to stakeholders, the TA approach would result in a smoother profile for the regulatory cost of debt, decreasing the variation in output prices over time

(d) stakeholders' view is that the implied debt management strategy implied by QCA's 'on-the-day' approach cannot be fully implemented and, therefore, will not produce an appropriate estimate of the efficient cost of debt for a benchmark firm.

Although the 'on the day' approach enables a regulated firm to use interest rate swaps to align the risk-free component of its debt costs with the regulatory term, stakeholders argue that it is not possible for the firm to align the average debt risk premium component of its borrowings with a debt risk premium that is fully reset at the start of each regulatory period due to the lack of suitable credit default swaps.

Stakeholders also argue that in the absence of regulation, it is unlikely that an efficiently financed business would use interest rate swaps to fully reset the risk-free interest rate on its entire debt portfolio over any regulatory period frequency

(e) stakeholders consider that a weighted TA approach will provide appropriate investment signals by compensating the debt funded portion of new capital expenditure at the prevailing 10-year debt yield

(f) stakeholders argue that estimation errors in the benchmark debt yield will be reduced under the TA approach as only a relatively small proportion (e.g. 10%) of the regulated cost of debt is re-estimated each year. These estimation errors are more significant under the 'on-the-day' approach because the estimates are made over short averaging periods and are locked in for the term of the regulatory period

(g) in the view of stakeholders, the TA approach avoids the arbitrary factors associated with determining the cost of debt using the 'on-the-day' approach, such as the regulatory term and the timing of rate resets.

Other responses provided by stakeholders include:

(a) the trailing average should be calculated using the total cost of debt, rather than the debt risk premium (DRP) only.

Unitywater referred to the conclusion of the Australian Energy Regulator (AER 2013b) that a TA approach that applies to the total cost of debt is more reflective of the actual debt management approaches of businesses operating in a competitive market and, therefore, more likely to represent efficient financing practices.

In QTC's view, the regulatory distortions associated with the 'on-the-day' approach would continue if the trailing average was applied to the debt risk premium component only. For example, regulated entities would still need to use interest rate swaps to re-align the term of the risk-free component of debt. Moreover, QTC did not agree that the cost of debt will be overstated if a trailing average is applied to the entire 10-year debt yield because risk-adjusted interest costs are not necessarily higher for an entity which earns revenues that are relatively stable – that is, not highly sensitive to the economic cycle

(b) stakeholders consider that the regulatory cost of debt estimate should be updated annually for consistency with an efficient funding strategy for a benchmark firm. If using a portfolio of debt with staggered maturity dates out to 10 years with annual refinancing at the prevailing 10-year debt yield is considered an efficient debt management strategy, then the regulated cost of debt should also change each year to minimise mismatches between benchmark and regulatory costs of debt which could lead to sustained periods of over- or under-compensation.

The benefits of using the TA approach are considered by stakeholders to outweigh the higher transactions costs associated with annual updating of debt estimates. Stakeholders do not consider the implementation of the TA approach to be overly complex, and QTC has suggested a relatively simple spreadsheet model to address this issue

(c) stakeholders also prefer a weighted-average TA to a simple (that is, unweighted) TA because a weighted average TA will minimise the difference between regulatory allowances and efficiently incurred debt costs when borrowings are made to fund new capex. The incentives for efficient capital expenditures are improved (and thus investment distortions minimised), if borrowings for new capex are compensated at the

prevailing, rather than the historical, debt yield; and differences between forecast and actual capex are allowed for by multiplying actual changes in the RAB by the benchmark gearing ratio

(d) stakeholders suggest a transitional arrangement based on one more application of the 'on-the-day' approach followed by a gradual transition to a trailing average based on prevailing debt yields over a 10-year period. Reasons for transition include the need to take into account possible changes in stakeholders' expectations about the regulatory framework; practical considerations about the use of historical data to calculate the cost of debt; and minimising the potential for strategic behaviour (AER 2013b). However, if a business can demonstrate that it already has in place a debt portfolio that is consistent with the TA approach, it may be appropriate to include some historical data in the transitional arrangement

(e) stakeholders argue that it would be appropriate for QCA to adopt more than one cost of debt approach, or to permit different regulated entities to adopt the approach they prefer, provided mechanisms are put in place to prevent opportunistic switching between approaches. In QTC's view the choice should be between either the total debt TA or the DRP-only TA, and should exclude the 'on-the-day' approach.

QUU argued that in a light-handed framework – such as that proposed by QCA for the SEQ water retailers – the regulated business should have the discretion to choose the cost of debt approach subject to QCA's overall guidance on appropriate methodologies.

7.3 Other jurisdictions

Other Australian water regulators used a variety of approaches for estimating the cost of debt:

ERA (2013) chose credit ratings of A- (for Water Corporation), and BBB/BBB+ (for Aqwest and Busselton) based on analysis of Australian energy company comparators, Water Corporation financial indicators, and judgements that Aqwest and Busselton faced higher debt risks. The debt risk premium above the risk-free rate was estimated over a 20-day averaging period, using a bond-yield approach taking into account the joint weighted averages of terms to maturity and amounts issued. Debt issuance cost of 12.5 basis points was adopted consistent with Australian regulatory practice.

ESC (2013a and 2013b) estimated a range for the debt margin over the risk-free rate based on the additional cost of debt for benchmark companies with a BBB- to BBB+ rating over a 40-day averaging period.

ESCoSA (2013) estimated a debt margin based on a benchmark debt of BBB over a 20-day averaging period.

IPART (2013a) estimated an inter-quartile debt margin range from a sample of BBB/BBB+ rated corporate bonds with a target term to maturity corresponding to the regulatory period (5 years). The point estimate was set at the upper bound of the estimated WACC range to address Hunter Water's concerns that the 5-year debt margin may underestimate the cost of debt, given its preference for the 10-year term to maturity. 20 basis points (bps) were added to the cost of debt to cover debt raising costs. In its review of WACC, IPART decided to use both current market data and long-term averages to estimate the cost of debt, use a term of 10 years (rather than 5 years) for all industries, and reduce the allowance for debt raising costs from 20 bps to 12.5 bps, reflecting the longer term of debt adopted (IPART 2013).

ACCC (2011) estimated a debt margin based on the yields of benchmark BBB+ rated corporate bonds with 10 year maturity.

ICRC (2013) did not explicitly consider estimating a debt margin as the weighted average of ACTEW's reported actual cost of borrowings was used as the cost of debt.

7.4 QCA approach in recent water investigations

QCA analyses the cost of debt as the sum of three components: an estimate of the risk-free rate; an estimate of the debt risk premium; and allowances for the transaction costs of raising debt, and managing interest-rate and refinancing risks.

QCA's approach to estimating the risk-free rate is discussed above.

Consistent with generally accepted regulatory practice in Australia, QCA uses a benchmark cost of debt; that is, it sets a debt risk premium above the risk-free rate with reference to a benchmark credit rating consistent with the risk profile of the regulated entity.

An 'on-the-day' approach is used to estimate the benchmark cost of debt as an average over the 20 business days prior to a reference date chosen as close as possible to the start of the regulatory period.

As a practical consideration, the promised yield is used to estimate the cost of debt, rather than the expected return as defined by the CAPM because of the inherent empirical difficulties in estimating the systematic risk component of the promised yield.

QCA sets the term of the debt equal to the term of the risk-free rate (that is, the regulatory period), and provides the following regulatory allowances to compensate the benchmark entity for debt raising costs and the transactions costs of managing interest-rate and refinancing risks:

(a) an allowance to compensate the benchmark entity for the cost of using interest rate swaps to convert the risk-free component of the benchmark debt into the risk-free component of debt whose term aligns with the regulatory period

(b) in principle, an allowance to compensate the benchmark entity for the cost of using credit default swaps (CDS) to convert the debt risk premium component of the 10-year benchmark debt to regulatory-period debt. However, as CDS for this purpose are not available, in past water investigations QCA has used the difference between the credit spreads for 10-year debt and regulatory-period debt as a proxy for the transaction costs of CDS

(c) an allowance for annual debt raising costs.

These allowances are included in the cost of debt (and therefore the WACC), rather than as cash outlays, because QCA's view is that the opportunity cost of capital (the WACC) should include the full costs of issuing and managing the risks of debt finance.

7.5 QCA analysis

QCA position

Following receipt of submissions on the discussion paper on the trailing average cost of debt approach (QCA 2014c), QCA examined three cost-of-debt methodologies in further detail:

(a) the 'on-the-day' approach applied to the total cost of debt

(b) a simple (equally-weighted) trailing average applied to the total cost of debt

(c) a simple trailing average applied only to the debt risk premium (DRP) component of the cost of debt, and continued use of an 'on-the-day' estimate for the risk-free rate component – the 'hybrid' approach.

Further information on this analysis is contained in QCA 2014e.

QCA's responses to submissions are incorporated in the following sections, and in QCA's draft decision paper on the trailing average cost of debt (2014e), and final decision paper on cost of debt estimation methodology (2014f).

QCA's position is that the total cost of debt trailing average approach is not a suitable method for estimating the regulatory cost of debt because it violates economic efficiency criteria. Moreover, while there are advantages and disadvantages involved in adopting a 'hybrid' trailing average approach for estimating the regulatory cost of debt, a compelling case does not exist to change from established 'on-the-day' estimation methods.

QCA's reasons for its position are outlined below.

Economic efficiency

NPV=0 principle and 'matching'

A major concern of stakeholders is that the regulatory cost of debt allowance should align as close as possible with the cost of debt incurred by a benchmark firm which adopts an efficient debt policy. As outlined above stakeholders propose that the trailing average applied to the total cost of debt is the most suitable method for this purpose.

While QCA agrees that the regulatory allowance for the cost of debt of the regulated entity and the cost of debt incurred by an efficient benchmark entity should align as close as is reasonable, there are several efficiency considerations that need to be taken into account in achieving this outcome.

QCA believes that the appropriate benchmark entity is an efficient regulated comparator entity with systematic risk equivalent to that of the regulated entity. As the form of regulation affects this systematic risk, it follows that the benchmark entity would be regulated, rather than unregulated.

QCA's Statement of Regulatory Pricing Principles (QCA 2013b) concludes that economic efficiency is the prime objective of economic regulation.

The NPV=0 principle – discussed earlier above – is fundamental for achieving economic efficiency by ensuring that revenues generated are sufficient to finance efficient operations and investment, while not leading to excess profits that regulation seeks to prevent in the first place.

In relation to debt financing, the choice of the term for the risk-free rate (RFR) and the debt risk premium (DRP) are part of this revenue setting decision and, consequently, they should also satisfy the NPV=0 requirement. In principle, this requires setting the terms of the RFR and DRP to match the regulatory cycle (Lally 2010) – that is, use of the 'on-the-day' approach.

Ideally the efficient debt policy of the regulated benchmark entity would be to align the term of its debt to the regulatory term so as to minimise interest-rate and refinancing risk. In practice, rolling over total debt obligations at regulatory resets involves unacceptably high refinancing risk. For this reason, the lower refinancing risk of longer-term debt is normally balanced against its higher cost, and swap contracts used to align debt terms where feasible.

However, although interest-rate swap contracts are available for aligning the risk-free rate component of debt, setting the term of the DRP to the regulatory period is normally not feasible due to the lack of suitable credit default swaps for this purpose (Lally 2010).

In view of the above considerations, QCA considers that the established 'on-the-day' approach, which includes adequate allowances for managing interest-rate and refinancing risks, provides the appropriate regulatory cost of debt allowance for SEQ water retailers consistent with the efficient benchmark cost of debt, while satisfying economic efficiency criteria.

Economic signals for new investment

The prevailing cost of debt at the time of investment is generally considered to be the best indicator of future borrowing costs and, as such, provides appropriate signalling for efficient new investment to promote dynamic efficiency.

QTC (2014) emphasised that a trailing average approach could distort investment incentives unless new capital expenditure is compensated at the prevailing cost of debt, rather than the trailing average cost of debt. This could occur if weights in the trailing average do not reflect debt issuance for new capital expenditure in a particular year.

A simple (equally-weighted) average creates a bias towards under-investment when the prevailing debt yield is higher than the simple trailing average (and vice versa).

Moreover, a simple trailing average implies that a firm can issue debt at trailing average rates to fund new investment, which is not possible in practice.

QTC's submission included a spreadsheet model which purported to demonstrate how a weighted trailing average could be calculated in a simple and transparent way to allow new investments to earn the prevailing cost of debt rather than the trailing average cost of debt.

QCA considers that QTC's model is not readily intuitive and therefore not fully transparent in terms of how the weight applied to each time period is derived and applied in practice.

Application of QTC's approach would also result in different costs of debt (and benchmark WACCs) for each water retailer, even though all other benchmark WACC parameters were the same, including the benchmark capital structure. QCA believes that using water retailers' actual incremental capex in calculating weights to estimate debt financing costs would be inconsistent with the rationale for using a benchmark cost of debt (section 7.1 above).

QCA considers that the 'on-the-day' approach provides the best economic signals for new capital expenditure under annual performance monitoring and price adjustments because the prevailing rates for both risk-free and DRP components of debt would occur relatively close to the time of the expenditure.

Overstatement of cost of debt

Lally (2014) considered that applying a trailing average to the total cost of debt over the benchmark term of debt (for example, 10-year risk-free rate and 10-year debt premium) will typically result in an overstatement of the regulatory cost of debt.

Lally advised that the choice of both the debt term and interest rate swap contracts of the efficient debt policy of a benchmark firm would involve several trade-offs: the reduction in refinancing risk (but increased debt premium cost) from longer term debt; the decrease in the shorter-term risk-free rate and the transactions costs resulting from the swap contracts; and the increased interest rate risk arising from a shorter term for the risk-free rate.

QTC (2014) questioned whether a regulated firm would have an incentive to undertake the debt policy suggested by Lally because engaging in shorter-term swaps may not result in lower debt

costs on a 'risk-adjusted' basis, given the associated higher interest rate risk and transaction costs associated with engaging in shorter-term swaps.

QTC noted that while the use of short-term swaps might suit firms with revenues that are highly sensitive to the economic cycle or with relatively low gearing (and lower sensitivity of earnings to interest rate changes), regulated firms are likely to have relatively stable revenues and comparatively high gearing.

Moreover, use of shorter-term swaps would increase the variability of debt costs and amplify any mismatch with the stable revenue profile of a comparable unregulated firm. This would increase the probability of financial distress for a relatively highly geared firm.

Therefore, QTC doubted whether the lower interest rate associated with the reduced borrowing term would more than offset this increase in risk.

QCA is not persuaded by this argument. Estimates obtained by QCA during recent water investigations suggest that the transactions costs for swapping CGS bonds is considerably less than the term premium for the 10-year risk-free rate[11].

In addition, for a benchmark entity of equivalent systematic risk, any increased probability of financial distress caused by the use of interest rate swaps on CGS contracts is expected to be very low under the light-handed regulatory framework proposed by QCA. Within the CPI-X constraint, water retailers have control over determining their WACCs. Where price increases exceed CPI-X due to market-driven changes in the WACC (for example, significant changes in the risk-free rate or debt margins), these would be viewed as unavoidable and would be permitted to be passed on into prices.

Therefore, QCA agrees with Lally that there is potential for an overstatement of the regulatory cost of debt under the total cost of debt TA approach.

Inconsistent use of risk-free rates

Use of the total cost TA approach as proposed by stakeholders implies use of different risk-free rates for determining the cost of equity and the cost of debt. Whereas a 10-year trailing average for the risk-free rate (as part of the total cost of debt) would be applied in the total cost TA approach, the prevailing one-year risk-free rate would be used to estimate the cost of equity.

This situation does not arise in the case of either the 'hybrid' TA or the 'on-the-day' approaches as the prevailing one-year risk-free rate in used for both the cost of equity and the cost of debt.

QCA agrees with Lally (2010), that the prevailing one-year risk-free rate should be used to estimate both the cost of equity and the cost of debt so that the NPV=0 economic efficiency criterion is not violated.

Other issues

Estimating the benchmark cost of debt

Under normal regulatory conditions (that is, unless a detailed regulatory review or price determination is triggered by unsatisfactory performance), the proxy for the risk-free rate will be the nominal yield of a Commonwealth Government security (CGS) whose term to maturity is one-year, to align with the continual annual performance reviews of the long-term regulatory

[11] Interest-rate swap contract transactions costs are typically around 15-20 basis points per annum, whereas the prevailing spread (11/8/2014) between 1-year and 10-year CGS bonds is around 90 basis points per annum (RBA Statistical Table F16).

framework, and annual price adjustments of the water retailers. The debt risk premium will be set with reference to a benchmark BBB-rated corporate bond with a term of one year; and the proxy for credit default swaps will be the term premium between one-year and 10-year BBB-rated benchmark bonds. This is equivalent to setting a 10-year term for the debt risk premium, which is assumed to be the efficient term of risky debt.

Rather than using a point estimate of the cost of debt (spot rate), standard regulatory practice uses a short averaging period (for example, 20 trading days) to balance the trade-off between using the most current information and avoiding the potential anomalies from short-term fluctuations in the spot rate.

While there were no submissions that addressed this issue, QCA considers that it would be appropriate to continue to use a 20-day period to estimate the benchmark risk-free rate and benchmark debt risk premium under the 'on-the-day' approach. This is consistent with the research findings and practices of several other Australian water regulators.

Stakeholders also submitted that estimation errors in the benchmark debt yield will be lower for trailing average than for 'on-the-day' estimates. However, QCA considers that under the proposed long-term framework for SEQ water retailers, estimation errors will be minimal as the regulatory period is effectively only one year.

QCA also agrees with stakeholders that the econometric methodology developed by PricewaterhouseCoopers (PwC 2013) is a suitable primary method for generating the debt risk premium estimates. This is the approach used in estimating the cost of debt in setting the benchmark WACC for SEQ 2013-15 retail price monitoring.

However, QCA also proposes that reference be made to extrapolations of the Bloomberg valuation (BVAL) series and Reserve Bank of Australia (RBA) estimates, where they are available, as a 'cross-check' to the PwC econometric approach.

QCA has adopted a single estimate of benchmark debt raising transaction costs of 10.8 basis points per annum for all regulated firms based on the estimates of PwC (2013). A single allowance will ensure that sufficient debt raising costs are provided, while avoiding the difficulties associated with estimates based on entity-specific benchmark debt balances that, regardless, are unlikely to result in a material difference in the transaction cost allowance.

Further details of QCA's proposed approach to estimating the benchmark cost of debt are provided in QCA 2014f.

Annual updating of the regulatory cost of debt

Stakeholders supported the annual update of the regulatory cost of debt under trailing average cost of debt approaches, with QTC submitting additional analysis to demonstrate the extent of potential mismatches if annual updates do not occur.

Under the proposed long-term framework for SEQ water retailers, the regulatory cost of debt will need to be updated annually as input to the updated benchmark WACC in line with annual performance reviews and price adjustments.

This is also consistent with QCA's preference for continuing to use the established 'on-the-day' approach.

'Step change' in output prices

Stakeholders submitted that the 'on-the-day' approach would result in greater interest rate risk than the use of a trailing average because of the potential for 'step changes' in output prices between regulatory periods as both components of the cost of debt are fully reset at the start

of each regulatory period under the 'on-the-day' approach. On the other hand, the trailing average approaches would result in a more stable cost of debt allowance over time, and reduce the potential for significant output price changes between regulatory periods.

QCA considers that the potential for large step changes in allowed cost of debt and prices between regulatory periods is significantly reduced under the proposed long-term regulatory framework because performance assessments and estimates of the cost of debt are carried out annually. In effect, the regulatory period is only one year in duration.

Transitional arrangements

QTC recommended transitional arrangements for trailing average approaches to allow for possible changes in stakeholders' expectations about the regulatory framework; to take into account practical considerations about the use of historical data to calculate the cost of debt; and to minimise the potential for strategic behaviour.

As QCA is recommending continuation of the established 'on-the-day' approach, transitional arrangements are not relevant.

Allowing different approaches for different water retailers

QTC submitted that different cost of debt approaches may be applicable for different regulated firms, but mechanisms need to be in place to minimise incentives for regulated firms to switch between options on the basis of revenue maximisation. In QTC's view, the choice should be restricted to the two types of trailing average approach, as only these approaches have implied debt management strategies that can be implemented in practice.

QUU argued that, in a light-handed framework, the water retailers should have the discretion to choose the cost of debt approach subject to QCA's overall guidance on appropriate methodologies.

Consistent with the light-handed nature of the proposed regulatory framework, the cost of debt methodologies are intended to inform water retailers on QCA's preferred approach to estimating the regulatory cost of debt as an element of WACC.

As outlined in QCA's draft decision paper on the trailing average cost of debt (2014e), QCA believes that the use of a single cost of debt approach that applies to all regulated businesses will contribute to regulatory certainty and minimise incentives for regulated firms to seek options on the basis of revenue maximisation. In this regard, QCA's preference is to continue use of the 'on-the-day' method.

The actual WACC used by each water retailer, and the methods used in its derivation, will be one of the factors taken into account by QCA in assessing water retailers' performance under the long-term regulatory framework.

Complexity and cost

Generally, stakeholders considered that trailing average methods were not overly complex and any costs additional to the 'on-the-day' approach would be more than offset by the advantages of aligning regulatory and efficient benchmark costs of debt. A number of costly data and risk-related issues are also able to be efficiently managed through a transition process.

QCA considers the cost of updating cost of debt estimates will be similar under both 'on-the-day' and trailing average approaches as estimates would need to be updated annually under both approaches under the long-term regulatory framework proposed for water retailers, and the estimation methods would be similar.

However, QCA believes that the method used should be as simple, transparent, and internally consistent as possible and on this basis favours the 'on-the-day' approach. QCA also considers that alignment allowances provided under the 'on-the-day' approach are reasonable.

Arbitrariness

Stakeholders argue that the TA approach avoids the arbitrary factors associated with determining the cost of debt using the 'on-the-day' approach, such as the regulatory term and the timing of rate resets.

As discussed above, QCA believes that the appropriate benchmark entity is an efficient regulated comparator of equivalent systematic risk and therefore the regulatory term is an inherent factor in determining regulatory cost of debt allowances. In the case of SEQ water retailers this term is one year.

Other regulatory allowances

In keeping with its preference for continuation of the 'on-the-day' approach, QCA proposes to provide the following regulatory allowances to compensate the benchmark entity for the transactions costs of managing interest-rate and refinancing risk, and debt issuance costs:

(a) an allowance for using interest rate swap contracts to compensate for the cost of converting the term of the risk-free component of benchmark debt from 10 years to one year

(b) an allowance, equal to the difference between the credit spreads for 10-year and one-year BBB-rated debt, to compensate the benchmark entity to convert the term of the debt risk premium component from 10-years to one year

(c) an allowance for annual debt issuance costs.

Conclusion

Of the three cost of debt approaches examined, QCA does not consider the total cost of debt trailing average approach appropriate because it violates economic efficiency criteria.

The remaining two approaches ('hybrid' trailing average and 'on-the-day') have a number of similar characteristics under the long-term framework proposed for SEQ water retailers. For example, both approaches:

(a) are expected to incur similar estimation costs, in view of the annual updating of the regulatory allowances for the cost of debt, and the use of similar estimation methods

(b) are likely to sustain minimal step changes in allowed costs of debt from year to year

(c) provide adequate compensation for the costs incurred in managing financing risks

(d) align the term of the risk-free rate with the regulatory period for both the cost of debt and the cost of equity consistent with economic efficiency requirements.

However, QCA considers the 'on-the-day' approach to have several advantages over the 'hybrid' trailing average approach:

(a) the potential for investment distortions is greater for the 'hybrid' approach than for the 'on-the-day' approach as the 'on-the-day' DRP is usually more contemporary with the timing of new investment than the trailing average DRP

(b) the 'on-the-day' approach is easier to understand and put into effect

(c) continuation of the established 'on-the-day' approach will contribute to regulatory certainty.

On balance, QCA's preferred position is to maintain the established 'on-the-day' approach. In QCA's view, a significant change to the regulatory framework requires a compelling case for change supported by a broad range of stakeholders. QCA is not persuaded that such a case exists.

In relation to estimation of the cost of debt components, QCA proposes to use methods developed by PwC (2013) for the benchmark debt risk premium, and debt raising transaction cost allowance. QCA also proposes to 'cross-check' PwC estimates using Bloomberg valuation (BVAL) and Reserve Bank of Australia (RBA) data.

Further details of these estimation methods are provided in QCA's Final Decision on cost of debt estimation methodology (QCA 2014f).

In summary, QCA's position is that the regulatory cost of debt for SEQ water retailers should be estimated using the established 'on-the-day' approach comprising:

(a) a risk-free component estimated using the prevailing one-year risk-free rate

(b) a debt risk premium component using the prevailing one-year benchmark (BBB) bond rate

(c) an interest rate swap allowance for converting the term of the risk-free component of the cost of debt from 10 years to one year

(d) an allowance, equal to the difference between the credit spreads for 10-year and one-year BBB-rated debt, to convert the term of the debt risk premium component from 10-years to one year

(e) an allowance for debt raising costs of 10.8 basis points per annum.

Draft Recommendation

7.1 From 1 July 2015, the benchmark cost of debt for SEQ water retailers be estimated annually using QCA's established 'on-the-day' approach comprising:

(a) a risk-free component of the cost of debt estimated using the prevailing one-year risk-free rate

(b) a debt risk premium component of the cost of debt using the prevailing one-year benchmark (BBB) bond rate

(c) an interest rate swap allowance to convert the term of the risk-free rate from 10 years to one year

(d) a debt risk premium conversion allowance equal to the difference between the credit spreads for 10-year and one-year BBB-rated debt

(e) an allowance for debt raising costs of 10.8 basis points per annum.

8 DEBT BETA

The debt beta is a measure of the systematic risk of debt, and is defined as the covariance of the returns of risky debt (r_d) with returns on the market portfolio (r_m), expressed as a proportion of the variance of market returns:

$$\beta_d = \frac{\text{cov}(r_d, r_m)}{\text{var}(r_m)}$$

The debt beta is the entity-specific parameter in the CAPM which determines the expected return on risky debt for the entity:

$$r_d = r_f + \beta_d \left(r_m - r_f \right) = r_f + \beta_d .MRP$$

The debt beta is also a factor in the appropriate relationship (defined in section 2.4) for calculating the entity's levered equity beta from estimates of equity (and asset) beta obtained from a sample of comparator entities:

$$\beta_e^L = \beta_a + (\beta_a - \beta_d)(1 - t_\varepsilon)\frac{D}{E}$$

8.1 Other jurisdictions

No value was specified for the debt beta by ERA (2013), ESC (2013a and 2013b), IPART (2013a), and ACCC (2011).

ESCoSA (2013) assumed a debt beta of zero, whereas ICRC (2013) considered an explicit estimate of the debt beta not relevant as the CAPM was not suitable for calculating ACTEW's cost of capital.

8.2 QCA approach in recent water investigations

Consistent with Australian regulatory practice, QCA does not use the debt beta to estimate the cost of debt using the CAPM. However, it does require an estimate of the debt beta to determine the entity's leveraged equity beta from sample estimates.

Up until the onset of the global financial crisis (GFC), QCA estimated the debt beta by taking the midpoint of a range where the lower bound is zero and the upper bound is determined from the CAPM relationship, but using the promised yield on debt in the estimate of the debt risk premium, rather than the expected return:

$$R_d = r_f + \beta_d \left(r_m - r_f \right) = r_f + \beta_d .MRP$$

$\beta_d = \frac{R_d - r_f}{MRP}$; where R_d is the promised yield, and $R_d - r_f$ is the credit (or corporate) spread.

QCA adopted this approach as a reasonable compromise based on empirical evidence that suggests the debt beta is greater than zero, but less than the upper bound, as the latter includes compensation for diversifiable elements of risk, such as for default losses.

However, during the GFC, corporate spreads increased to historically high levels resulting in unreasonably high estimates of the debt beta under QCA's 'midpoint' approach.

QCA's view is that these increases were associated mainly with the diversifiable components of debt risk (for example, higher expected default losses). Moreover, QCA has noted that, if the same value of the debt beta is applied consistently in the de-levering and re-levering process, the effect on the target equity beta should not be material, provided the difference between the leverage of the comparators is not substantially different from the leverage of the target entity.

Therefore, in its more recent water decisions, QCA has retained the debt beta estimate used in its earlier decisions (that is, 0.11) as a coarse approximation.

8.3 QCA analysis

Recent evidence supports the debt beta assumption of 0.11 used by QCA. Based on an analysis of Australian corporate bond indices compiled by Bank of America/Merrill Lynch, a recent study by PwC New Zealand estimated debt betas to lie in the range 0.061 for AAA-rated bonds to 0.106 for BBB-rated bonds.

Conclusion

QCA proposes to continue to apply a debt beta of 0.11 in its calculation of levered equity beta for all SEQ Water retailers using the Conine relationship.

Draft Recommendation

8.1 A debt beta of 0.11 to apply to all SEQ water retailers from 1 July 2015.

9 VALUE OF IMPUTATION CREDITS (GAMMA)

9.1 Background

'Gamma' is a measure of the effective value of dividend imputation franking credits. It is the proportion of dividends distributed from Australian-taxed earnings able to be used as dividend imputation credits, and is calculated as the product of the distribution rate (that is, imputation credits (IC) distributed as a proportion of company tax paid), and the value to investors of those credits at the time they are received, that is the proportion of credits actually used by shareholders (utilisation rate, U).

$$\gamma = \left(\frac{IC}{Tax} \right) U$$

Consistent with the definition of Officer's WACC3 as discussed in section 2.4 above, gamma affects the calculation of the WACC, and its associated cash flows, in two ways:

(a) it affects the calculation of the regulated firm's equity beta using the modified Conine levering formula

(b) it adjusts the regulatory cash flows for the effects of dividend imputation.

9.2 Other jurisdictions

ESC (2013a and 2013b) and ESCoSA (2013) have both used a gamma of 0.5 based on regulatory precedent.

ERA (2013) and IPART (2013a) have both used a gamma of 0.25 following a 2011 decision of the Australian Competition Tribunal[12].

No gamma value was specified by ACCC (2011), whereas ICRC (2013) concluded that, as ACTEW is an entity subject to the tax-equivalent regime, it is analogous to a private business whose shareholders can make full use of their imputation credits, the value of gamma is unity, and the effective tax rate is zero.

9.3 QCA approach in recent water investigations

In its investigations to date, QCA has applied a value of 0.5 for gamma, comprising estimates of 0.8 for the distribution rate and 0.625 for the utilisation rate (0.8 x 0.625 = 0.5).

9.4 QCA analysis

QCA has re-examined its estimates of the distribution and utilisation rates as part of its review of the cost of capital (QCA 2014d).

QCA's position is that a revised estimate of 0.84 for the distribution rate is appropriate based on work by Professor Lally who computed the average distribution rate of the 20 largest Australian Stock Exchange (ASX) companies directly from their financial statements from 2000 through 2013. QCA considers that this estimate is the most reliable available as these 20 listed firms

[12] Australian Competition Tribunal, Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9 (12 May 2011). This decision is analysed further in QCA 2014d.

account for 62% of the ASX200 (in terms of their market capitalisation), their financial statements are subject to annual, independent audit, and the use of original source data protects against possible double-counting and other aggregation problems.

In relation to estimating the utilisation rate, after considering alternative approaches (dividend drop-off studies, redemption studies, financial market practices, and a conceptual test based on cost of equity bounds suggested by Lally), QCA's position is that the equity ownership approach is the most appropriate methodology for estimating this parameter.

The equity ownership method calculates the shares of domestic and foreign equity ownership for listed firms and assumes utilisation rates for these two classes of investors of one and zero respectively.

Based on an estimate of 44% as the foreign ownership share of Australian listed equities, and assuming a utilisation rate of one for domestic resident investors and zero for foreign investors, the weighted average utilisation rate for listed Australian domestic market equities is 0.56 (that is, 44% of zero plus 56% of unity).

The product of the revised estimates of the utilisation rate (0.56) and the distribution rate (0.84) gives an estimate of 0.47 for gamma, which is marginally lower than QCA's previous estimate of 0.5.

Further information on the reasoning behind the above estimate for gamma is contained in QCA's Final Decision on market parameters (QCA 2014d).

Conclusion

QCA's proposes to apply a gamma value of 0.47 (based on a distribution rate of 0.84 and a utilisation rate of 0.56) from 1 July 2015.

Draft Recommendation

9.1 A gamma of 0.47 (based on a distribution rate of 0.84 and a utilisation rate of 0.56) to apply from 1 July 2015.

10 SUMMARY OF QCA WACC METHODOLOGY

Recommended changes to the methodology for determining the benchmark WACC for water retailers resulting from the cost of capital review to date are relatively minor, with the form of the discount rate and the approach to estimating most parameters either unchanged or facing minor adjustments. A summary of the QCA's recommended treatment of the WACC is incorporated in the Overview.

GLOSSARY

A	
ACCC	Australian Competition and Consumer Commission
AER	Australian Energy Regulator
ASX	Australian Stock Exchange
B	
β_a , β_e^L , β_d	Asset beta, levered equity beta, and debt beta, respectively
bps	Basis points (1/100th of 1%. For example, 15 bps = 0.15%)
C	
CAPM	Capital Asset Pricing Model
CDS	Credit Default Swap
COAG	Council of Australian Governments
cov	Covariance
D	
DCF	Discounted cash flow
DRP	Debt risk premium
D/V	Capital structure, 'gearing' or 'leverage' = market-value proportion of debt in the entity's funding mix
E	
ERA	Economic Regulation Authority
ESC	Essential Services Commission of Victoria
ESCoSA	Essential Services Commission of South Australia
G	
Gamma (γ)	Proportion of dividends distributed from Australian-taxed earnings able to be used as dividend imputation credits
GFC	Global financial crisis
I	
IEC	Incenta Economic Consulting
ICRC	Independent Competition and Regulatory Commission
IPART	Independent Pricing and Regulatory Tribunal
M	
MAR	Maximum allowable revenue
MBRC	Moreton Bay Regional Council
MRP	Market risk premium
N	
NERA	NERA Economic Consulting

NWI	National Water Initiative
NPV	Net present value
P	
PwC	PricewaterhouseCoopers
Pi (π)	Expected rate of inflation
Q	
QCA	Queensland Competition Authority
QTC	Queensland Treasury Corporation
QUU	Queensland Urban Utilities
R	
RAB	Regulatory asset base
r_f , r_a , r_d , r_e^L , r_m	Risk-free rate, expected return on assets, expected return on risky debt, expected return on levered equity (cost of equity), expected return on market portfolio, respectively
R_d	Promised yield on risky debt (cost of debt)
S	
SEQ Water retailers	South east Queensland monopoly distribution and retail water and sewerage entities
SCC	Split cost of capital
T	
TA	Trailing average
t_c , t_ε	Corporate tax rate, and tax rate adjusted for dividend imputation, respectively
U	
UW	Unitywater
V	
$V = E + D$	Market value of entity = market value of equity + market value of debt
var	Variance
W	
$WACC$	Weighted Average Cost of Capital
$WACC_{nom}$, $WACC_{real}$	Nominal and real WACC, respectively
X	
$X_0 = X_G + X_E + X_D$	Net operational cash flow expected to be distributed to the government, equity holders and debt holders, respectively

APPENDIX A: MINISTERS' DIRECTION NOTICE

QUEENSLAND COMPETITION AUTHORITY ACT 1997
SECTIONS 10(e)
MINISTERS' DIRECTION NOTICE

Referral
As the responsible Ministers, pursuant to section 10(e) of the *Queensland Competition Authority Act 1997* (the QCA Act), we direct the Queensland Competition Authority (QCA) to investigate and report on a long-term regulatory framework for the monopoly distribution and retail water and sewerage activities (the activities) of the following entities (the DRs):

- Northern SEQ Distributor-Retailer (Unitywater);
- Central SEQ Distributor-Retailer (Queensland Urban Utilities);
- Logan City Council;
- Redland City Council; and
- Gold Coast City Council;

For the purposes of the investigation and report, the Authority is directed to investigate and report on the regulatory framework which would apply from 1 July 2015, including reporting requirements, based on the following overarching regulatory objective:

> *'To protect the long term interests of the users of SEQ water and sewerage services by ensuring the prices of these services reflect prudent and efficient costs, while promoting efficient investment in and use of these services, having regard to service reliability, safety and security over the long term'.*

For the purposes of developing and implementing such a framework, the QCA is directed to:

a) develop a regulatory framework for the identified businesses and the QCA to operate from 1 July 2015 onwards – this must set out:
   i. pricing principles to apply to the industry (including water, sewerage, trade-waste, recycled water services and stormwater re-use services);
   ii. form of regulation; and
   iii. the preferred length of the regulatory period.
b) outline how the regulatory framework will be implemented on an ongoing basis;
c) assist the businesses to develop a strategic approach to long term investment in the water sector; and
d) assist with transition toward best practice stakeholder engagement.

Conduct of the QCA pursuant to this referral
1. The development of the regulatory framework should consider the following over-arching principles:
   a) ensure the costs of implementing the regulatory regime do not exceed the benefits;
   b) appropriate levels of customer engagement for the framework;
   c) sufficient co-ordination with other regulatory and regulatory review processes taking into consideration things such as Netserv plans, Total Water Cycle Management Plans, environmental regulation and land use planning;

d) ensure that opportunities for a whole-of-sector approach to solutions for the industry are encouraged under the regulatory framework (including non-infrastructure and efficient demand side management initiatives).

e) taking account of the different characteristics, in particular, size of the DRs.

2. The framework should recommend treatment of the following regulatory parameters:

a) the roll-forward of the regulatory asset base (RAB), within and across regulatory periods. A revaluation of the initial RAB (established for the purpose of the 2010-13 price monitoring period) is not to be considered;

b) the Weighted Average Cost of Capital (WACC);

c) calculating the return of capital;

d) assessing efficient and prudent operating and capital costs, including the process the Authority will apply in assessing prudency and efficiency;

e) principles to guide the treatment of capital revenues, including gifted assets and infrastructure charges; and

f) incentive mechanisms to support innovation and other efficiencies.

3. In developing and implementing the regulatory framework, the following supplementary regulatory objectives will be considered:

a) the form of prices oversight applied should be proportionate with the risk of misuse of market power by the DRs to ensure that the costs of implementing the framework do not exceed the benefits;

b) the framework should be developed to allow for the management of potential price shocks for customers, including:

i. price paths within and across regulatory periods, where appropriate;
ii. changes in pricing policies, including tariff structures;
iii. the provision of subsidies and how they may be treated;

c) the form of prices oversight applied should seek to minimise the administrative burden on DRs, including the number of, and detail required in, information returns provided to the Authority and duplication in reporting requirements;

d) the Authority must develop service quality performance reporting, in consultation with the DRs and other stakeholders, based on service quality indicators of relevance to residential and non-residential customers, with the objective of informing these customers about the comparative performance of SEQ DRs.

In doing so, the QCA should ensure that the framework is not excessively onerous or costly to implement by focusing on a reasonable range of meaningful indicators in the following areas: baseline (contextual) information; water and sewerage network reliability and service (including water) quality; water consumption, recycling and reuse; customer responsiveness and service;

e) the treatment of aggregate annual revenue under/over-recoveries in relation to core water and sewerage services should be considered as part of the permanent price monitoring framework in a manner that balances the interests of the DRs and their customers;

f) the long-term framework should facilitate the DRs moving to more light-handed prices oversight over time; and

g) a primary focus of the long-term framework should be on assisting customer understanding of how the costs of water and sewerage services influence prices by;

   i. identifying the key drivers of existing retail price levels and annual price increases, particularly where prices increase by more than the rate of general inflation; and
   ii. reinforcing and promoting understanding of accountabilities for retail prices and service outcomes.

Consultation

The Authority must undertake an open consultation process including all relevant parties and consider all submissions.

For this purpose, the Authority must prepare, in consultation with relevant stakeholders, and publish, a work program, which provides for the release of appropriately sequenced position papers (incorporating draft recommendations).

Consistent with section 34 of the QCA Act, all information papers, submissions and the Final Report must be published on the Authority's website.

Timetable

The Authority must provide to the Ministers and the Minister for Energy and Water Supply a Final Report by 30 September 2014.

[redacted]

TIM NICHOLLS
Treasurer and Minister for Trade

[redacted]

JARROD BLEIJIE
Attorney-General and Minister for Justice

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