9   WEIGHTED AVERAGE COST OF CAPITAL

The building block approach to determining the maximum allowed regulated revenue (as discussed in Section 1.5.1) requires a return on capital. As discussed in Chapter 10, the return on capital requires a rate of return to be applied to capital invested in the regulated business. The rate of return used is a WACC.

The WACC is an expected benchmark cost of capital and represents the future returns for an efficiently managed business. The Economic Regulator uses a benchmark WACC rather than a WACC calculated using the regulated business' actual financial statements on the premise that a benchmark WACC incentivises the business to efficiently finance its operations.

The WACC is calculated as the cost of equity multiplied by the proportion of equity used to finance the enterprise plus the cost of debt multiplied by the proportion of debt used to finance the business with the basic formula as follows:

$$\frac{E}{D+E}*Re + \frac{D}{D+E}*Rd$$

Where:

Re	=	Return on Equity (costs of equity) is conventionally quoted as a **post**-tax value
Rd	=	Return on Debt (the cost of debt) is conventionally quoted as a **pre**-tax value.
D	=	Proportion of business funded by debt
E	=	Proportion of business funded by equity

However, the WACC can be calculated on a vanilla, real or nominal, pre-tax or post-tax basis resulting in a number of different WACC types and formulae.

As the WACC is a forward looking value it incorporates a degree of forecasting with the values and derivation of some of the components subject to ongoing vigorous debate between academics, regulators, economists and finance practitioners. Consequently, the appropriate value and or method to derive the WACC component may involve a degree of professional judgement on the part of the Economic Regulator.

9.1   Statutory requirements

Section 68(1A) of the Industry Act requires the rate of return, on assets transferred to the previous regulated entities before 1 July 2011, to incorporate a commercial rate of return on debt and a pre-tax rate of return of three percent on equity. For all other regulated assets, the rate of return must incorporate a commercial risk based rate of return on both debt and equity.

Therefore section 68(1A) effectively requires two separate WACCs, one for assets transferred to the previous regulated entities before 1 July 2011 (referred to as existing) and another for assets purchased or constructed by the previous regulated entities and now TasWater after 1 July 2009 (referred to as new).

9.2   Type of WACC

The Economic Regulator used a real pre-tax WACC For the first and second water and sewerage price investigations. Prior to the commencement of this investigation, the Economic Regulator proposed in the PSP Guideline it released in April 2016, to use a pre-tax real WACC for the third regulatory period.

A pre-tax WACC means that the post-tax return on equity is grossed up by an applicable tax rate to become a pre-tax return on equity. Therefore both the return on debt and the return on equity are pre-tax values. This results in a higher WACC, all other things being equal, which results in a regulated business receiving a higher maximum allowed regulated revenue which must be used to cover the businesses tax liabilities. A real WACC factors in inflation and is therefore lower, all other things being equal, than a nominal WACC which does not account for inflation.

TasWater proposed the use of a post-tax nominal vanilla WACC for the third regulatory period. TasWater made this proposal on the basis that the AER uses a post-tax vanilla WACC in its Post Tax Revenue Model. However, unlike the AER, which updates the WACC parameters annually, TasWater proposes that the WACC determined during the price investigation apply for the entire regulatory period and is not updated during the period. A post-tax nominal vanilla WACC includes a post-tax return on equity and a pre-tax return on debt and necessitates the inclusion of a tax allowance and inflation adjustment in the calculation of the MARR. A discussion of the required tax allowance and inflation adjustments are included in Chapter 11.

As a post-tax nominal vanilla WACC is the most common form of WACC used by other Australian regulators, the Economic Regulator intends accepting TasWater's proposal to use this form of WACC for the third regulatory period.

> *The Economic Regulator <u>intends to accept</u> TasWater's proposal to apply a post-tax nominal vanilla WACC for the third regulatory period.*

9.3   WACC formulae

The following sections outline the formulae for the $WACC_{NEW}$ and the $WACC_{EXISTING}$.

9.3.1   WACC_NEW

The post-tax nominal vanilla $WACC_{NEW}$ is calculated using the following formula:

$$WACC_{NEW} \;=\; R_d G + R_e(1\text{-}G)$$

Where:

R_d	=	Cost of debt
	=	RFR + DRP + debt issuance costs
RFR	=	Risk free rate
DRP	=	Debt risk premium
G	=	Gearing ratio
R_e	=	Cost of equity
	=	RFR + β_e MRP
β_e	=	Equity beta
MRP	=	Market risk premium

9.3.2 WACC$_{\text{EXISTING}}$

The post-tax nominal vanilla WACC for existing assets $_{\text{EXISTING}}$ is calculated using the following formula:

$$\text{WACC}_{\text{EXISTING}} \quad = \quad \text{RdG + EXISTING Re(1-G)}$$

Where:

EXISTING Re	=	Z[1-t(1-γ)]
Z	=	Statutory nominal pre-tax return on equity = 3%
t	=	Corporate tax rate = 30%
γ	=	Gamma

9.4 TasWater's proposed WACCs

TasWater's proposed WACC components and the resultant WACCs are included in Table 9.2.

Table 9.2 TasWater's proposed WACC

WACC component	Value
Gearing	60%
Risk free rate	3.50%
Debt risk premium	2.49%
Debt issuance	0.10%
Cost of debt (pre-tax)	6.09%
Market risk premium	6.50%
Equity beta	0.70
Statutory return on equity $_{\text{(Existing)}}$ (pre-tax nominal)	3.00%
Gamma	0
Cost of equity$_{\text{(New)}}$ (post-tax)	8.05%
WACC$_{\text{EXISTING}}$	**4.49%**
WACC$_{\text{NEW}}$	**6.87%**

The following sections outline TasWater's rationale for its proposed WACC components together with the Economic Regulator's assessment of those components and the Economic Regulator's proposed WACC components and resultant WACCs.

9.4.1 Gearing

Gearing refers to the percentage of capital funded by debt. In determining the level of gearing (i.e. debt financing) regulators generally use a benchmark gearing ratio to ensure customers do not bear the cost associated with an inefficient financing structure.

TasWater has not proposed to change the gearing ratio of 60 per cent used for the second regulatory period. The Economic Regulator intends to accept TasWater's proposed 60 per cent gearing ratio.

The Economic Regulator <u>intends to accept</u> TasWater's proposed gearing ratio of 60 per cent in calculating the WACCs for the third regulatory period.

9.4.2   Risk free rate

The risk free rate refers to a theoretical rate of return of an investment with zero risk and it is used to calculate both the cost of debt and the cost of equity. It is generally accepted practice to use a government security as proxy for the risk free rate, with 10-year Commonwealth Government bonds commonly used.

For the second regulatory period, the Economic Regulator calculated the risk free rate the midpoint of the 40 trading day average and a 10-year weighted average of 10-year Commonwealth Government bonds, with the weighting placing greater weigt on more recent data.

TasWater proposed the risk free rate to be calculated as the mid point of the 10-year simple average and a 40 trading day average of 10-year Commonwealth Government securities. Based on its preferred method, TasWater proposed a risk free rate of 3.5 per cent.

As discussed in section 9.4.4, the Economic Regulator has proposed a modified method to calculate the risk free rate. Based on that method, and using data as at 1 November 2017, the Economic Regulator proposes a risk free rate of 2.90 per cent.

9.4.3   Cost of Debt

The cost of debt is the sum of the risk free rate (see Section 9.4.2 above), a debt risk premium (DRP) and debt issuance costs.

9.4.3.1   Debt Risk Premium

The Economic Regulator used the RBA's corporate credit spread data to calculate the debt risk premium (DRP) for the second regulatory period and TasWater proposes continuing to use same the data set to calculate the debt risk premium for the third regulatory period. TasWater proposes to use the same approach for calculating the debt risk premium as for the risk free rate namely: the mid point of the 10-year simple average and an average of the last two observations of the RBA's monthly corporate credit swap data in place of a 40 trading day average. Using this method, TasWater proposed a debt risk premium of 2.49 per cent.

The Economic Regulator accepts TasWater's proposal to use the RBA's corporate credit spread data to calculate the debt risk premium but, as discussed in section 9.4.4, the Economic Regulator proposes a modified method to calculate the risk free rate. Based on that method, and using data from 1 November 2017, the Economic Regulator proposes a debt risk premium of 2.03 per cent.

9.4.3.2   Debt issuance costs

The debt issuance costs compensate an entity for costs related to raising or refinancing debt.

TasWater proposed the inclusion of debt issuance costs since a benchmark efficient company would incur debt issuance costs to raise or refinance debt. TasWater proposed a debt issuance cost allowance of 0.1 per cent.

TasWater noted that the Queensland Competition Authority (QCA), the Independent Pricing and Regulatory Tribunal (IPART) and the Economic Regulatory Authority of Western Australia (ERAWA) include a debt issuance cost allowance of between 0.108 per cent and 0.125 per cent in the cost of debt.

The Economic Regulator proposes to accept the inclusion of debt issuance costs of 0.1 per cent in the cost of debt calculation.

> *The Economic Regulator <u>intends to accept</u> TasWater including debt issuance costs of 0.1 per cent in calculating the WACCs for the third regulatory period.*

9.4.4   Method to calculate risk free rate and debt risk premium

For the second regulatory period, the Economic Regulator applied the same calculation method to determine the RFR and the DRP. The method used a 40 trading day average combined with a 10-year weighted average which placed greater weight on more recent data.

TasWater accepts using a combination of a 40 day trading average and a 10-year component, but proposed a simple average instead of the Economic Regulator's weighted average. TasWater described the effect of the Economic Regulator's method has a similar effect to a 5-7 year average. TasWater contends that its debt maturity profile shows that approximately 10 per cent of its debt is refinanced each year for the next 10 years.

The cost of debt component of the WACC has been subject to considerable debate in recent years. A number of events have contributed to the debate including, changes in 2013 to the rate of return provisions of the National Electricity Rules and the National Gas Rules, and the post-GFC economy which has seen interest rates decrease significantly.

There is no consistent approach used by regulators to calculate the RFR or DRP. The QCA, ERA and the ACT Treasurer's Industry Panel[58] (Industry Panel) contend that finance theory dictates that the most current rate is most appropriate rate. IPART uses a combination of current and historical rates to calculated the risk free rate, specifically the mid-point of the 40 day average of the yields on 10-year Commonwealth Government Securities and the ten year simple average of yields on 10-year Commonwealth Government Securities

The AER, ESC and ESCOSA use a trailing average portfolio approach to determine the cost of debt which replaces or will replace the risk free rate plus debt premium approach. The trailing average approach assumes that every year, one - tenth of the debt of a business is refinanced. As the return on debt is an average of the interest rates over a period of ten years, this approach leads to a relatively stable estimate of the risk free rate over time. The trailing average approach involves recalculating the cost of debt for each year of the regulatory period and, therefore, requires prices to be reviewed annually.

The Economic Regulator agrees with the QCA, ERA and the Industry Panel that past interest rates are less relevant than current market rates and, consistent with efficient market theory, the most recent market prices incorporate all information available regarding future prices and, therefore, theoretically represent the most efficient expected cost of debt.

However, the Economic Regulator considers that a cost of debt that incorporates a historical component is appropriate given that a benchmark firm would have an efficient debt financing and risk management policy and such a policy would be based on issuing debt at different points in time with a staggered maturity profile. In addition, businesses opportunistically restructure debt. It therefore seems unlikely an efficiently managed business will have a fixed maturity and/or refinancing profile i.e. it will most likely have a mix of current and past interest rates and maturity profiles. The Economic Regulator considers that incorporating a historical component in the cost of debt is beneficial in that it may reduce the volatility in the WACC, which in turn may lead to less price volatility.

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[58]Industry Panel (2015) Draft Report: Review of the Independent Competition and Regulatory Commission's 2013 Price Direction for Regulated Water and Sewerage Services in the ACT, Canberra.

As the Economic Regulator does not propose recalculating the required revenue annually it does not consider the trailing average method appropriate. The Economic Regulator considers historical rates are over represented in IPART's approach.

For the second price investigation, the Economic Regulator developed a modified version of the IPART approach where the historical component is a time weighted average over ten years rather than a ten-year simple average. The Economic Regulator concluded that a cost of debt methodology that incorporates some degree of historical rates but is predominately weighted towards current market rates would provide regulated businesses with the appropriate signals regarding the need to make efficient investment decisions.

The Economic Regulator does not intend to accept TasWater's proposal to use a simple 10-year average in calculating either the RFR or DRP with the Economic Regulator proposing to use a slightly modified version of the method that applied for the second regulatory period.

The Economic Regulator proposes to use the annual averages for the past nine years plus the current point in time rate to make up the ten year refinancing profile. In maintaining the assumption of a ten year refinancing profile the changes reflect that rates ten years ago are irrelevant by the first year of the regulatory period. The changes place a greater weighting on the forward looking point in time rate.

The Economic Regulator therefore proposes the following approach to determine the RFR:

1.   Calculate the 40 trading day average of 10-year Commonwealth Government Securities.

2.   Calculate the daily average of the last nine, eight, seven, six, five, four, three, two, one year of yields on the 10-year Commonwealth Government Securities used in step 1.

3.   Calculate the average of the value in step 1 and the values in step 2.

4.   Calculate the midpoint of the values calculated in steps 1 and 3.

Similarly, the Economic Regulator proposes the same approach to determine the DRP but with the RBA's monthly corporate credit swap data.

Given the lack of consistency or consensus among jurisdictional regulators regarding the calculation of the cost of debt, the Economic Regulator considers its proposed method is an appropriate compromise between the forward looking aspects of the point in time methodology and the actual borrowing costs aspect of incorporating a historical component.

> *The Economic Regulator <u>intends to require</u> TasWater to calculate the Risk Free Rate and Debt Risk Premium using the method specified in Section 9.4.4 of this Draft Report for the third regulatory period.*

9.4.5   Market risk premium

The market risk premium (MRP) is the additional return for investing in a risky market portfolio over the risk free rate. The Economic Regulator used a MRP of 6 per cent for the first and second regulatory periods.

TasWater proposed a MRP of 6.5 per cent based on the premise that state-owned regulated network monopolies should have the same MRP. The AER applied a MRP of 6.5 per cent for TasNetworks and other electricity network business.

The Economic Regulator proposes to accept TasWater's proposed MRP of 6.5 per cent for the third regulatory period based on the AER's review of the MRP in its *Better Regulation Explanatory Statement, Rate of Return Guideline*.

> *The Economic Regulator <u>intends to accept</u> TasWater's proposal to apply a Market Risk Premium of 6.5 per cent in calculating the WACCs for the third regulatory period.*

9.4.6 Equity beta

The equity beta measures the risk (volatility) of the returns a business's assets relative to the financial market as a whole. It is a statistical value and is the R squared of the covariance of the returns on the assets of the business with returns of the market. Specifically the equity beta represents only whole-of-market related risk and should not reflect any firm-specific risk.

TasWater proposed an equity beta of 0.70 based on the recent decisions of other regulators in particular the AER's decision to use an equity beta of 0.70 for TasNetworks' distribution business.

As there are no listed monopoly water and sewerage businesses on the Australian Stock Exchange, regulators have used listed energy businesses as comparators. The AER, in its *Appendices to the Explanatory Statement Rate of Return Guideline 2013*, identified a number of possible comparator businesses for regulated network providers, in order to justify an equity beta of 0.70 for regulated network providers.

The Economic Regulator does not accept TasWater's proposed equity beta of 0.70. TasWater's proposal is based on regulatory precedent with TasWater citing a number of recent decisions by other Australian regulators and specifically referring to the AER's decision for TasNetworks' distribution business.

The Economic Regulator considers the equity beta should be as close as possible to that of a benchmark efficient business providing the same services and with the same risks as TasWater but some of the comparator businesses used by the AER are not sufficiently similar to a monopoly water and sewerage business. For example, the Alinta group that owns retail businesses operating in unregulated markets and the Hastings Diversified Utilities Fund, which is a fund manager, specialising in infrastructure. The Economic Regulator notes that a number of the comparator business have not only been delisted for a number of years but were only listed for a short period compared to other comparator businesses. Frontier Economics[59] calculated a 10-year average beta for the businesses that were used by the AER for its "primary" range for beta noting that some regressions used less than ten years of data due to shorter listing periods. The average for the monthly beta is 0.62 and the average for the weekly beta is 0.63. After excluding the delisted businesses, the average monthly beta is 0.57 while the average "weekly beta" is 0.49. The Economic Regulator considers that this comparator group, which comprises currently listed Australian energy distribution businesses i.e. APA Group, Ausnet Services, Duet Group[60] and Spark Infrastructure are the best comparators for a regulated monopoly water and sewerage business.

The Economic Regulator reviewed the findings of the Industry Panel for international comparisons. The Industry Panel calculated the equity betas for 16 listed water and sewerage business in the United States and the United Kingdom with the Industry Panel calculating a median equity beta of 0.53 and an average equity beta of 0.69.

The Industry Panel reviewed Australian regulated water business price reviews and found that since 2010, regulators have used equity beta's ranging from 0.55 to 0.8 with the majority using an equity beta of 0.65 or 0.70. The Economic Regulator used an equity beta of 0.65 for the second regulatory period and, based on the above discussion, proposes to maintain an equity beta of 0.65 for the third regulatory period.

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[59] Frontier Economics, Estimating the equity beta for the benchmark efficient entity, January 2016.

[60] Duet Group is included in the listed group but was subsequently delisted in May 2017.

> *The Economic Regulator <u>intends to require</u> TasWater to apply an equity beta of 0.65 in calculating the WACCs for the third regulatory period.*

9.4.7   Gamma

Gamma is the value of dividend imputation credits, which is the product of the distribution rate and the utilisation rate. The distribution rate is the ratio of the amount of distributed imputation credits to the amount of company tax paid. The utilisation rate is proportion of investors in the market that utilise imputation credits. For the second regulatory period, the Economic Regulator used a gamma of 0.5.

TasWater considers that because its council shareholders cannot benefit from imputation credits the utilisation rate is zero and consequently gamma should be zero. TasWater also considers that the 3 per cent pre-tax cost of equity specified in the WSI Act prevents it receiving a cost reflective price for its assets and applying a non-zero gamma will reduce its tax allowance leading to an under recovery of costs since imputation credits have no value to TasWater's shareholders.

The Economic Regulator considers that the underlying premise of economic regulation is to determine the revenue for a benchmark efficiently managed *privately* owned business. Therefore, the fact that the TasWater is publicly owned should not be factored into the calculation of the required revenue i.e. TasWater should not benefit from its public ownership.

The Economic Regulator considers that the AER's review of gamma for Distribution Network Service Providers is a comprehensive review of the value of imputation credits. The Economic Regulator does not accept TasWater's proposal for gamma to equal zero and, based on the AER's findings, the Economic Regulator proposes using a gamma of 0.4.

> *The Economic Regulator <u>intends to require</u> TasWater to apply a gamma of 0.4 in calculating the WACCs for the third regulatory period.*

9.5   Economic Regulator's proposed WACCs

Based on the discussion in Section 9.4, the Economic Regulator's proposed WACC components, calculated using data available as at 1 November 2017, and the calculated existing and new asset WACCs are, as set out in Table 9.3.

Table 9.3 Economic Regulator's proposed WACC

WACC component	Value
Gearing	60%
Risk free rate	2.90%
Debt risk premium	2.03%
Debt issuance	0.10%
Cost of debt (Pre-tax)	5.02%
Market risk premium	6.50%
Equity beta	0.65
Statutory return on equity$_{(Existing)}$ (pre-tax nominal)	3.00%
Gamma	0.4
Cost of equity$_{(New)}$(post-tax)	7.12%
WACC$_{EXISTING}$	**4.00%**
WACC$_{NEW}$	**5.86%**