

ADVICE ON A REGULATORY RATE OF RETURN FOR SA WATER

DRAFT ADVICE

December 2011



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REQUEST FOR SUBMISSIONS

The Essential Services Commission of SA (the Commission) invites written submissions from interested parties in relation to the issues raised in this paper. Written comments should be provided by **6 January 2012.** It is highly desirable for an electronic copy of the submission to accompany any written submission.

It is Commission policy to make all submissions publicly available via its website (www.escosa.sa.gov.au), except where a submission either wholly or partly contains confidential or commercially sensitive information provided on a confidential basis and appropriate prior notice has been given.

The Commission may also exercise its discretion not to exhibit any submission based on their length or content (for example containing material that is defamatory, offensive or in breach of any law).

Responses to this paper should be directed to:

Advice on a Regulatory Rate of Return for SA Water

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Public Information about ESCOSA's activities

Information about the role and activities of the Commission, including copies of latest reports and submissions, can be found on the ESCOSA website at <u>www.escosa.sa.gov.au</u>.



The Hon. Jack Snelling M.P.

TF11D03648

14 October, 2011



Dr Patrick Walsh Chair Essential Services Commission of South Australia G.P.O. Box 2605 ADELAIDE S.A. 5001

Dear Dr Walsh



Government of South Australia

Treasurer

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The Water Industry Bill was introduced into Parliament on 27 July, 2011. The Bill declares the water industry in South Australia to be a regulated industry and authorises the Essential Services Commission of South Australia (ESCOSA) to regulate prices under the Essential Services Commission Act 2002. The Bill also provides that ESCOSA must comply with the requirements of any pricing order issued by the Treasurer.

It is anticipated that ESCOSA's first price determination for SA Water's drinking water and sewerage charges will be effective from 1 July, 2013. To help me develop a pricing order for SA Water's drinking water and sewerage charges for the initial regulatory period, I propose to seek ESCOSA's advice on an appropriate regulatory rate of return to apply to SA Water's assets.

Pursuant to section 5(f) of the Essential Services Commission Act 2002, I seek ESCOSA's advice on a single regulatory rate of return to apply to SA Water's new and existing regulatory assets from 1 July, 2013. The regulatory rate of return would be consistent with the pre-tax weighted average cost of capital with the cost of equity derived from the Capital Asset Pricing Model.

ESCOSA's advice on this matter should reflect the National Water Initiative Pricing Principles and be developed in a manner that is consistent with ESCOSA's Charter of Consultation and **Regulatory** Practice.

ESCOSA's draft advice on this matter should be provided to me by 1 December, 2011, and final advice by mid February, 2012. I ask that your officers keep Treasury and Finance informed of the likely timing of the provision of the final advice to me as the reform process progresses.

If you have any queries about this matter, please do not hesitate to phone Penny Black-Tiong on (08) 8204 1727.

Yours sincerely

Snelling M.P.

Treasur

encl.

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GLOSSARY OF TERMS

ACCC	Australian Competition and Consumer Commission
AER	Australian Energy Regulator
ACG	Allen Consulting Group
ΑΤΟ	Australian Taxation Office
BP	Basis Points
САРМ	The Capital Asset Pricing Model
CGB	Commonwealth Government Bond
COMMISSION	Essential Services Commission of South Australia
СРІ	Consumer Price Index
DTF	South Australian Department of Treasury and Finance
ERA	Economic Regulatory Authority of Western Australia
ESC ACT	The Essential Services Commission Act 2002
ESCV	Essential Services Commission of Victoria
ICRC	Independent Competition and Regulatory Commission
IPART	Independent Pricing and Regulatory Tribunal
MRP	Market Risk Premium
NWI	National Water Initiative
QCA	Queensland Competition Authority
RBA	Reserve Bank of Australia
SA WATER	South Australian Water Corporation
SEQ	South East Queensland Water Companies
SDP	Sydney Desalination Plant
SFG	Strategic Finance Group
SORI	Statement of Regulatory Intent
TREASURY	The Treasury of the Australian Federal Government
TRIBUNAL	The Australian Competition Tribunal
VAA	Value Adviser Associates Pty Ltd
WACC	Weighted Average Cost of Capital

EXECUTIVE SUMMARY

The Essential Services Commission of South Australia (the Commission) has been asked to provide advice to the Treasurer on a regulatory rate of return to apply to SA Water. The Commission's advice, which has been sought by the Treasurer pursuant to section 5(f) of the *Essential Services Commission Act* 2002 (ESC Act), is to be based on a pre-tax weighted average cost of capital (WACC), with the cost of equity derived from the Capital Asset Pricing Model (CAPM).

The regulatory rate of return (also referred to as the "cost of capital") is a key input into the cost "building blocks" of a regulated business. It is a measure of the opportunity cost of investment in regulated assets, and is integral in ensuring that there is sufficient incentive for ongoing investment in relevant infrastructure. The Treasurer has requested advice on a regulatory rate of return for SA Water to assist in the development of a pricing order for SA Water's drinking water and sewerage charges for the initial period of independent price regulation of the water industry (to commence on 1 July 2013).

Methodology

The appropriate regulatory rate of return to apply to SA Water should be one that is representative of an efficient water supplier, to ensure that SA Water's prices are reflective of efficient financing costs. Basing the regulatory rate of return on SA Water's actual cost of capital may lead to excessive prices if that cost is inefficient.

To derive a pre-tax real regulatory rate of return, the approach generally used by regulators is to first derive a nominal post-tax WACC, and to then apply the imputationadjusted corporate tax rate (to convert from post-tax to pre-tax) and remove the forecast inflation rate (to convert from nominal to real). The formula that is used to calculate the post-tax nominal WACC is:

WACC =
$$k_e \frac{E}{V} + k_d (1 - t_c (1 - \gamma)) \frac{D}{V}$$

Where:

- k_e = cost of equity capital after corporate tax;
- k_d = cost of debt, defined as k_d = risk-free rate (r_f) + debt risk premium;
- t_c = the corporate tax rate;
- γ ("gamma") = value (pre-personal tax) of \$1 of imputation credits. In essence this is the proportion of company tax which gives rise to the tax credit associated with a dividend with attached imputation credits;
- E = market value of equity;
- D = market value of debt; and
- V = market value of the firm (V = E + D).



The regulatory rate of return is dependent on the cost of equity and the cost of debt, with those costs weighted by the proportion of total capital that is financed by debt and by equity.

Cost of debt

The Commission has derived a nominal risk free rate of 4.38%, based on the observed yields of Commonwealth Government 10-year bonds (CGB) (sourced from the Reserve Bank of Australia (RBA)), averaged over the 20 day period ending 31 October 2011. This amount has been applied in cost of debt and cost of equity calculations.

The Commission has established an estimate of the debt risk premium based on a BBB rated entity with an assumed capital structure of 60% debt to total regulatory assets. These assumptions are consistent with general regulatory practice. Based on those assumptions, the Commission would normally recommend the use of yields from the 10-year Australian BBB Bloomberg fair value curve to estimate the debt risk premium, as 10-year bonds provide the longest term to maturity and would normally be used for financing of long-lived assets such as water infrastructure. However, there are very few 10-year BBB bonds being traded in Australia and the yield estimates from those bonds are therefore unreliable. The Commission advises that the method most likely to represent a 10-year BBB debt risk premium is the use of the Bloomberg 7-year fair value curve to determine the yield on 7-year bonds and to then add an additional premium to represent the additional risk associated with a longer investment period. A debt risk premium of 3.80% has been calculated based on that method.

The pre-tax nominal cost of debt is estimated at 8.18%.

Cost of equity

The CAPM formula to be used by the Commission is defined as:

 $k_e = r_f + \beta_L x MRP$

Where:

- k_e represents the cost of equity;
- r_f is the risk-free rate;
- β_L is the levered or equity beta, or the systematic risk of a specific equity; and;
- MRP is the market risk premium (expected market return minus the risk-free rate).

The Commission considers that, for the purpose of this advice, an appropriate value of equity beta (β_L) is 0.80. While there is empirical evidence to suggest that the value of β_L is in the range of 0.60-0.70, there is a large degree of measurement error underlying that evidence. In order to maintain regulatory certainty for investment, the Commission's advice is that it is preferable to use 0.80, which is the same value adopted in SA Water's current cost of capital determination, and is consistent with many other relevant regulatory decisions. The Commission has not seen sufficient evidence to demonstrate

that there has been a change in market conditions over recent years that has resulted in a material change in β_{L} .

The recommended value of the market risk premium (MRP) is 6%. This is consistent with the vast majority of regulatory decisions over the past 10 years, market surveys of academics and market practitioners and also well within the range provided by historical estimates. To provide certainty and regulatory stability, the Commission recommends adopting this value.

The nominal cost of equity that results from these inputs is 9.18%.

Imputation-adjusted corporate tax rate

To derive the pre-tax regulatory rate of return, assumptions on the corporate tax rate and the value of imputation tax credits ("gamma") are required.

The Commission's advice is to adopt the current corporate tax rate of 30%. While the corporate tax rate may be subject to future review, the outcomes of such a review are uncertain and it is prudent to assume continuation of the current rate.

The role of imputation credits in the cost of capital determination has been widely discussed and debated by various stakeholders during other regulatory reviews. The Commission appreciates the limitations of the methods used in recent valuations of imputation credits and believes that a suitable outcome is to apply a value of 0.50 for gamma, which is consistent with the value used in other water pricing determinations in Australia.



Summary

The Commission's draft advice on a regulatory rate of return for SA Water based on the parameters below in Table 1 which provides a pre-tax real rate of return of 6.88%.

Parameter	Draft Advice		
Nominal risk-free rate	4.38%		
Credit Rating	BBB		
Gearing	60%		
Debt risk premium	3.80%		
Equity Beta	0.80		
Market risk premium	6%		
Corporate Tax rate	30%		
Gamma	0.50		
Post-tax nominal WACC	7.85%		
Pre-tax nominal WACC	9.23%		
Inflation forecast	2.20%		
Pre-tax real WACC	6.88%		

Table 1 - The Commission's Draft Advice

1 INTRODUCTION

The Essential Services Commission of South Australia has been asked to provide advice to the Treasurer under section 5(f) of the ESC Act on the matter of regulatory rates of return to assist the Treasurer in the preparation of a pricing order for SA Water's drinking water and sewerage charges. In particular, the Treasurer has sought the Commission's:

"... advice on a single regulatory rate of return to apply to SA Water's new and existing regulatory assets from 1 July 2013. The regulatory rate of return would be consistent with the pre-tax weighted average cost of capital with the cost of equity derived from the Capital Asset Pricing Model."¹

The Treasurer has also requested that the Commission's advice should reflect the National Water Initiative Pricing Principles and be developed in a manner consistent with the Commission's Charter of Consultation and Regulatory Practice.

The fundamental task for the Commission is to provide advice to the Treasurer on those matters based on facts and circumstances as they presently exist and to inform itself throughout the process by undertaking public consultation. The Commission's advice is set out herein and is based on the best information and evidence presently available to the Commission and the expert analysis and judgment of the Commission.

In preparing its advice, the Commission is cognisant of the view that this subject is at times both complex and difficult to grasp, given the sophisticated economic and finance concepts involved.

The Commission has therefore taken care to explain key concepts and reasoning in its preparation of this advice, so as to best permit stakeholders to engage in the process and provide views on the issue of the regulatory rate of return. This includes explaining the nature and consequences of various parameters which need to be estimated or determined in order to provide advice as well as highlighting the impacts of its overall advice.

The Commission understands that many of the concepts are highly technical and, to the extent that stakeholders are not able to express specific views on those matters, would nevertheless urge stakeholders to consider the potential impacts of its overall advice and provide commentary on that matter.

1.1 Limitations

While the Commission may, under the terms of the Water Industry Bill 2011 currently before the Parliament, have a future role in the regulation of SA Water's charges, the Commission regards future processes as necessarily separate and distinct from this task.

¹ Letter of Referral, Treasurer to Essential Services Commission, 14 October 2011.



In large measure, this is because many aspects of rate of return calculations require estimation of financial market data at a point in time or by observations of currently available historical data. Regulatory practice in Australia and overseas is that, when a regulator like the Commission undertakes any price determination process, those estimations and observations are made as close as possible to the time of the decision. This ensures that there is no detriment to the regulated business as the prevailing market indicators at the time of the decision are used in the rate of return calculation. It also promotes the interests of consumers by ensuring that the regulatory rate of return is based on the best information available, which is more likely to deliver prices that are reflective of efficient costs. For example, if the cost of debt was to reduce between the time of preparing this advice and the time of the Commission's determination of SA Water's prices, that reduction would lead to a lower regulatory rate of return and, all else being equal, lower prices. Of course, the opposite would be true if the cost of debt were to increase. However, to the extent that the efficient costs of the utility change materially (either upward or downwards), the Commission believes that it is in the long-term interests of consumers to ensure that prices reflect those efficient costs.

In the context of this draft advice the Commission has highlighted those areas which are usually determined at the time of a price determination. Any future price determination process by the Commission will not be commencing for some time. The advice that the Commission is now providing will be out-dated and hence unreliable for a price determination which will occur at a future date.

1.2 The Regulatory Rate of Return Defined

Capital (or investment funds), like any other commodity, has a price that is determined by supply and demand and the risk in cash flows potentially generated by the asset relative to the risk associated with other assets. Unlike the price for most goods and services, the price for investment capital cannot be observed but must be estimated from other market information. Thus, determination of the return to be assumed in the revenue benchmarks requires the estimation of the cost of capital associated with the regulated activity, as implied by the market.

While there is a 'true' cost of capital for any activity in theory, any estimate of the cost of capital is subject to a large degree of statistical uncertainty or imprecision. The capital intensive nature of a water utility business makes the estimate of the cost of capital one of the more significant inputs in the review of price controls, and has been a matter of some debate and controversy in matters before other regulators.

Accordingly, the Commission addresses this imprecision when estimating the cost of capital in light of the statutory imperatives contained within section 6 of the Essential Services Commission Act and the principles set out in the National Water Initiative Pricing Principles.

6—Objectives

In performing the Commission's functions, the Commission must-

- (a) have as its primary objective protection of the long term interests of South Australian consumers with respect to the price, quality and reliability of essential services; and
- (b) at the same time, have regard to the need to
 - (i) promote competitive and fair market conduct; and
 - (ii) prevent misuse of monopoly or market power; and
 - (iii) facilitate entry into relevant markets; and
 - (iv) promote economic efficiency; and
 - (v) ensure consumers benefit from competition and efficiency; and
 - (vi) facilitate maintenance of the financial viability of regulated industries and the incentive for long term investment; and
 - (vii) promote consistency in regulation with other jurisdictions.

A key objective when determining the regulated rate of return that is assumed in the revenue benchmarks is to provide investors with a return that is sufficient to motivate the investment and attract the capital away from alternative investments. In this sense, the regulatory rate of return should reflect an opportunity cost of capital – the return on capital available to investors in the next-best investment opportunities, adjusted for the relative risk of the projects.

As the assets employed by a firm are generally financed by a combination of debt and equity, part of the return that accrues to a particular asset flows to debt providers and part to equity holders. Accordingly, the term weighted average cost of capital, or WACC, is often used to refer to the market-determined cost of capital for a particular asset, reflecting the fact that the overall return to an asset comprises a return both to lenders and equity holders.

As with all other aspects of the building block approach, the rate of return to be reflected in SA Water's prices will be a benchmarked rate of return based on the financing decisions of an efficient supplier. Under incentive based regulatory arrangements, the use of a benchmark rather than actual debt raising costs should provide an incentive for the business to pursue efficient financing arrangements and ensure that customers do not pay for inefficient funding arrangements. In light of this, the Commission will determine a rate of return that is consistent with an efficient utility operating in the South Australian water market.

The Commission notes the number of issues that surround cost of capital determinations and the current debate occurring across other jurisdictions. In response to this, the



Parameter

Commission has taken into consideration a number of recent regulatory decisions concerning water utilities and has also engaged a consultant to provide it with expert advice on particular issues. The Commission will address any relevant matters raised by stakeholders through public consultation in preparing its final advice. For information Table 2 below provides a summary of the cost of capital parameters originally adopted in 2007 by the South Australian Department of Treasury and Finance (DTF) in its transparency statement for SA Water.

	DTF Transparency Statement ²
Nominal risk-free rate	10-year CGB
Inflation forecast	10-year CPI-indexed CGB
Debt risk premium	1.1%
Gearing	55%
Equity Beta	0.80
Market Risk Premium	6%
Gamma	0.50
Post-tax nominal WACC	6.86%
Real pre-tax WACC	6.05%

Table 2 - Current SA Water Cost of Capital Parameters

SA Water

Source: South Australian Department of Treasury and Finance: 2010-11 Transparency Statement

² The 2010-11 Transparency Statement for Potable Water and Sewerage Prices in South Australia provided by the South Australian Department of Treasury and Finance can be found at: http://www.treasury.sa.gov.au/dtf/infrastructure_support/water.jsp

2 METHODOLOGY

Under the terms of reference provided by the Treasurer, the regulatory rate of return must be calculated using a pre-tax rate of return where the cost of equity is derived from the CAPM. The CAPM describes the relationship between the risk and return of an asset by determining the appropriate rate of return for an asset in a diversified portfolio.

While the Treasurer's terms of reference and the NWI pricing principles require the Commission to use the CAPM, the Commission's view is that the use of the CAPM is the most suitable method for calculating the cost of equity. In a survey of the capital budgeting practices of Australian corporations conducted by Truong, Partington and Peat (2008), it was established that 72% of corporations use the CAPM when determining their cost of capital.³ The Commission also notes that the implementation of the CAPM is uniform across all Australian regulators as well as being the method used in SA Water's previous cost of capital decisions.

The CAPM equation to be used by the Commission is defined as:

$$k_e = r_f + \beta_L x MRP$$

Where:

- k_e represents the cost of equity;
- r_f is the risk-free rate;
- β_L the levered or equity beta, or the systematic risk of a specific equity; and;
- MRP is the market risk premium (expected market return minus the risk-free rate)

Each of these parameters must be estimated in order to provide a regulatory rate of return for SA Water. The equity beta is the only parameter specific to an asset that can be observed for a publicly listed company. However, as SA Water is not publicly traded, a suitable proxy must be used, which is discussed in detail in section 5.1 of this report.

This cost of equity (k_e) to be determined by the CAPM is a key component in the rate of return formula.

The formula for the cost of capital to be used by the Commission is represented by:

WACC =
$$k_e \frac{E}{V} + k_d (1 - t_c (1 - \gamma)) \frac{D}{V}$$

This delivers a post-tax nominal weighted average cost of capital;

where:

• k_e = cost of equity capital after corporate tax;

³ Truong G., Partington G., Peat M., Cost of capital estimation and capital budgeting practice in Australia, Australian Journal of Management, 33, 1-6, 2008.



- $k_d = \text{cost of debt, defined as } k_d = r_f + \text{debt risk premium;}$
- t_c = the corporate tax rate;
- γ = value (pre-personal tax) of \$1 of imputation credits. In essence this is the proportion of company tax which gives rise to the tax credit associated with a dividend with attached imputation credits;
- E = market value of equity;
- D = market value of debt; and
- V = market value of the firm (V = E + D).

Under the WACC formula, the rate of return is comprised of a weighted return to bondholders as well as shareholders. This weighting is represented in the formula by $\frac{E}{V}$ which is the proportion of the firm that is financed by equity, and $\frac{D}{V}$ which denotes the proportion of the firm that is financed by debt.

The rate of return derived from this formula will deliver a post-tax nominal rate of return. To transform the post-tax nominal return into a pre-tax nominal return, the Commission grosses up the post-tax nominal rate of return to a pre-tax nominal rate of return by the imputation-adjusted corporate tax rate(t_e), where;

$$t_e = t_c (1 - \gamma);$$

and:

- t_e = the effective tax rate;
- t_c = the corporate tax rate; and
- γ = the value of imputation credits.

The pre-tax nominal rate of return = post-tax nominal rate of return(1-t_e)

This will produce a pre-tax nominal rate of return. To deflate the resulting pre-tax nominal rate of return to a pre-tax real rate of return the Commission will deflate the return using the Fisher equation.⁴

In determining a pre-tax rate of return the Commission has transformed the post-tax return into a pre-tax return by using the statutory corporate taxation rate. The pre-tax approach incorporates the taxation liability of the firm into its rate of return. However, this approach does not take into account firm-specific taxation matters and possible changes in taxation rates and various tax allowances. It also introduces the problem of transforming a post-tax return into a pre-tax return. Transforming a rate of return that applies to multiple periods can be problematic when attempting to adjust returns for unexpected changes to taxes or

⁴ Fisher equation: Inflation = $\left(\frac{1+Nominal}{1+Real}\right)$ - 1

inflation that have occurred. It is extremely difficult to adjust the return to take into consideration this new information.

In contrast, a post-tax return is applied to the after-tax cash flows of the benchmark firm, after making the appropriate tax adjustments. This method does not require any transformation or any assumptions surrounding the taxation a firm will incur, which means the issues encountered by adopting a pre-tax rate of return are removed.

Throughout the formation of this advice the Commission has ensured that each recommendation is based on the best available evidence. Where individual cost of capital parameters can be observed the Commission has sought to use the observed value of the parameter. However, not all of the variables are observable in the market and must be considered in the context of the relevant evidence that is available. Unless the context, logic or evidence, warrant a departure from historical evidence and regulatory stability, the Commission will continue to place substantial weight on these considerations.

The Commission believes that consistency with other relevant regulatory decisions is an important principle for the economic regulation of infrastructure industries. Indeed, it is a factor that the Commission must have regard to in performing its functions.⁵ In regulated industries, such as the water industry, the decisions of regulators play a critical role in ensuring efficient long-term investment. Jurisdictions that have regulatory regimes that provide for higher returns on investment are more likely to divert capital away from other jurisdictions. Unless there is an underlying difference between the cost of capital in each jurisdiction, such an outcome will distort capital markets.

One of the key objectives of the current process of water regulatory reform in South Australia is to attract new investment into the industry, particularly from the private sector. The decision on the regulatory rate of return to apply to SA Water is likely to create a signal to industry participants looking to enter the South Australian market. Regulatory stability will therefore play an important role in facilitating new entry.

The overarching objective behind giving weight to relevant regulatory decisions and historical evidence is to promote regulatory stability for regulated entities. In an environment where regulatory stability is not promoted, there is a substantial decrease in the confidence of investors. Where this is the case, the regulated entity will incur additional costs to attract investment. This is particularly profound in the utilities industry where financing is generally long term and therefore more vulnerable to changes in regulatory decisions.

2.1 Consultant Advice

To assist in the development of an appropriate regulatory rate of return, the Commission engaged Value Adviser Associates (VAA) to provide advice on specific components that

⁵ Essential Services Commission Act 2002, section 6(b)(vii).



compromise the regulatory rate of return. In particular, VAA were asked to provide advice on a suitable debt risk premium and equity beta to apply to SA Water. VAA's final report is available on the Commission's website (<u>www.escosa.sa.gov.au</u>).

2.2 Timing of the final advice

The Commission notes that there are a number of market-based variables in the rate of return formula, which should be updated for the Commission's final advice. The variables that will be updated include the yield on CGBs, the forecast inflation rate and the yield on corporate bonds. For its final advice, the Commission intends to use bond yield data over the 20 day period ending 27 January 2012. As a consequence, it is highly likely that the rate of return recommended in this draft advice will be different to that recommended in the Commission's final advice, due mid-February 2012.

3 RISK-FREE RATE AND INFLATION FORECAST

3.1 Risk-free rate

The risk-free rate is the rate of return at which investors are able to invest their capital without risk. This riskless rate of return is purely theoretical and cannot be observed in the market. As a consequence, an appropriate proxy asset must be chosen to represent the risk-free rate of return. The most commonly adopted proxy in Australia is the yield on CGBs.

When the holding period of a bond is less than its maturity, the market value of a bond may fluctuate with changes to interest rates. This implies that if the holding period of a CGB is below its maturity then it is not completely risk-free because the market value of the bond may be different from its face value. However, CGBs are often regarded as default risk-free due to the guaranteed returns imposed by the Australian Government and are therefore considered an adequate proxy for deriving a risk-free rate.

3.1.1 Methodology

Regulators have generally used 10-year CGBs to measure the risk-free rate, on the basis that a 10-year bond has the longest term of maturity and is most consistent with the life of a utility's regulated assets (which can be up to 100 years).

The Commission notes the recent discussion⁶ that has developed with regard to the appropriateness of a 10-year term for the proxy bond. Subject to the term structure of the bond (upward or downward sloping yield curve), it is possible that an over or under recovery of revenue could occur if the term of the bond exceeds the length of the regulatory period.⁷ One way to circumvent this is to use a bond that possesses a term that matches the regulatory cycle (eg. 5 years) instead of the life of the regulatory assets.

Currently, there is only one regulatory case in the water industry where a 10-year bond has been replaced by a 5-year bond. This was the decision by the Queensland Competition Authority (QCA) in their most recent rate of return review for South East Queensland (SEQ) water companies and the Gladstone Area Water Board.

Decisions to match the term with the regulatory period are primarily based around the following arguments:

- 10-year bonds do not completely align the life of the assets and financing;
- risk minimisation can be achieved by a combination of short term debt and hedging options; and

⁶ IPART – Estimating the Debt Margin for the weighted average cost of capital, Discussion Paper, p 19, May 2009

⁷ Regulation and the Choice of the Risk free rate – Lally 2004 Accounting Research Journal Volume 17(1)



▲ 10-year bonds provide compensation for risks that regulated entities do not bear. It is understood that the yield on 10-year bonds exceeds the yield on 5-year bonds to compensate investors for liquidity or inflationary risks. If this is the case, regulated companies will be rewarded with a higher rate of return although the risk associated with liquidity and inflation is reset each regulatory period.

The Commission notes the possible advantages from matching the term of the risk-free rate with the regulatory period. However, in practice, businesses attempt to align the maturity of their financing with the average duration of their assets suggesting that the financing decision is influenced by the firm's assets rather than the regulatory period imposed.

A term that doesn't attempt to align itself with the life of the assets could provide a number of problems for SA Water, namely:

- ▲ substantial refinancing risk;
- fluctuations in interest rates that could cause the profitability of the regulated entity to be lower than expected;
- additional transaction costs; and
- regulatory instability.

The Commission's view is to continue the use of a 10-year bond as it is the longest term bond that is traded and currently there is insufficient evidence available to convince the Commission that a shorter term would lead to a better risk-free rate estimate.

The averaging period used to derive the risk-free rate is a 20 day period, which, for the purpose of this draft report is the 20 day period ending 31 October 2011. An averaging period of 20 days is recognised as standard practice when determining the risk-free rate as it provides the benefit of accounting for any shocks or outliers that could occur if a one day period is used or for any structural changes that may influence the result if a long-term average is used.

The data used to derive the risk-free rate for this draft advice are outlined in Appendix A and were sourced from the RBA website. Using these data, the risk-free rate is calculated to be 4.38% (nominal).

Draft Advice:

The Commission's advice on the nominal risk-free rate is 4.38% per annum.

3.2 Inflation forecast

As previously discussed in chapter 2, the Commission will determine a real rate of return. To convert the nominal rate of return into a real rate of return the Commission, will deflate the nominal rate of return using the Fisher equation. An inflation forecast is required for this purpose.

3.2.1 Methodology

In the past, the Commission has used Commonwealth Government CPI-indexed bonds to derive a forecast of the inflation rate.⁸ The forecast is determined by the difference between the yields on CPI-indexed bonds and CGBs of the same maturity calculated by the Fisher equation. As both of these bonds are traded in the domestic bond market, an up-to-date view of the expected inflation rate over the applicable time period can be established.

Recently a number of concerns have been raised over the issue of a potential bias in the yields on CPI-indexed bonds. The number of CPI-indexed bonds has been noted by the Federal Treasury to be declining, and as these bonds mature without replacement an upward bias in inflation estimates may occur.⁹ Treasury also notes other factors that would contribute to an upward bias such as increasing demand while the supply of bonds declines, and low turnover of indexed bonds.

Notwithstanding these issues, the Commission is of the view that CPI-indexed bonds are currently the best available option for determining the forecast inflation rate. The Commission notes that in the future it may need to revise this methodology if the number of CPI-indexed bonds available continues to decline.

Like the risk-free rate, the data for CPI indexed bonds are also outlined in Appendix A and were sourced from the RBA website over the same 20 day averaging period, to provide consistency with the risk-free rate. The inflation forecast is calculated to be 2.20% per annum.

Draft Advice:

The Commission's advice on the forecast inflation rate is 2.20% per annum.

⁸ ESCOSA, 2005 – 2010 Electricity Distribution Price Determination, April 2005

⁹ The Treasury Bond Yield as a Proxy for the CAPM Risk-free rate, Australian Federal Treasury, 7 August 2009.



4 COST OF DEBT

When a company wishes to expand its capital base through debt, it can issue bonds that are traded in the secondary market where the price of bonds is determined. This implies that the cost of debt to a company will be the price investors are willing to pay for bonds in the market. Specifically, the price of a bond will comprise the risk-free rate and a premium above the risk-free rate. This premium is often referred to as the debt risk premium and is the return above the risk-free rate that investors seek to be compensated for against the probability of the issuer defaulting.

4.1 Gearing

As discussed in Chapter 2, the regulatory rate of return is dependent on the assumed proportion of assets financed by debt and equity. This is also referred to as the "gearing" level, which is the ratio of debt to the total regulatory asset base. The regulatory asset base of a regulated entity is the value of the assets that are used in providing the regulated services and on which the entity is able to earn a reasonable return. Regulators often assign a benchmark gearing level based on an industry average as opposed to an actual gearing level to ensure that consumers are not subject to the costs associated with an inefficient capital structure.¹⁰ That is, the gearing ratio chosen should reflect a prudent and efficient capital structure.

As shown in Table 3, a benchmark gearing assumption of 60% debt to total regulatory assets is adopted almost uniformly by other Australian regulators.

¹⁰ IPART, IPART's cost of capital after the AER's WACC review, Discussion Paper, p.71, November 2009

Table 3 - Benchmark credit ratings and assumed leverages in other jurisdictional
decisions

Jurisdiction	Credit Rating	Assumed Leverage
IPART		
State Water Corporation (2011)	BBB+ to BBB	60
Sydney Water Corporation (2008)	BBB+ to BBB	60
Country Energy Water (2010)	BBB+ to BBB	60
Gosford and Wyong Councils (2009)	BBB+ to BBB	60
ESC Victoria		
Water Price Determination (2007)	BBB+	60
Metropolitan Water (2009)	BBB to AA+	60
ICRC		
Water Price Determination (2008)	BBB	60
QCA		
Gladstone Water Review (2010)	BBB	50
SEQ Interim Price Monitoring (2011)	BBB	60

Source: IPART: Review of bulk water charges for State Water Corporation June 2010, IPART: Investigation into prices for water, sewerage and stormwater services provided by Sydney Water May 2008, IPART: Review of Prices for Country Energy's (Broken Hill) water and sewerage services June 2010 IPART: Review of Gosford City Council's & Wyong Shire Council's water, wastewater & stormwater prices May 2009, ESC Victoria: 2008 Water Price Review June 2008, ESC Victoria: Metropolitan Melbourne water price review April 2009, ICRC Water and Wastewater Price Review December 2007, QCA: Gladstone Area Water Board June 2010. QCA: SEQ Interim Price Monitoring Report Part B Detailed Assessment, March 2011.

Also, as noted by VAA, a capital structure of 60% debt to total assets is considered to be commensurate with Standard and Poor's 2006 corporate credit rating criteria associated with a BBB rating.¹¹ The Commission considers that a gearing ratio of 60% debt is the most appropriate benchmark gearing for SA Water.

¹¹ Standard and Poor's – Corporate Ratings Criteria 2006



Draft Advice:

The Commission's advice on the benchmark gearing ratio is 60% debt to total regulatory assets.

4.2 Credit Rating and Debt Risk Premium

The riskiness of a company, or its probability of defaulting, is often established by an independent credit rating agency such as Standard and Poor's or Moody's who, after examination will assign the company an appropriate credit rating. A low credit rating implies a higher degree of risk and consequently a larger debt premium required by investors. Regulators often assign a benchmark credit rating appropriate for the regulated entity for a given level of gearing. The Commission notes from Table 3 that there is a clear regulatory practice in water determinations towards adopting a benchmark credit rating of BBB+ to BBB and a capital structure of 60% debt to total regulatory assets.

Once a benchmarked credit rating is established, regulators can determine the debt risk premium by deriving the yield from a sample of bonds associated with the assigned credit rating. This has been the method the Commission has used in the past, using the data provided by the Bloomberg 10-year BBB fair yield curve.

The Commission would ordinarily envisage using this method again for this advice. However, given current market conditions the Commission considers that this approach may be inappropriate. The Independent Pricing and Regulatory Tribunal (IPART), which has used a similar approach in the past, recently conducted a review of this methodology and outlined a number of issues that may warrant an alternative approach.¹² The key issues considered by IPART included:

- the small number of bonds in its current sample given the lack of trades occurring in the BBB bond market;
- the average term to maturity of the sample bonds is very low; and
- the only term to maturity available for the Bloomberg BBB fair value curve is 7 years, rather than 10 years.

These issues provide a number of complications for determining a debt risk premium. As previously mentioned, the financing decision of a firm is driven by the nature of its assets, and utility operators will attempt to align the maturity of its financing with the life of its assets. Given the typically long life of a water operator's assets, the most appropriate term to maturity used to derive the debt risk premium should be the longest term to maturity possible. As identified by IPART, currently long term maturity bonds are not available in sufficient volumes to derive a representative debt risk premium.

¹² IPART – Estimating the Debt Margin for the weighted average cost of capital, Discussion Paper, p 19, May 2009

The Commission agrees that under these circumstances, 10-year BBB bonds may not be the most appropriate one. Given these difficulties, the Commission has asked VAA to provide advice on a suitable debt risk premium.

4.3 VAA's Advice

VAA reiterated the Commission's view on the current challenges facing the estimation of the debt risk premium and conceded that a new approach is needed given the limited trading of 10-year Australian BBB bonds.

VAA proposed a number of different methodologies and stated that there is no standout choice of methodology to determine an appropriate debt risk premium, that and any decision would require a degree of judgment between the strengths and weaknesses of each option. The methodology used to derive each option is discussed in VAA's final report, available on the Commission's website. For the purpose of this advice a summary of the results is provided below in Table 4.

	Option		Debt risk premium (bp)
А	Extrapolate Bloomberg 7-year curve		379
	Extrapolate from Rate sheet data		386
В	Use rate sheet 9 year traded bond (APT)		293
С	Include Australian companies with USD denominated bon	ds	463
	Include Australian companies with other currency denomi bonds	nated	248
D	Reduce term to 5-years and add premium for extra 5-year	S	
	- using Aa2 as a reference		366
	- using BBB CDS as a reference		388
E	CDS data on Australian company bonds in USD		263
		Average	348
		Median	373

Table 4 - Summary of debt risk premium results

Source: Value Adviser Associates Pty Ltd (2011), "Advice on Components of Regulatory Rate of Return", Final Report, p.37, 9 November 2011



VAA stated that obtaining market-based data was preferable to model-based solutions, recommending the values that are observed from the Bloomberg 7-year fair value curve (option A) as being the preferred reference point. VAA believes that the Bloomberg fair value curve is the most appropriate measure due to the "professional and independent" nature of the data source¹³ and also given that the data set is limited to Australian bonds. The inherent advantage of using Australian yield data is that there is consistency between the debt risk premium and the other rate of return parameters which are estimated in reference to Australian data. The yield derived from the Bloomberg 7-year fair value curve by VAA was 358 basis points (bp).

VAA further noted that currently Bloomberg does not offer extrapolation to a 10-year term and consequently an alternative approach must be used to estimate the difference between the yield of a 7-year bond and a 10-year bond. A longer term to maturity presents a larger degree of risk to the bond holder, which implies that the yield on a 10-year bond should be higher than the yield on a 7-year bond. VAA proposed that the additional premium could be estimated by:

- estimating the difference between the yields observed in 10-year and 7-year BBB credit default swaps; and
- deriving the difference between the yields of a 7-year Aa2 bond and a 10year Aa2 bond from UBS rate sheets.

The results of these estimates were 21bp and 28bp respectively, which were added to the 7-year Bloomberg fair value yield of 358bp. These are the two results provided by option A in Table 4 (379bp and 386bp).

VAA advocated a debt risk premium of 380bp (3.80%) be adopted using the debt risk premiums determined by option A as its preferred reference. VAA also advocated the use of the Bloomberg 10-year yield curve once sufficient trading in 10-year BBB bonds returns.

4.4 The Commission's Consideration

The Commission believes an assumption of a BBB credit rating for this advice is a suitable benchmark for SA Water. The challenge is to determine an appropriate debt risk premium for a BBB rated entity given the lack of trades occurring in the 10-year BBB bond market.

The Commission notes that the recommended method by VAA to derive the debt risk premium has been practised by other jurisdictional regulators. Both the Independent Competition and Regulatory Commission (ICRC) and the Economic Regulatory Authority (ERA) in 2009 adopted a similar methodology,¹⁴ deriving the debt risk premium from the 8-year Bloomberg fair value curve and estimating an additional premium to represent the difference between an 8 and 10-year yield. The method proposed by VAA is similar but is

¹³ Value Adviser Associates Pty Ltd (2011), "Advice on Components of Regulatory Rate of Return", p.23, 9 November 2011

¹⁴ QCA, Gladstone Area Water Board: Investigation of Pricing Practices, March 2010

limited by the fact that the maturity of the Bloomberg fair yield curve has since decreased from 8 to 7 years.

However, the Commission notes that other regulators such as IPART and the QCA have implemented an alternative approach. Both IPART and the QCA have decreased the term to maturity of debt from a 10-year term to a 5-year term. The advantages and disadvantages of decreasing the term to maturity are considered in chapter 3 and are not revisited here.

From the previous discussion in Chapter 3, the Commission concluded that the appropriate term to maturity should be one that matches the duration of financing with the life of the assets. This is also the view of VAA which provided a statement from the NSW Treasury which estimated that the average term to maturity of debt it has raised for utilities is just below 10 years.¹⁵

In light of this, the Commission considers the preferred approach by VAA to implement a debt risk premium derived from the Bloomberg 7-year fair value curve and extrapolated to 10-years is appropriate. The recommended debt risk premium resulting from this approach is 3.80%.

At this time the Commission has not added additional basis points to the debt risk premium to reflect the transaction costs that SA Water will incur in raising debt. The Commission notes that a debt risk premium of 3.80% is already in the high range of current cost of capital decisions and the practice of not increasing the debt risk premium to allow for transaction costs is also applied by other regulators. In particular, the Australian Energy Regulator (AER) has said that the over compensation provided by enforcing a 10-year term assumption as opposed to a 5-year term is likely to be on average 0.18% which is considered by the AER to be sufficient to cover for any debt raising costs.¹⁶

The figure derived for the debt risk premium in this draft report should be considered as indicative as the Commission anticipates updating this figure closer to the final advice.

Draft Advice:

The Commission's advice is that a benchmark credit rating of BBB and a debt risk premium of 3.80% should be used in the regulatory rate of return calculation.

¹⁵ Value Adviser Associates Pty Ltd (2011), "Advice on Regulatory Rate of Return" – Final Report, p.24, October 2011

¹⁶ AER, Review of the weighted average cost of capital (WACC) parameters Final Decision, p 166, May 2009.



4.5 Calculation of the Cost of Debt

As noted earlier, the pre-tax nominal cost of debt can be derived using the abovementioned debt risk premium and nominal risk-free rate. This figure is directly placed into the WACC formula as the parameter k_{d} , where:

 $k_d = r_f + debt risk premium$

Using the risk-free rate of 4.38% and debt risk premium of 3.80%, the Commission derives the estimated cost of debt equal to 8.18%.

Draft Advice:

The Commission's advice is that the pre-tax nominal cost of debt is 8.18%.

5 COST OF EQUITY

As previously stated, the cost of equity is determined by the use of the CAPM framework and is defined as the sum of the return available on a risk free asset and the premium required to accept the risk associated with the specific asset:

 $k_e = r_f + \beta_L x MRP$

where:

- k_e represents the after tax nominal cost of equity;
- r_f is the risk-free rate and is defined as the return that investors would require in order to hold a risk free asset;
- β_L is the levered equity beta or the systematic risk of a specific equity; and
- MRP is the expected market risk premium (i.e. the expected market return above the risk-free rate).

The risk-free rate was discussed in section 3.1 and what follows is a discussion of the equity beta and market risk premium.

Of the CAPM parameters, only β_L is specific to any particular asset – all other inputs are economy-wide factors that affect the required rate of return on all assets. By definition, beta is the extent to which the returns of an asset will co-vary with the returns of the market. Assuming equal gearing, an asset with an equity beta of one implies that the asset's returns will move or co-vary equally with the market. An equity beta of below one denotes that the returns of the asset are less risky relative to market returns and an equity beta above one infers that the asset's returns are more risky relative to market returns.

It should be noted that investors can eliminate much of the risk associated with a particular asset by holding that asset as part of a portfolio. As this portion of risk can be eliminated at no cost, this portion of risk – often termed 'diversifiable' (or 'unsystematic') risk – would not be compensated for in a competitive capital market.

It is only the remaining risk – the non-diversifiable or systematic risk – that is reflected in the cost of equity associated with an asset.¹⁷ The non-diversifiable portion of an asset's risk, that is the systematic risk, reflects the variation in an asset's return that is related to movements in overall market returns of assets and, as such, tends to reflect the variation in returns associated with market-wide factors such as general economic cycles.

¹⁷ The CAPM provides an estimate of the return required to compensate for the non-diversifiable component of risk only. However, the conclusion that no compensation should be provided for diversifiable risk is relevant to all of the models from finance theory that could be used to estimate costs of capital.



5.1 Equity Beta

While the beta that is used in the CAPM should reflect the expected relationship between returns to a particular asset and the market as a whole, beta can only practicably be measured for a historical period. In practice, the estimation of an equity beta for an entity is undertaken using an ordinary least squares regression technique involving the returns of the asset against the returns of the market. This requires the relevant entity to be listed on a stock exchange with observations available over a reasonable period of time. The observed "raw" equity beta determined from such a regression will be affected by the firm's level of gearing.

However, a beta as observed or estimated in this manner is subject to substantial statistical uncertainty, and may be imprecise, as well as being volatile and unstable over time. It follows, that there is some risk in it being relied upon unsupported by other evidence.

The fact that no Australian regulated water entities are listed, coupled with the desire to derive a more precise estimate, requires adoption of the common practice to estimate the equity beta from a group of firms, and to use this as a proxy for the equity beta of the regulated firm. This approach can be extended to analysing comparable water businesses in foreign markets and also to comparable industries (such as electricity and gas) both in Australia and overseas.

Selecting an appropriate proxy becomes particularly challenging given that there are no publicly listed water utilities in Australia and that, amongst other matters, overseas-listed water utilities are not directly comparable to an efficient South Australian water utility. Accordingly, a multi-faceted approach based on assessing the empirical evidence and the use of industry and portfolio benchmarks is required to overcome some of the problems inherent in the determination of an appropriate beta for an efficient South Australian water utility.

A number of detailed methodological issues also need to be resolved.

5.1.1 Adjusting Beta for Capital Structure

The measured equity beta for a particular firm relates to the unique capital structure of that firm and a change in its capital structure will change the degree of financial risk borne by the equity holders and hence the equity beta.

To allow equity betas to be compared across firms with different capital structures, the estimated equity beta must be converted into an equivalent asset beta (which is the risk associated with the asset as a whole).

When an asset beta is purged of the financial risks associated with gearing, it can be compared with other asset betas derived from different capital structures. The asset beta can then be adjusted into an equity beta that is consistent with the target firm's level of gearing. The process of adjusting equity betas for different levels of gearing is known as levering and de-levering.

The appropriate approach to de-levering and re-levering adjustments is a matter of debate. The derivation of an appropriate levering/de-levering formula requires assumptions about:

- ▲ whether the debt policy is active or passive;
- ▲ the marginal tax advantages associated with debt; and
- ▲ whether or not debt is risky, the implication of which is whether or not debt providers share some of the risk associated with the asset.

5.1.2 Levering/De-Levering Formulae

The first of these issues is the method of levering/de-levering the equity beta. There are a number of different formulae for predicting the relationship between equity betas and financial gearing, which reflect different assumptions about the debt management practices of firms and the assumed marginal tax advantages of debt finance. However, the choice between these formulae has little effect on the proxy equity beta that is derived from a set of empirical beta estimates, provided that the same levering/de-levering approach is used for estimated asset betas as is used when re-levering asset betas into equity betas. This is particularly the case for Australia, where the dividend imputation system and concessionary treatment of capital gains are likely to reduce the tax advantages of debt finance.¹⁸

Accordingly, the Commission proposes to use the simplest formula for predicting the relationship between equity betas and the gearing level, which is

$$\beta_a = \beta_e \frac{E}{V} + \beta_d \frac{D}{V}$$

where:

- β_a is the asset beta;
- β_e is the equity beta;
- β_d is the debt beta; and
- E/V and D/V are the proportions of equity and debt in the financing of the asset.

¹⁸ The various formulae and their assumptions are discussed in: Empirical Evidence on Proxy Beta Values for Regulated Gas Transmission Activities: Final Report, report by the Allen Consulting Group for the Australian Competition and Consumer Commission, July 2002



5.1.3 VAA's views on Equity Beta

In considering the matter of an equity beta for SA Water, VAA¹⁹ drew heavily from a study for IPART by Strategic Finance Group (SFG)²⁰ on the cost of capital parameters for the Sydney Desalination Plant (SDP). SFG undertook a comprehensive empirical study of 16 overseas water utilities that ostensibly faced a similar systematic risk exposure; 11 from the US and 5 from the UK. In its report, SFG concluded that an equity beta of 0.65²¹ could be derived.

VAA reviewed the SFG report and noted that the operating and regulatory regimes for the US and UK firms are different from the Australian context. They also hypothesised that not only are they different but that the UK is more highly regulated than both the US and Australia giving rise to less risk in the UK. However, SFG's empirical analysis did not separate and distinguish between these differences.

Table 5 summarises the results of VAA splitting the firms in SFG's study 22 into their UK and US markets.

Firm	Equity Beta (at observed gearing)	Equity Beta (at 60% gearing)	
UK Water Utilities			
Northumbrian	0.34	0.32	
Pennon	0.42	0.47	
Severn Trent	0.39	0.47	
United Utilities	0.51	0.61	
York Water	0.33	0.40	
Average (UK)	0.40	0.45	

Table 5 - VAA's summary of SFG's beta estimates for water businesses in the UK and US

¹⁹ Value Adviser Associates Pty Ltd (2011), "Advice on Components of Regulatory Rate of Return", Final Report, 9 November 2011

²⁰ Strategic Finance Group (2011), "Cost of capital parameters for Sydney Desalination Plant", 10 August 2011

²¹ It should be noted that SFG's conclusions on the empirical equity beta was determined after a lengthy analysis of the firm betas shown in Table 5. SFG's analysis considered several matters including a portfolio analysis, bias correction, excluding outliers, and the consideration of the effect that rising and falling markets have on the observations of the equity beta.

²² The data presented in Table 5 is an interim step toward SFG's final conclusions and are only presented here to demonstrate the variability of the individual firm's beta estimates that operate in US and UK markets.

Firm	Equity Beta (at observed gearing)	Equity Beta (at 60% gearing)
US Water Utilities		
American States Water	0.28	0.30
American Water Works	0.41	0.46
Aqua America	0.36	0.41
Artesian	0.22	0.22
Cadiz	1.14	1.55
Cal Water	0.29	0.32
Connecticut Water	0.33	0.37
Consolidated Water	0.95	1.65
Middlesex Water	0.37	0.41
Pennichuk	0.17	0.16
SIW	0.56	0.73
Average (US)	0.46	0.60
Total Average (UK and US)	0.44	0.55

Table 5 – VAA's summary of SFG's beta estimates for water businesses in the UK and US (continued)

Source: Value Adviser Associates Pty Ltd (2011), "Advice on Components of Regulatory Rate of Return", p17 (as drawn from Strategic Finance Group (2011) – Cost of capital parameters for Sydney Desalination Plant).

This analysis by VAA shows that once re-levered to the same gearing (60%), the average beta for US firms is 0.60 compared to 0.45 for UK firms. VAA concludes that the empirical evidence suggests that an equity beta for a US and UK water utility lies in the range of 0.60 to 0.70.



However, VAA also notes that care should be taken when inferring a beta for SA Water from overseas betas because:

- the absolute level of risk can differ across countries (different industry mix);
- financial leverage in the country can differ; and
- regulatory regimes can transfer risk across the value chain in a manner that differs across countries.

VAA concludes that SFG's derived beta may understate the beta for water companies in Australia because of their different exposure to risk.

In its report to the Commission, VAA also drew upon evidence from a number of recent regulatory decisions applying to water, rail and electricity infrastructure businesses. VAA highlighted that the AER's last three decisions for electricity network businesses adopted an equity beta of 0.8, which contrasts with the AER's decisions on equity beta for electricity network businesses prior to 2009, which used equity betas generally in the range of 0.90 to 1.0.²³

Furthermore, in its 2009 review of the WACC for electricity distribution and transmission network service providers, the AER noted that, although the market data suggested an equity beta of less than 0.80, the imprecision involved in the estimation, and the importance of regulatory stability, were sufficient to warrant an equity beta of 0.80.²⁴

VAA also concluded that the lack of precision, in estimating the equity beta and the challenge in differentiating between the drivers of equity betas for firms operating in the water, electricity and gas industries means that the use of the same equity beta across all these industries is supportable (assuming similar leverage). VAA further this statement by declaring:

"Nevertheless it is important to recognise that there is a considerable lack of precision in the beta estimates as evidenced by the high standard errors accompanying the estimates."²⁵

5.1.4 The Commission's consideration

Although the empirical evidence VAA explored in the SFG report suggests that estimates of equity betas for comparable overseas water utilities are likely to fall within the range of 0.60 - 0.70, there is a large degree of difficulty in using overseas and empirical data to infer a beta for a South Australian water utility.

²³ Value Adviser Associates Pty Ltd (2011), "Advice on Components of Regulatory Rate of Return", p.14, 9 November 2011

²⁴ Australian Energy Regulator, May 2009, Final Decision: Electricity transmission and distribution network service providers – Review of the weighted average cost of capital (WACC) parameters, p.343.

²⁵ Value Adviser Associates Pty Ltd (2011), "Advice on Components of Regulatory Rate of Return", p.17, 9 November 2011

The Commission notes the difficulties in directly translating overseas betas to the Australian context. There are a number of differences between the environment in which an Australian water utility operates in comparison to US and UK water utilities which make it difficult to determine the weight that should be given to the empirical estimates provided by the SFG study. For example, UK water utilities have a relatively small proportion of customers with water meters. This means that, for many customers UK water utilities can only charge a fixed charge, which provides greater revenue certainty for the utility. This is substantially different to the case of the South Australian water market where a greater proportion of revenue is raised from variable charges.

The comparability of overseas betas with Australian betas is also considered by the Commission to be problematic due to the inherent differences in the markets from which the equity betas are estimated. A firm's equity beta is a measure of the risk of the firm relative to the overall market. If the market from which the beta is derived faces different risks to overseas markets, the betas cannot be directly compared with each other. This was noted by VAA, who stated that the use of overseas betas are helpful given the lack of available information, however, care should be exercised when inferring a beta for SA Water from such data.

The Commission notes that the results from the equity betas of individual firms studied by SFG provide large standard errors and consequently a wide range of estimates. This is noted by SFG who state:

*"The estimates have wide confidence intervals and have limited ability to predict future realised returns"*²⁶

The Commission also notes VAA's judgement that due to statistical imprecision in estimating equity betas, it is difficult to clearly differentiate between equity betas across the electricity, gas and water industries. VAA states that, given the lack of compelling empirical evidence currently available, it is difficult to imply that the risk of a water utility relative to the market is different to that of an energy utility. VAA concluded that it is reasonable to consider betas derived from other regulated networks betas such as gas and electricity.

In light of the challenges involved in comparing the empirical data of overseas water utilities to an efficient South Australian benchmark utility, the Commission considers that regulatory stability is important and departures from accepted regulatory practice should only be made when, context, logic or evidence warrants such a decision.

²⁶ Strategic Finance Group (2011), "Cost of capital parameters for Sydney Desalination Plant", p.19 10 August 2011



Table 6 shows a number of recent decisions on equity beta made by Australian utility regulators covering the water, gas and electricity industries.

Regulatory Decision	Equity Beta	Assumed Gearing
AER		
Envestra Gas Distribution 2011-2016 (2011)	0.80	60%
ERA		
Dampier to Bunbury Natural Gas Pipeline Access (2011)	0.80	60%
ESC Victoria		
Melbourne Water (2009)	0.65	60%
ICRC		
2008-2013 Water Price Determination (2008)	0.90	60%
IPART		
State Water Corporation (2010)	0.80-1	60%
Sydney Water (2009)	0.80-1	60%
QCA		
SEQ Water and Wastewater (2011)	0.66	60%

Table 6 - Recent Australian Regulatory Decisions on Equity Beta

Source: AER, Envestra Access arrangement proposal for the QLD gas network, Final Decision, February 2011, ERA, Proposed Revisions to the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline, Draft Decision, March 2011, ESC Victoria: Metropolitan Melbourne water price review April 2009, ICRC Water and Wastewater Price Review December 2007, IPART: Review of bulk water charges for State Water Corporation June 2010, IPART: Investigation into prices for water, sewerage and stormwater services provided by Sydney Water May 2008, QCA: Interim Price Monitoring of SEQ Water and Wastewater Distribution and Retail Activities Final Report, March 2011.

The Commission notes that the two water decisions listed above that have adopted an equity beta of 0.65 and 0.66 were based primarily around empirical estimates of the equity beta. The QCA's decision to adopt an equity beta of 0.66 for SEQ water operators was largely dependent on a study provided by Lally.²⁷ The

²⁷ Lally, M., The Estimated WACC for the SEQ Interim Price Monitoring, 5 January 2011

sample of firms Lally used consisted of 20 US companies and 9 Australian energy companies which Lally considered to be facing a similar level of risk to the SEQ water utilities.²⁸ Similarly, the study for the Essential Services Commission of Victoria (ESCV) conducted by the Allen Consulting Group (ACG) mainly featured international firms with only 5 Australian firms considered.²⁹ As previously discussed, the Commission does not believe that the equity betas derived for international firms can be relied upon and should be used with caution. The Commission also expresses concern over the reliability of the estimates, particularly where the number of available sample firms is low. The lack of Australian firms in the Lally and ACG samples make it difficult for the Commission to consider these studies as sufficient evidence to warrant an equity beta similar to the ESCV or QCA.

Although the regulatory decisions provided in Table 6 do not uniformly agree on a single value for the equity beta, there are broadly two categories of decisions: those that are heavily weighted towards empirical evidence, producing estimates of around 0.65, and those that place less weight on empirical evidence and more weight on regulatory stability, producing estimates of 0.80 or 0.90.³⁰

In order to maintain longer-term certainty for investment, the Commission recommends that the equity beta be based primarily on the relevant decisions of other regulators. Such an approach would lead to an equity beta of 0.80 or 0.90.

While the Commission has expressed concern over the validity of recent empirical studies which suffer from lack of comparability across countries and wide confidence intervals, it cannot completely dismiss that evidence. On balance, the Commission considers that the empirical evidence suggests that it is more reasonable to determine an equity beta at the lower end of the range of recent regulatory decisions than it is at the higher end. The Commission therefore advises that an equity beta of 0.80 is currently the most appropriate value for an efficient benchmark water utility operating in the South Australian market.

Draft Advice

The Commission's advice is that an appropriate equity beta for an efficient benchmarked water utility operating in South Australia is 0.80.

²⁸ Lally also estimated the betas for UK water companies. However, Lally assigned no weight to these estimates stating that UK firms are significantly different to Australian water utilities and this may understate the equity beta.

²⁹ Allen Consulting Group, Empirical Evidence on Proxy Beta Values for Regulated Gas Distribution Activities, Report for the Essential Services Commission of Victoria, June 2007.

³⁰ Noting that the IPART decisions included a range of 0.8-1.0, the mid-point being 0.9.



5.2 Market Risk Premium

The MRP is the expected market return above the risk-free rate (excess returns). The MRP required by the CAPM is a forward-looking estimate. Since it cannot be directly observed in the equities market, the Commission must estimate it using the best evidence available.

The evidence provided on the MRP has been the subject of contention and the academic literature has not arrived at a consensus regarding the most appropriate method of estimating it. As a result, regulators have relied on a number of indicators to form a judgement on a suitable MRP. In particular, regulators have considered historical estimates of the MRP, surveys of market practitioners and academics, and previous regulatory decisions. Each of these sources of evidence is considered in turn below.

5.2.1 Historical estimates of the MRP

Historical estimates of the MRP describe the excess returns that have been earned in the past by investors. Although the MRP required for the CAPM is forward looking, investors often form expectations on future returns based on past observations. While it cannot be used as the single determinant of the MRP, historical estimates provide a useful reference point which can assist the Commission in determining the appropriate forward-looking MRP. This is also considered to be consistent with the practice of other Australian regulators who, in the past, have assigned significant weight to historical estimates of the MRP.

The Commission notes a recent study provided on the historical equity risk premium conducted by John Handley for the AER.³¹ The study considers Australian market returns over various time periods relative to the risk-free rate, as measured by a 10-year CGB. The returns are grossed up for the value of distributed imputation credits as a proportion of their face value (θ). The results of the Handley study are provided in Table 7.

³¹ Handley, An estimate of the equity risk premium for the period 1883 – 2010, Final Report, January 2011

Table 7 - Historical MRP Results for different values of imputation credits³²

Time Period	0.30	0.40	0.50	0.65	0.70	0.80
1883–2010	6.2%	6.3%	6.3%	6.3%	6.4%	6.4%
1937-2010	5.9%	5.9%	6%	6.1%	6.1%	6.1%
1958–2010	6.4%	6.4%	6.5%	6.6%	6.7%	6.8%

Value of distributed imputation credits as a proportion of their face value (θ)

Source: Handley, An estimate of the equity risk premium for the period 1883 – 2010, Final Report, January 2011

The estimates provided above support an estimate of the MRP of between 5.9% and 6.8%. The estimates of the historical MRP are accompanied by wide confidence intervals and therefore historical estimates should be considered in reference to other sources of evidence.

5.2.2 Market surveys

An additional source of evidence when determining the MRP is the results from surveys of market practitioners and academics on their expectations of the future MRP. Market surveys are considered to be a suitable reference point for the MRP given that the results are forward looking and reflect actual market practice.

Studies by KPMG (2006)³³ and Truong, Partington and Peat (2008)³⁴ noted that the most commonly adopted value for the MRP in their samples was 6%.³⁵ Although these studies were conducted before the global financial crisis (GFC), these results appear to be consistent with a recent survey undertaken by Fernandez, Aguirreamalloa and Corres who found that, in 2011, the average MRP used by Australian analysts, professors and company managers was 5.8%.³⁶

The results provided by surveys of academics and market practitioners therefore support an MRP of 6%, although caution should be exercised in relying on these results. The participants of a market survey may have varying views on market risk and look at a number of different time periods, often a short time period as opposed to a long time period. For regulatory purposes, where an estimated rate

³² Other time periods were considered by Handley. However, these time periods did not provide results that were statistically significant at the 5% level based on a 2-tailed t-test. The estimates are arithmetic means.

³³ KPMG, Cost of Capital – Market practice in relation to imputation credits Victorian Electricity Distribution Price Review 2006-10, p.15, August 2005

³⁴ Truong G., Partington G., Peat M., Cost of capital estimation and capital budgeting practice in Australia, Australian Journal of Management, 33, 1-6, 2008

³⁵ The average MRP chosen in the Truong, Partington and Peat study was 5.94%

³⁶ Fernandez P., Aguirreamalloa J., Corres L., Market Risk Premium Used in 56 Countries in 2011: A survey with 6,014 answers, Working Paper, May 2011



of return is to be applied over multiple years, a longer-term view of the MRP is appropriate.

5.2.3 Other regulatory decisions

The Commission also believes that it is important to give consideration to the decisions made by other regulators so as to provide consistency and regulatory stability for regulated entities. Table 8 provides a summary of the most recent regulatory decisions made on the MRP by other Australian regulators.

 Table 8 - Most Recent Australian Regulatory Decisions on Market Risk Premium

Regulatory Decision	MRP Adopted
AER	
Envestra Gas Distribution 2011-2016	6%
ERA	
Dampier to Bunbury Natural Gas Pipeline Access (2011)	6%
ESC Victoria	
Melbourne Water (2009)	6%
ICRC	
2008-2013 Water Price Determination	6%
IPART	
State Water Corporation (2011)	5.5% - 6.5%
QCA	
SEQ Water and Wastewater (2011)	6%

Source: AER, Envestra Access arrangement proposal for the QLD gas network, Final Decision, February 2011, ERA, Proposed Revisions to the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline, Draft Decision, March 2011, ESC Victoria: Metropolitan Melbourne water price review April 2009, ICRC Water and Wastewater Price Review December 2007, IPART: Review of bulk water charges for State Water Corporation June 2010 QCA: Interim Price Monitoring of SEQ Water and Wastewater Distribution and Retail Activities Final Report, March 2011.

The Commission notes that each regulatory decision presented in Table 8 has either implemented an MRP of 6% or has proposed a range that incorporates 6%

as its midpoint. Regulators have consistently accepted an MRP of 6% since it was first adopted in 1998 by the Australian Competition and Consumer Commission (ACCC) and the Victorian Office of the Regulator General.³⁷ The only exception to this is the decision by the AER in May 2009 which proposed an MRP of 6.5%.³⁸ In making this decision, the AER specified that the uncertainty in market conditions that had occurred as a consequence of the GFC warranted a shift from an MRP of 6%.

The AER reflected that one of either two outcomes had occurred as a result of the GFC:

- ▲ there may have been a "structural break" in the MRP and therefore the forward looking MRP will exceed the historical MRP; or
- ▲ the medium term MRP currently exceeds the historical average, but would return to the historical MRP of 6% over time.³⁹

Although the AER did not specify which outcome it believed had occurred, the AER increased the MRP to 6.5% which it considered to be reasonable given the market conditions at the time. The Commission notes that this decision has since been revised. In the AER's most recent access arrangement determination for Envestra, the AER has returned to an MRP of 6%. The AER stated that the market conditions that warranted an increase of the MRP have stabilised and an MRP of 6% remains the best forward looking estimate available.⁴⁰

5.2.4 Conclusions on MRP

The Commission believes that, for regulatory purposes, adjustments to the MRP should not be made on the basis of short-term fluctuations in market conditions. Although the MRP is likely to change from time to time, it is important to take a long-term view given the longer-term impacts of regulatory decisions on investment incentives. The MRP should only be revised if there is sufficient evidence available to demonstrate that there has been a "structural break" in the market, which suggests that the MRP may change in the longer term. This view is shared by other regulators who have not deviated from an MRP of 6% since 1998. Likewise, Lally has stated that although the argument that the MRP may have risen due to the GFC may well be uncontroversial, he is not in favour of any adjustments to the WACC estimates during these periods because any upward bias is counterbalanced by periods in which the WACC estimates are underestimated over the life of the firm's assets. He adds:

³⁷ ACCC, Final decision, Access arrangement for Transmission Pipelines Australia and Victorian Energy Networks Corporation, October 1998

³⁸ AER, Review of the Weighted Average Cost of Capital(WACC) Parameters, Final decision, p.48 May 2009

³⁹ AER, Review of the Weighted Average Cost of Capital(WACC) Parameters, Final decision, p.46 May 2009

⁴⁰ AER, Envestra Ltd Access arrangement proposal for the QLD gas network, Final Decision, p.47, June 2011.



"...the five year period preceding the GFC was characterized by historically low market volatility and was therefore likely to have been a period in which WACC was over estimated; naturally, regulated entities did not petition regulators to lower WACC during this period and regulators did not do so."⁴¹

The Commission considers that the observed MRP may deviate in the short-term; however, over time it will revert back to its long-term average. This is consistent with the views expressed by Bishop, Fitzsimmons and Officer in their study of the impact of the GFC on the MRP.⁴² Until substantial evidence can be provided that there has been a shift in the long-term estimate of the MRP, the Commission recommends an MRP of 6% given the strong Australian regulatory practice behind using an MRP of 6%, consistency with market practice and the fact that 6% is well within the range provided by historical estimates.

Draft Advice

The Commission's advice is that the market risk premium is 6%.

⁴¹ Lally, M (2011), The estimated WACC for the SEQ interim price monitoring, p30, 5 January 2011

⁴² Bishop, S., Fitzsimmons, M., Officer, Bob., Adjusting the Market Risk Premium to reflect the global financial crisis, JASSA The Finsia Journal of Applied Finance Issue 1, 2011.

5.3 Calculation of the Cost of Equity

With the determination of the individual parameters that make up the cost of equity, k_e , as set out in the CAPM, the cost of equity can now be calculated. As previously stated, the CAPM equation for the nominal cost of equity, k_e , is:

 $k_e = r_f + \beta_L x MRP$

where:

- r_f, the risk-free rate was determined to be 4.38% as set out in section 3.1;
- $\beta_L I$, is the levered equity beta was determined to be 0.80 as set out in section 5.1;
- MRP is the expected market risk premium was determined to be 6% in section 5.2;

k_e = 0.0438 + 0.8 x 0.06

k_e = 0.0918 or 9.18%

Accordingly, the Commission advises that it has determined that an appropriate nominal cost of equity of 9.18%.

Draft Advice

The Commission's advice on the nominal cost of equity is 9.18%.



6 CORPORATE TAXATION RATE

Under the terms of reference provided by the Treasurer, the Commission's advice is sought on a pre-tax rate of return using the CAPM to derive the cost of equity.

Regulators and regulated businesses in the past have uniformly agreed on adopting the statutory corporate tax rate in the determination of the regulatory rate of return.

The Commission recommends the use of the statutory corporate tax rate to transform the post-tax rate of return to a pre-tax regulatory rate of return.

The Commission notes that the Federal Government intends to reduce the statutory corporate tax rate.⁴³ Given that the details surrounding the statutory corporate tax rate have not been finalised by the Parliament, the Commission believes a prudent approach is to retain the current statutory corporate tax rate at 30% until the matter is resolved by the Parliament.

However, the Commission reserves the right to update the tax rate to match any variation in the statutory corporate tax rate should circumstances change prior to the release of its final advice.

It is to be noted that if the statutory corporate tax rate is reduced by Parliament whilst the regulatory rate of return remains fixed with a tax rate at 30%, the effect of this difference will result in an overstatement of the pre-tax cost of capital for SA Water potentially leading to an over recovery of revenue.

Draft Advice:

The Commission's advice is to use the statutory corporate tax rate of 30% in the regulatory rate of return calculation.

⁴³ Australian Federal Government, Cuting the Company Tax Rate, Fact Sheet, 26 July 2011. The fact sheet is available at: http://www.futuretax.gov.au/content/FactSheets/downloads/Fact_sheet_cutting_company_tax.pdf

7 VALUE OF IMPUTATION TAX CREDITS (GAMMA)

The interest paid by a company is tax deductible. Until 1987, dividends paid to shareholders were not tax deductible and, hence, suffered from double-taxation; that is, income of the company was taxed at the corporate tax rate and any dividends were subsequently taxed at the individual shareholder level. This created a bias towards debt funding. In 1987, the Commonwealth Government introduced a dividend imputation tax system.⁴⁴ Under that system, tax credits (called franking credits) are attached to dividends paid out. Those credits remove the double-taxation problem by providing a tax credit in respect of the company tax paid by the company.

Imputation tax credits provide a benefit for eligible investors⁴⁵ in addition to any capital gains or dividend income acquired through their investments. The implication of this for regulatory rate of return calculations is that investors who are entitled to these credits may be willing to accept an investment with a lower return than would be the case were no tax credits available.

This additional benefit is built into the regulatory rate of return formula by the introduction of a parameter the cost of equity calculation referred to as "gamma" (γ). The value of γ is determined as the product of two parameters: the imputation payout ratio (F) and the utilisation rate (theta or θ). Those parameters are described as follows:

- The imputation payout ratio (payout ratio) (**F**) is the value of imputation credits distributed to the investors by a firm, as a proportion of the value of imputation credits generated by that firm in the same period.
- The utilisation rate (θ) measures the value ascribed to the distributed credits by the investors (on average) as a proportion of their face value.

As with a number of the other inputs in the regulatory rate of return calculation, the value of gamma has been highly contested. Arguments abound as to the appropriate measurement of γ as well as to a number of theoretical issues, such as the characteristics of the representative investor in Australian capital markets.

The following sections provide discussion and also the Commission's view with regard to the value of γ and its two components: F and θ .

7.1 Payout Ratio (F)

An F of one implies that all of the imputation credits generated by a firm are dispersed to shareholders through dividends. This is not always the case, as

⁴⁴ A number of changes have been introduced to the dividend imputation tax since then. For example, since 1 July 2000, franking credits not only can reduce a taxpayer's total tax liability to zero, but any excess is refunded.

⁴⁵ Non-resident investors are not eligible investors for the purpose of the imputation tax system.



companies often do not pay out all their profits as dividends; typically retaining a proportion of their profits for various reasons, including to finance investment.

In 2004, Hathaway and Officer researching Australian Taxation Office (ATO) tax statistics, discovered that, in 2002, Australian firms were holding \$77 billion worth of undistributed franking credits.⁴⁶ That finding suggested that the value of F is below one, as firms are not paying all available franking credits to shareholders.

Supporting that proposition, Hathaway and Officer also noted an apparent time delay between the generation of imputation credits and the realisation of benefit by the shareholder.

The ultimate finding of Hathaway and Officer in their 2004 study for the value of F was a figure of 0.71 for F. Of note, that study used data from the Australian market as a whole and was not specific to a particular industry.

In a paper prepared by Handley for the AER in 2008, it was postulated that F should be *assumed* to be one for valuation purposes, although it was at the same time recognised that the *actual* value of F may well be below one.⁴⁷

The AER largely relied on the *assumed* F postulated by Handley in adopting a value of one in its decision on Statement of Regulatory Intent (SORI), published in accordance with the requirement of the National Electricity Rules in 2009.⁴⁸ Of note, the requirement placed on the AER to fix values for various regulatory rate of return parameters for the purposes of making price determinations under the National Electricity Rules is entirely a function of those Rules, established for the purposes of forward-looking regulatory certainty in the electricity network sector. Estimations of parameter values from instruments such as a SORI, and regulatory and quasi-judicial determinations made based on those parameter values, need to be treated with some caution in considering the present task before the Commission.

In a matter arising under the National Electricity Rules recently determined by the Australian Competition Tribunal (**Tribunal**) (*Application by Energex Limited* (*Distribution Ratio (Gamma)*) (*No 3*) [2010] ACompT 9), the Tribunal noted the AER's concession that, on the material which was before the Tribunal on the hearing, no empirical data was capable of supporting an estimated F at a value higher than 0.70 (and therefore that the F value of one adopted by the AER through the SORI could not be used in making the relevant electricity distribution determinations under the National Electricity Rules). Consequently, for the purposes of determining that particular application in accordance with the

⁴⁶ *The Value of Imputation Tax Credits, Update 2004.* N. Hathaway and R.R. Officer, November 2004:

⁴⁷ A Note on the Valuation of Imputation Credits; Report Prepared for the AER. John C. Handley, 12 Nov 2008.

⁴⁸ Statement of the revised WACC parameters (transmission), Statement of regulatory intent on the revised WACC parameters (distribution). AER. May 2009.

requirements of the National Electricity Rules, the Tribunal determined that F should be $0.70.^{49}$

7.2 Utilisation Rate (එ)

There is no single methodology that is unequivocally accepted as the best way to determine a value for θ . However, dividend drop-off studies have been widely used to determine that value.

A dividend drop-off analysis compares share prices before and after a dividend is issued, to determine whether or not a company's share price declines by more than the value of the dividend payment to shareholders. The additional decline in share price is considered to represent the value of imputation credits to investors.

There are two dividend drop-off studies that are of particular note:

- Beggs and Skeels analysed the value of θ using a dividend drop-off study over a long period of time, making adjustments for various changes to the Imputation taxation system. The paper explored the effects of dividend imputation on ex-dividend share price drop-off from its inception until mid-2004, with particular attention paid to the differential effects of cash dividends and franking credits. This study derived a θ value of 0.57.⁵⁰
- SFG used the same methodology as Beggs and Skeels and undertook the analysis for the period 2001-2006. This study was submitted to the AER by ETSA Utilities. SFG made various improvements to this study over time. It concluded that the value of θ should be 0.35.⁵¹

The Commission notes that the wide range of values that are obtained from dividend drop-off studies are caused by a number of possible problems with the dividend drop-off methodology. SFG have noted that its own results are associated with large standard errors, which is likely explained by the fact that there are many factors that may change a stock price, not just the payment of dividends.⁵²

Another widely accepted methodology are studies of the redemption rate. Such a study was undertaken by Handley and Maheswaran in 2008, by reviewing the ATO tax statistics.⁵³ That study determined a θ value of 0.71 and 0.81, for periods 1990-2004 and 2001-2004 respectively.

⁴⁹ Application by Energex Limited (Distribution Ratio (Gamma)) (No 3) [2010] ACompT 9 (24 December 2010).

⁵⁰ D. Beggs and C. L. Skeels, 'Market arbitrage of cash dividends and franking credits', The Economic Record, vol.82, no.258, September 2006

⁵¹ SFG, The impact of franking credits on the cost of capital of Australian companies, Report prepared for Envestra, Multinet and SP AusNet, 25 October 2007

⁵² SFG, The Value of franking credits on the cost of capital of Australian Firms, September 2008

⁵³ Handley, J.C. and K. Maheswaran. 2008. "A Measure of the Efficacy of the Australian Imputation Tax System", Economic Record, 84 pp. 82-94. This study, amongst others, was relied upon by AER in support of its decision in the Statement of Regulatory Intent.



Table 9 provides recent estimates of theta from various studies.

Study	Method	Study Period	Utilisation Rate (theta)
Hathaway & Officer (2004)	Dividend drop-off ATO statistics	1986-2004 post-2000 1988-2002	0.50 0.60 ~0.40
Beggs & Skeels (2006)	Dividend drop-off	1986-2004	0.57 (2001-2004)
SFG (2011)	Dividend drop-off	1998-2006	0.35 ⁵⁴
Handley & Maheswaran (2008)	ATO statistics	1988-2004	0.81 (2001-2004) 0.71 (1990-2004)
Estimate (high-low)			0.35 - 0.81

Table 9 - Recent Estimates of theta

Source: N. Hathaway and B. Officer, The Value of Imputation Tax Credits – Update 2004, Capital Research Pty Ltd, November 2004, pp.13 and 24. D. Beggs and C. L. Skeels, 'Market arbitrage of cash dividends and franking credits', The Economic Record, vol.82, no.258, September 2006, p.247. SFG, Regulatory estimates of gamma in light of the recent decisions of the Australian Competition Tribunal, Report prepared for DBP, 20 July 2011, J. C. Handley and K. Maheswaran, 'A measure of the efficacy of the Australian imputation tax system', The Economic Record, vol.84, no.264, March 2008, p.90.

7.3 The Commission's Consideration

In giving consideration to the payout ratio, the Commission has had regard to various matters.

The Commission notes the recent decision by the Tribunal, that the payout ratio is 0.70. In this regard, the Commission has some reservations about using *market wide* benchmark for ascribing a value to F, although the Commission is not aware of any credible *industry specific* study on the value of F.

It also notes the limitations on the applicability of the Tribunal's decision described above, depending as it did on facts and circumstances specific to the application it was considering and the structure of the National Electricity Rules.

The Commission also notes the study undertaken by Handley for the AER⁵⁵, which suggests that the payout ratio should be 1 for valuation purposes:

⁵⁴ SFG's March 2011 report proposed a point estimate of 0.35 for theta.

⁵⁵ ibid

"An alternative view is that a decomposition of gamma along these lines is unnecessary since, for valuation purposes, it is appropriate to assume the distribution ratio is equal to one. In other words, the appropriate assumption is a 100% distribution of a firm's free cash flow and therefore a 100% distribution of (associated) imputation credits i.e $\gamma = \vartheta$. This suggested alternative approach is then not only consistent with the standard WACC valuation framework (within a classical tax environment) due to Miller and Modigliani (1961), and which underlies standard valuation practice such as that formulated by McKinsey & Company, Inc. (2005) and Stewart (1991) but is also consistent with the valuation framework which underlies Officer's (1994) set of WACC definitions appropriate to the Australian imputation tax system."

Handley goes on to explain the basis of this proposition:

"The standard approach assumes that cash flow retained for one or more periods can be reinvested at the firm's cost of capital such that the present value of the firm remains unchanged. Although retained imputation credits can not be reinvested, the cash flow which would otherwise be paid out in distributing those credits can be. In this way, retained credits correspond to retained (underlying) cash flow which generates future (taxable) cash flow and thereby generates future credits. There will, of course, be some time value loss associated with the retention of credits, however, subject to the franking rules, firms may choose to distribute retained credits at will – including by way of special dividend and share buy back arrangements. So whilst the current value of a retained credit ultimately depends on the expectation of when it is paid out, it is suggested here that the most appropriate assumption for valuation purposes is the one which is consistent with the standard cost of capital formulae i.e. assume a full distribution of free cash flow and therefore assume a full distribution of imputation credits. In contrast, the current approach reflected in equation (1) implicitly assumes retained imputation credits have zero value."

Given these considerations, the Commission believes that the value of the payout ratio, for the purposes of setting the regulatory rate of return, should fall within the range of 0.70 to 1.

With regard to the value of the utilisation rate, the Commission notes that all methodologies of estimation have their problems.

In recent times, dividend drop-off methodology seems to have gained greater acceptance. This is largely influenced by a recent decision by the Tribunal⁵⁶ to adopt the value derived from SFG's dividend drop-off study (note Table 10 which suggests a shift by regulators towards the Tribunal's lower figure of γ). However, even the Tribunal noted

⁵⁶ Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9 (12 May 2011)



that "... estimation of a parameter such as gamma is necessarily, and desirably, an ongoing intellectual and empirical endeavour. Its decision in these proceedings is based on the material before it."

In a paper prepared by SIRCA⁵⁷, it sets out the problems with various techniques in determining the value of θ . It states that;

"The first approach is the use of dividend drop off studies. This technique brings with it a host of issues related to the problem of estimating the value of the package of cash dividend and franking credit and splitting the package into its components for the purposes of estimation. In particular the presence of noise in the data and measurement errors present severe problems in generating reliable estimates of the variables of interest. These data problems mean that it is common in ex-dividend studies to engage in some form of data filtering and also to partition the data into various samples, which brings with it many issues related to selection criteria and representativeness of results. The second approach is to estimate gamma using taxation data. Such taxation studies present an entirely different set of measurement problems and their indirect approach to estimating gamma makes them intuitively less appealing."

Further, the Tribunal noted the significant problem that is caused due to the existence of multicollinearity in the dividend drop-off study. With reference to multicollinearity, the Tribunal noted that:

"It is an unavoidable problem in the estimation of the utilisation of franking credits, since franking credits are very highly correlated with cash dividends. What can be done is to conduct a study as carefully as possible with as large a data set as is available."

Given these considerations, the Commission believes that the value of the utilisation rate, for the purposes of setting regulatory rate of return, should fall within the range of 0.35 to 0.81.

In dealing with these problems with estimation methodology for imputation credits, SIRCA provide the following suggestion:

"Triangulation of the evidence relating to the value of dividends and credits distributed would suggest that the gamma value supplied by SFG is substantially on the low side while the gamma value determined by the AER tends to the high side, but much more evidence can be adduced to support the AER's gamma value. However, a precise estimate of gamma remains elusive both because of econometric problems and the fundamental problem of splitting the combined value of dividends and franking credits into its component parts".

⁵⁷ Evidence and Submissions on Gamma, Report to AER, Michael Mckenzie and Graham Partington on Behalf of the Securities Industry Research Centre of Asia Pacific (SIRCA) Limited. March 25, 2010

Of course, as noted earlier, the context in which the Tribunal has been called upon to consider and determine various parameters, including gamma, is specific: the National Electricity Rules, while perhaps being persuasive in the context of consideration of a regulatory rate of return for SA Water, provide no binding precedent for the Commission. The Tribunal has considered the matters before it based on the National Electricity Rules (with the particular objectives and considerations attached to those Rules) and made decisions based on the materials presented to it in particular case. In that sense, the question before the Commission is different: free from the structure and considerations of the National Electricity Rules, what are the appropriate values to ascribe to the parameters F and θ so as to derive a value for γ ?

Furthermore, the Commission understands that the Tribunal's considerations on the utilisation rate were limited to the evidence presented to it. Other considerations, such as regulatory stability and additional studies on the utilisation rate were not placed before it; the Tribunal's decision on the utilisation rate was based on SFG's study. The Commission is of the view that, absent the evidentiary restrictions placed on the Tribunal and having regard to the significant debates as to the appropriate methodology to be adopted in estimating the utilisation rate, consideration should be given to a broad range, as opposed to a single piece, of evidence.

The Commission has, therefore, reviewed a broad range of evidence, as described earlier. However, as argued above, while noting that the studies which have been reviewed are all persuasive (to a greater or lesser degree), none of them are considered conclusive in terms of estimation of parameters for F and θ so as to derive a value for γ . The absence of probative evidence leads the Commission to conclude that there is no credible reason, at this stage, to depart from its previous regulatory practice in this field.



Table 10 below shows a selection of recent regulatory determinations of γ .

Jurisdiction	γ
IPART	
State Water Corporation (2011)	0.50 – 0.30
Sydney Water (2008)	0.50 - 0.30
ESC Victoria	
2008 – 2013 Water Price Determination	0.50
Melbourne Water (2009)	0.50
ICRC	
2008 Water Price Determination	0.50
QCA	
2010 Gladstone Water Review	0.50
SEQ Water and Wastewater (2011)	0.50
ERA	
Dampier to Bunbury natural gas pipeline access arrangement - 2010	0.25
AER	
Statement of Regulatory Intent (SORI)	0.65
Queensland/SA Gas distribution 2011-2015	0.25

Table 10 - Selection of recent y values adopted by Australian regulators

Source: IPART: Review of bulk water charges for State Water Corporation June 2010, , IPART: Investigation into prices for water, sewerage and stormwater services provided by Sydney Water May 2008, ESC Victoria: 2008 Water Price Review June 2008, ESC Victoria: Metropolitan Melbourne water price review April 2009, QCA: Gladstone Area Water Board June 2010, QCA: Interim Price Monitoring of SEQ Water and Wastewater Distribution and Retail Activities Final Report March 2011, ERA Final Decision on Proposed Revisions to the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline October 2011, AER: Statement of regulatory intent on the revised WACC parameters May 2009, AER Access arrangement proposal for the SA gas network, Final Decision, June 2011.

The table shows that prior to the Tribunal's decision in the *Energex* matter, regulators consistently used the value of 0.50, or a range incorporating 0.50 for γ . For reasons described above, the Commission regards the outcome in the *Energex* matter as specific and distinguishable on its particular facts, and therefore does not place much weight on it.

Given the discussion, and the Commission's view that the value of distribution payout (F) falls within the range of 0.70 and 1, and that the value of utilisation rate (θ) falls within the range of 0.35 and 0.81, the value of gamma, therefore falls within the range of 0.25 and 0.81.

The Commission understands the importance of regulatory stability for regulated entities and believes that given a lack of consensus within academic literature and the limitations of empirical estimates of γ , a value of 0.50 for imputation credits is currently the most appropriate value.

Draft Advice

The Commission's advice is that the estimated value of γ in determining the regulatory rate of return is 0.50.



8 DRAFT ADVICE

The Commission's draft advice is that the pre-tax real rate of return is 6.88%. This advice is based on the parameters below in Table 11.

Parameter	Draft Advice
Nominal risk-free rate	4.38%
Credit Rating	BBB
Gearing	60%
Debt risk premium	3.80%
Equity Beta	0.80
Market risk premium	6%
Corporate Tax rate	30%
Gamma	0.50
Post-tax nominal WACC	7.85%
Pre-tax nominal WACC	9.23%
Inflation forecast	2.20%
Pre-tax real WACC	6.88%

Table 11 - The Commission's Draft Advice

As previously stated, the Commission intends to update the inputs that are derived directly from the market prior to the release of its final advice to the Treasurer. The Commission however anticipates on implementing the same methodologies used to derive these inputs.

The Commission welcomes comments from interested parties regarding this draft advice. Details on how to submit to this draft advice are provided on the front cover of this document.

APPENDIX A

Date	Yield on 10-year CGB	Yield on CPI-Indexed CGB	Inflation implied by the Fisher equation
04-Oct-2011	4.00%	1.80%	2.17%
05-Oct-2011	4.07%	1.86%	2.17%
06-Oct-2011	4.17%	1.93%	2.20%
07-Oct-2011	4.24%	1.98%	2.22%
10-Oct-2011	4.30%	2.02%	2.23%
11-Oct-2011	4.33%	2.09%	2.20%
12-Oct-2011	4.31%	2.08%	2.19%
13-Oct-2011	4.46%	2.21%	2.20%
14-Oct-2011	4.44%	2.20%	2.19%
17-Oct-2011	4.58%	2.30%	2.23%
18-Oct-2011	4.47%	2.22%	2.20%
19-Oct-2011	4.48%	2.24%	2.19%
20-Oct-2011	4.43%	2.19%	2.19%
21-Oct-2011	4.49%	2.23%	2.22%
24-Oct-2011	4.50%	2.24%	2.21%
25-Oct-2011	4.51%	2.25%	2.21%
26-Oct-2011	4.38%	2.15%	2.18%
27-Oct-2011	4.50%	2.24%	2.21%
28-Oct-2011	4.55%	2.26%	2.23%
31-Oct-2011	4.51%	2.24%	2.22%
Average	4.38%	2.13%	2.20%

The data used to determine the risk-rate and the inflation forecast are provided below.

Source: RBA Statistics