9 COST OF CAPITAL

9.1 Introduction

This chapter describes Transend's estimate of its weighted average cost of capital (WACC). A company's WACC is calculated as follows:

$$WACC = R_e \frac{E}{V} + R_d \frac{D}{V}$$

where R_e and R_d are the costs of equity and debt respectively, and E/V and D/V are the proportions of equity and debt in the financing structure of the company.

The estimate is a 'vanilla' cost of capital — the weighted average of the post-tax nominal return on equity and the pre-tax nominal return on debt. In other words, it excludes all tax-related matters from the WACC calculation.[1] The Commission's recent decisions have adopted a 'weighting' by applying a benchmark level of gearing of 60%.

The cost of equity R_e, has been calculated using the Capital Asset Pricing Model (CAPM) as follows:

$$R_e = R_f + \beta e(R_m - R_f)$$

where R_e is the required return on equity; βe is the equity beta; R_f is the risk-free rate; and (R_m-R_f) is the return over the risk-free rate that investors require to invest in a well-diversified portfolio of equities (i.e. it is the 'market risk premium').

Transend commissioned Network Economics Consulting Group (NECG) to prepare a report on the weighted average cost of capital it should be allowed to earn on its regulated transmission assets. NECG's report is attached to this submission at Appendix 7.

Transend endorses NECG's approach, which examines recent regulatory decisions, the latest academic studies and specific issues relating to Transend's business. On the basis of this advice, Transend estimates its nominal 'vanilla' WACC to be 8.80%. The key parameters in calculating this WACC are summarised as follows:

- risk-free rate of 5.24%

- market risk premium (MRP) of 6.0%

- gearing and debt – benchmark gearing of 60% and a cost of debt of 6.69%

- asset and equity betas of 0.45 and 1.12 respectively, and debt beta of zero

- gamma of 0.50.

Each of these parameters is briefly discussed.

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[1] *In determining the regulated revenue requirement, a provision for the cost of taxation is made separately from the WACC, in the form of an estimate of the company tax that would be payable each year by the regulated entity. The estimate of this annual tax cost is based on a range of assumptions about the tax-deductible expenses of the company (including depreciation, and the value of tax deductions for interest payments under the capital structure assumed in the estimation of WACC) and on the valuation of imputation tax credits in the hands of investors. Chapter 10 of this submission provides further details of the provisions for tax that have been included in the company's forecast annual revenue requirements for the forthcoming regulatory period. A discussion of the issues involved in estimating the value of imputation credits is set out in Section 9.6.*

9.2 Risk-free rate

The risk-free rate of return in CAPM is generally derived from long-term government bond rates.[2] There are two key issues in estimating the risk-free rate: the appropriate bond maturity to adopt, and the period over which these rates are averaged.

In recent regulatory decisions, the Commission has based the risk-free rate on the 5-year Government bond rate, on the basis of its view that the appropriate term for determining the risk-free interest rate is the regulatory review period (typically five years). As noted in NECG's report, this view is at odds with that held by other regulators, who have adopted the longest dated nominal bond — the 10-year bond — as the appropriate measure of the risk-free rate.

There are a number of arguments in support of using a 10-year bond rate, which strongly suggests that the Commission's current approach is not appropriate. From Transend's perspective, the critical issue is that the risk-free rate should be set on a basis that is consistent with other variables in CAPM, notably the market risk premium. NECG's paper explains that using a 5-year bond rate is inconsistent with the calculation of the market risk premium.

NECG further explains that Associate Professor Lally's paper for the Commission assumes that the only risk facing the business is interest rate risk. The paper does not address the critical issues of cost uncertainty and regulatory risk. In reality, investment in transmission networks will be muted if the Commission does not provide investors with a reasonable rate of return. It is important to recognise that CPI-X regulation does not provide any guarantee that the actual return will meet or exceed the company's cost of capital.

In this environment — and in contrast to the assumptions in Associate Professor Lally's paper — regulators should not try to estimate WACC with a finely tuned, precise calculation. It is essential for regulators to err on the side of caution in estimating the WACC to ensure that investment continues.[3] Transend urges the Commission to review NECG's critique of Associate Professor Lally's arguments, and to endorse the principles that the Productivity Commission espoused during the recent review of the national access regime.

On the basis of NECG's report, and consistent with the Commission's SPI PowerNet and ElectraNet decisions, we have adopted a 10-day averaging period. For the period ending on 4 February 2003, the 10-day average of the 10-year Commonwealth bond was 5.24%.

9.3 Market risk premium

The market risk premium (MRP) is the amount an investor expects to earn from an investment in a fully diversified portfolio, above the return earned on a risk-free investment. The key difficulty in estimating the MRP arises because it is an 'expected' premium, which is not directly observable. Estimates of the MRP inevitably consider historic returns as a reasonable proxy for the forward-looking value.

In NECG's view, the Commission's estimate of the MRP at 6% is at the bottom end of the historical range. The historical range for the MRP favoured by finance professionals is 6.0% to 8.0%. It is further noted that recent work by Dimson, Marsh and Staunton suggests that the MRP for the Australian economy averaged 7.0% over the last century.

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[2] It is noteworthy that page 17 of the Commission's South Australian Transmission Network Revenue Cap Decision for 2003 to 2007–08 stated: 'The risk-free rate measures the return an investor would expect from an asset with zero volatility and zero default risk. The yield on long-term Commonwealth Government bonds, which are viewed as risk-free as the government can honour all interest and debt repayments, is the closest to the risk free return.'

[3] It is noted that such an approach would be consistent with that advocated by the Productivity Commission during its recent review of the national access regime.

NECG also draws on survey and benchmarking work in suggesting that the MRP exceeds 6%. For example, Bowman[4] recently used a benchmarking approach to estimate the Australian MRP from the United States MRP. Bowman estimated the Australian MRP to be 7.8% on the basis of two factors:

- an MRP for the United States in the range of 6.0% to 9.0%

- an increment of 0.1% to 2.35% on the United States MRP for differences in taxation, market composition, country risk and estimation time horizon between the United States and Australia, with 0.3% considered an appropriate adjustment.

Similarly, Ibbotson Associates[5] suggest that the market risk premium for the United States is 7.76% and that, based on Australia's country credit rating, the expected return on the Australian market is 1.53% to 2.26% higher than for the United States.

The MRP varies over time and it is impossible in practice to quantify this variation accurately. Indeed, NECG's view is that the most recent data suggest that the MRP has been increasing over the past year in ex-post terms.

There have been suggestions of a recent decline in some market participants' expectations of the MRP. However, the Commission has itself noted that the market participants' expectations of MRP 'reflect a significant amount of uncertainty'.[6] It is also noted that some recent forecasts of MRP suggest a value which is lower than the historical average. For instance, analysis completed in 2001 by Professor Stephen Gray of the University of Queensland Business School on behalf of the Victorian gas distributors[7] found that application of the dividend valuation model produced an estimate of the MRP of around 5.9%. However, in producing this estimate, Gray notes:

> When we recognise the uncertainty surrounding the estimation of the components of the dividend growth model, it is clear that this model's estimate of the market risk premium is even more imprecise than the estimate obtained by historical data.

In view of these considerations, Transend believes that the long-term historical average MRP:

- provides the most reliable estimate of the MRP

- provides, from a public policy perspective, the most sound basis for the regulator's estimate of the MRP.

On this basis, NECG's view is that a reasonable range for the MRP is between 6% and 8%. The Commission's recent decisions have adopted an MRP of 6%, and therefore Transend is prepared to adopt 6% for the purposes of this revenue application. However, Transend would like to draw the Commission's attention to the studies cited in NECG's report, which suggest that substantially higher estimates of MRP could be justified.

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[4] *R. Bowman* Estimating the Market Risk Premium, JASSA, Spring 2001, *pp. 10-14. NECG advise that Professor Bowman has recently revised his estimate of the US MRP, which results in an Australian MRP of 7.0%.*

[5] *Ibbotson Associates, (2001), International Cost of Capital Report 2001, valuation.ibbotson.com*

[6] *ACCC,* Victorian transmission network revenue caps*: Decision, 11 December 2002, p. 27-28.*

[7] *Stephen Gray,* Issues in Cost of Capital Estimation: Market Risk Premium*, 19 October 2001. Copy available at: http://www.reggen.vic.gov.au/ PDF/2001/Sub2UE_GasPosPapOct01.pdf*

9.4 Gearing and debt

The cost of debt capital for a company is influenced by:

- the market rates of interest on debt

- the company's credit rating

- the maturity of debt

- the assumed capital structure.

Standard regulatory practice adopted by the Commission and other regulators has been to assume a benchmark gearing level of 60% debt to total capital. In adopting this benchmark, the Commission has argued that this value is within a range where the cost of capital is stable, and is consistent with market practice.

Currently, Transend has little debt and hence low gearing. Given these circumstances, it is questionable whether the Commission's benchmark gearing of 60% is appropriate for Transend. Nevertheless, if such a benchmark is to be adopted, it is important that the cost of debt is estimated on a basis consistent with that 60% gearing assumption.

It is noted that Transend would incur significant debt financing costs if it were to increase its current gearing to the benchmark rate of 60%. Accordingly, Transend's actual cost of debt (given the company's present low level of gearing) is significantly lower than the cost of debt that the company would expect to incur at the benchmark gearing level.

On the basis of NECG's analysis, Transend supports a cost of debt of 6.69%.

9.5 Asset and equity betas

CAPM assumes that all non-systematic (business-specific) risks are diversifiable. Hence, in a competitive market, the firm's cost of capital does not include an allowance for the expected cost of these risks. The systematic risk (β or beta) of a firm is the only risk factor incorporated in the CAPM. For the purposes of estimating Transend's cost of equity, an appropriate equity beta must be applied. However, Transend's equity beta is not observable, and therefore can be estimated only by examining other companies' equity betas.

A further complication arises because the observed equity betas are affected by each company's level of gearing. It is therefore necessary to normalise the observed equity betas for differences in gearing through the following process of 'de-levering' and 're-levering':

1. Observe equity betas for comparable companies, and their gearing ratios.

2. De-lever the equity betas to establish a benchmark asset beta (or 'ungeared' beta) for Transend.

3. Re-lever the asset beta (by applying the benchmark gearing assumption adopted by the Commission) to estimate the benchmark equity beta for Transend at the benchmark level of gearing.

NECG has examined international beta values, evidence from recent regulatory decisions and the extent to which Transend's business is subject to more systematic risk than other regulated businesses. As a result of this analysis, NECG concluded that an asset beta of 0.45 and an equity beta of 1.12 are appropriate. In these calculations, the debt beta is assumed to be zero.

9.6   Gamma

The dividend imputation mechanism used in Australia is intended to ensure that company profits are taxed only once for Australian resident taxpayers, but this benefit is not intended for foreign shareholders. Dividends that are paid out of after-corporate-tax profits can be accompanied with a 'franking' credit to the extent of the corporate tax paid.

The assumed value of imputation (or franking) credits created is usually expressed as a proportion of their 'face value', with this proportion commonly denoted by gamma (γ). This approach implies that if a regulated entity were assumed to pay \$X in company tax in a particular year, then the regulated entity would only require an allowance of \$$(1-(\gamma))$X for taxation. The remaining \$$(\gamma)$X would be provided directly to shareholders through the imputation system.

NECG's view is that gamma should have a value of 0.5. This assessment is consistent with recent regulatory decisions, and in particular the Commission's South Australian and Victorian electricity transmission revenue cap decisions, both of which were finalised in December 2002.

9.7   Conclusion

Transend supports NECG's analysis of its WACC. Transend's required revenue calculations in Chapter 10 therefore apply a nominal 'vanilla' WACC of 8.80%. The values for each WACC parameter are listed in Table 9.1 below.

Table 9.1: Parameter values for Transend's WACC

WACC parameter	Value
Nominal risk-free interest rate, R_f	5.24%
Expected inflation rate[1], F	1.95%
Debt margin, over R_f	1.445%
Nominal cost of debt, $R_d = R_f$ + debt margin	6.69%
Market risk premium (MRP), $R_m - R_f$	6.0%
Gearing ratio (debt to total capital), D/V	60%
Value of imputation credits (gamma), γ	50%
Asset beta, βa	0.45
Debt beta, βd	0.0
Equity beta, βe	1.12

[1] *The inflation rate is calculated from the yield on nominal and index-linked bonds, and is used in modelling Transend's revenue requirements in Chapter 10.*

The calculation of Transend's nominal vanilla WACC is summarised in Table 9.2:

Table 9.2: Summary of the WACC calculation for Transend

WACC parameter	Calculation	Value
Post-tax nominal return on equity (R_e)	$R_e = R_f + \beta e (R_m - R_f)$	11.96%
Pre-tax nominal return on debt (R_d)	$R_d = R_f$ + debt margin	6.69%
Share of equity in financing structure of company (E/V)	Commission's benchmark assumption	40%
Share of debt in financing structure of company (D/V)	Commission's benchmark assumption	60%
Nominal 'vanilla' weighted average cost of capital	$WACC = R_e \dfrac{E}{V} + R_d \dfrac{D}{V}$ = (11.96*0.4) + (6.69*0.6)	8.80%