The Allen Consulting Group

Gladstone Area Water Board

Assessment of Cost of Capital Parameters

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Report to Queensland Competition Authority

The Allen Consulting Group

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Contents

Introduction and Executive Summary

The Brief

The Queensland Competition Authority ('QCA' or 'the Authority') is presently reviewing the draft Access Undertaking for the Gladstone Area Water Board ('GAWB'). As part of this review process, the Authority must determine a weighted average cost of capital ('WACC') that will apply to GAWB. The Authority employs the Capital Asset Pricing Model ('CAPM') for this purpose.

The Authority has engaged The Allen Consulting Group ('ACG') to undertake an independent study to:

- Identify an appropriate capital structure for GAWB;
- Identify GAWB's credit rating and corresponding debt margin (over the government bond rate);
- Identify a proxy asset and equity beta for GAWB.

The study is required to address the following matters:

- GAWB's systematic risk profile compared with other domestic and international water infrastructure companies;
- Contractual arrangements (take-or-pay contracts, long term contracts with review periods);
- Pricing structures including the balance between fixed and variable charges;
- Form of regulation (price vs revenue caps and associated review mechanisms);
- Proposed queuing or option charges for prospective new customers;
- Measures taken to otherwise incorporate the costs of managing risks (systematic or non-systematic) in GAWB's cash flows; and,
- Whether there is a case for applying different asset betas for different major classes of customers.

Executive Summary

Capital Structure

Australian water utilities exhibit low levels of gearing, arising from the public ownership of these utilities, and in many cases, inflated asset values relative to earnings capacity. There has been some trend for gearing levels to increase in response to commercialisation.

Water companies in the US and the UK provide better commercial comparators. Their gearing levels are currently within the 50% to 60% range. Recent regulatory determinations in Australia and the UK accept the view that 50% to 60% gearing forms an efficient benchmark for water companies. However, these results relate to relatively larger water companies (with stable domestic and industrial demand) that do not have the large reserve capacity issues that affect GAWB's operations.

We consider there are compelling reasons for applying a regulatory gearing level below 60% for GAWB. GAWB is less able to support debt relative to energy companies, and larger, more diversified water companies. In its last regulatory determination for GAWB, the QCA recommended a gearing level of 50%. We concur with the QCA's approach, and recommend that a regulatory gearing level of 50% be applied in the regulation of GAWB.

Credit Rating

GAWB is exposed to a number of business risks. These relate to the weather, its concentrated client and geographic base and policy risks. A distinguishing feature of GAWB is its relatively large excess capacity and the risks associated with demand (largely industrial/commercial) being found to take up the capacity.

In assessing financial performance, S&P relies on a number of financial ratios, whose primary purpose is to measure a company's ability to repay debt. These ratios suggest a regulatory credit rating for GAWB of BBB at the assumed 50% gearing.

Debt Margin and Debt Issuance Transaction Costs

Our analysis has demonstrated that, with one exception, recent regulatory decisions on debt margin have been referenced from the short-term average of the margin over the 10-year government bond rate estimated by CBASpectrum. We have compared estimates for BBB rated bonds provided by CBASpectrum and Bloomberg over 10-year and 5-year horizons. We have also provided evidence that the CBASpectrum benchmark may lie above the margins being achieved in the market by utilities through credit wrapping and issuance in international bond markets, particularly the US. The use by regulators of a benchmark such as the CBASpectrum service provides an incentive for regulated utilities to innovate in their financing, and is a fundamental tenet of the CPI-X incentive regulation framework.

On the balance of the evidence, we recommend that the QCA adopt a debt margin that lies within the range of CBASpectrum and Bloomberg benchmark debt margins, applying a 20-day average. Using 27 October 2004 as the cut-off date, ACG would therefore recommend the following ranges of debt margins for GAWB:

- 110 (being the CBASpectrum benchmark margin) to 135 basis points (being the Bloomberg benchmark margin) for a 10-year time horizon; and
- 96 (being the Bloomberg benchmark margin) to 104 basis points (being the CBASpectrum benchmark margin) for a 5-year time horizon.

Combined debt margin and allowance for debt issuance costs

ACG recommends that debt issuance transaction costs of 12.5 basis points be added to the debt margin. This level of debt issuance costs is recommended on the basis of research undertaken by the ACCC, and in the absence of research that would justify a higher level of transaction costs. On a combined basis, reasonable ranges for the total debt margins for GAWB would be:

- 123 to 148 basis points for a 10-year horizon.
- 109 to 117 basis points for a 5-year horizon.

In recent regulatory decisions regulators have adopted the CBASpectrum margin (for 10 year bonds) and have not considered other evidence, such as the Bloomberg estimates. Adoption of Bloomberg estimates or of a mid-point between the CBASpectrum and Bloomberg estimates would be a departure from recent regulatory practice in Australia. However, the use of information from both services would expand the information set that is used to derive debt costs, and hence is an improvement.

Asset and equity beta

In 2002 the QCA reviewed the systematic risk of GAWB and concluded that a 0.45 asset beta, at the top of its identified range, was appropriate. However, when converted using a debt beta assumption of 0.27, and a gearing assumption of 50%, it resulted in an equity beta of 0.63.

GAWB's submission

GAWB's submission claimed that it was exposed to similar levels of systematic risk to an electricity generator, and should therefore attract an asset beta of 0.60. However, GAWB provided no evidence to substantiate this claim, and the historical record of GAWB's industrial as well as domestic load suggests a negligible sensitivity to the domestic business cycle.

Effects of the dot-com 'bubble'

One of the difficult issues for the estimation of betas for all utility activities at the present time is the consequences of the dot-com 'bubble' that occurred between about mid 1998 and mid 2001. The dot-com 'bubble' was most pronounced in the US market, where 'new economy' stocks came to dominate the entire market. In Australia the effect were seen in the movements of the telecommunication and utilities indexes relative to the ASX 200 index. However, as the 'bubble' burst in May 2000, the selling of the new-economy stocks and buying of utilities stocks led to the utilities index in both the US and Australia moving up significantly relative to the market as a whole. The sharp relative rise in the utilities index in both markets coincided with a large fall in the measured equity betas over this period. We believe the evidence suggests that the dot-com bubble (or rather, the bursting of the bubble) had a dampening effect on utility stocks (in both the US and in Australia) and that the betas measured over this period are likely to understate the expected future beta for utility activities. Hence, any estimates of beta that include observations from over this period (which will include estimates of betas that include 4-5 years of monthly observations) are unreliable indicators of the actual level of systematic risk faced by utility companies.

Our approach to dealing with the dot-com bubble is two-fold. First, we have derived beta estimates for relevant firms from the period prior to the dot-com bubble, using conventional sampling frequency (i.e. monthly observations) and sample size (5 years). Secondly, we have also obtained current estimates of betas using observations drawn over a shorter period (60 weeks) and using more frequent sampling of observations (namely, weekly observations). While beta estimates using weekly observations over a shorter period are more variable that those estimated over a longer period, our analysis suggests that a 'rolling' estimate of beta applying 60 weeks of weekly observations is a leading indicator of the movement of 5-year beta using monthly observations.

For an Australian proxy group of network electricity and gas distribution and transmission companies we found that the measured equity beta (regeared to 60%) using 60 monthly observations has been declining since 1999, but which we consider is biased as a result of the dot-com 'bubble'. However, the equity beta using 60 weekly observations has been steadily increasing since the beginning of 2003, and now averages 0.73.

We undertook a similar analysis for US and UK water companies and found current average equity betas (geared at 50%) using 60 weekly observations have been increasing and now stand at 0.86 and 0.17 respectively. These results for the US should be treated with some caution, however, since the regulatory framework differs from the CPI-X benchmark regulation approach applied by the QCA. In general, we should expect a water company subject to a CPI-X regime to have higher systematic risk than an otherwise similar company regulated by rate-of-return. The current differential between the 60-week betas measured for the US and UK water sectors does not appear warranted on this basis.

Recommendation on equity beta

Our analysis of GAWB's risk profile has identified the following key issues:

- As a supplier of water and wastewater services subject to a CPI-X regulatory regime, we should expect GAWB to experience a lower level of systematic risk than the average company in the market.
- GAWB will be subject to less systematic risk than say, electricity DNSPs, since compared with electricity, water demand is less correlated with domestic economic growth.
- Relative to water companies serving large metropolitan areas, GAWB's demand is more heavily weighted towards industrial demand, which should have a higher systematic risk than domestic demand. However, GAWB's largest industrial customer is QAL, which is engaged in the export of alumina to world markets. Over the past 20 years there has not been a linkage between Australia's GDP growth and production of alumina, nor with alumina and aluminium production worldwide. This suggests that a large part of GAWB's existing industrial load will be uncorrelated with the domestic economic cycle.

- The regulatory framework has provided an incentive structure for GAWB to achieve utilisation of its excess capacity over time. Since the rate of utilisation of the capacity is likely to be correlated with the state of the domestic business cycle (e.g. through the attraction of new businesses to Gladstone), this component of demand may be expected to have a higher level of systematic risk. However, the demand forecast applied in setting the target utilisation of capacity is not aggressive, and this fact will mitigate any systematic risk arising from the existence of excess capacity.
- GAWB's average Operating Cost ratio was found to be low relative to that of Victorian metropolitan and rural water utilities. However, GAWB's Operating Cost ratio was also found to be significantly more variable over time than say, US water companies. This would have the potential to raise GAWB's relative risk.

Taking account of all these factors, The Allen Consulting Group considers that it is appropriate to apply an equity beta of 0.66 for GAWB for a 50% level of gearing, which is equivalent to an asset beta of 0.40 (for a debt beta of 0.10 and the use of the Conine de-levering approach). The asset beta of 0.40 compares with an asset beta of approximately 0.76 for the average company in the market (geared at 30%), reflecting the lower risk nature of GAWB's operations. On the balance of considerations, we consider that an equity beta of 0.66 is appropriate for the Gladstone Area Water Board, and recommend that the QCA adopt this estimate in deriving a WACC.

Chapter 1

Key characteristics of GAWB

1.1 Overview of the Gladstone Area Water Board

The Gladstone Area Water Board (GAWB) is responsible for the supply of raw and treated water to industrial, commercial and domestic customers in the Gladstone area. The major assets owned by GAWB are the Awoonga Dam, located on the Boyne River south west of Gladstone, and a network of pipelines, pump stations, terminal reservoirs and treatment plants.

The location of Queensland Alumina Limited (QAL) alumina refinery at Gladstone in the late 1960s provided a major fillip to the economic development of the region. In addition to QAL, GAWB's major industrial customers include CS Energy and the Gladstone Power Station.

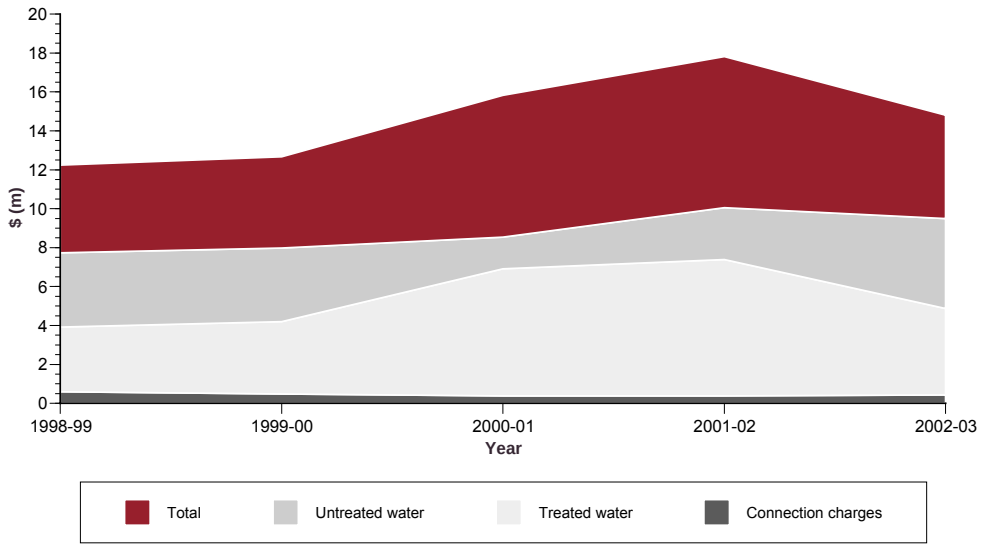
At 30 June 2003, GAWB had total assets of $349.5 million, and employed 27 people. In 2002-03, GAWB's revenue from connection fees and the sale of treated und untreated water was $14.8 million.

1.2 Revenue and demand growth

GAWB's revenues from water sales, incorporating sales of treated and untreated water, and connection charges, are shown in Figure 1.1.

Figure 1.1

GAWB REVENUES FROM WATER SALES



Source: GAWB (2003), *2003 Annual Report*, p. 32.

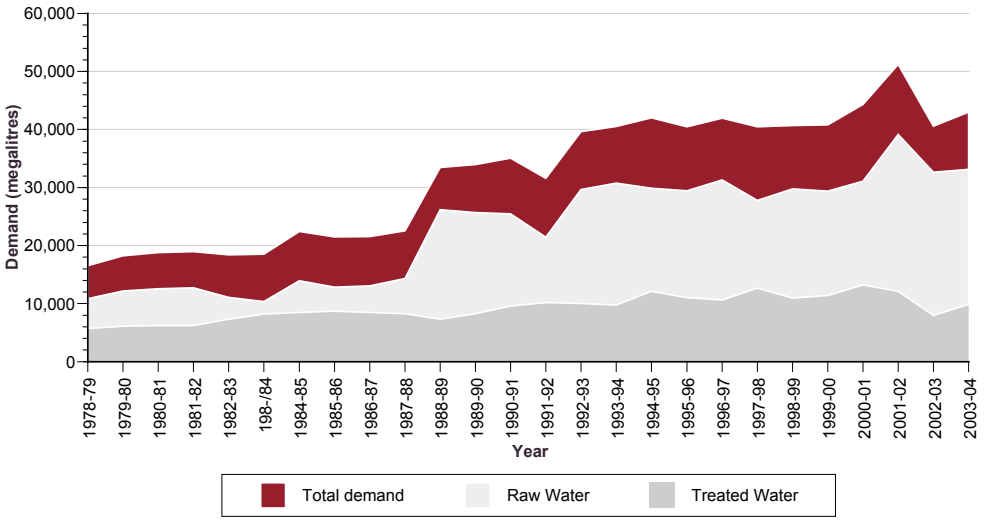
Figure 1.1 illustrates that GAWB obtains a majority of its revenue from sales of untreated water. However, the portion of revenue from treated water was rising considerably prior to the drought and imposition of water restrictions in 2002-03. This increase was primarily price, rather than quantity, driven. The price of treated water increased by 13.8% from 1998-1999 to 2002-03, while the price of untreated water rose only 2.5%.

Those restrictions had a larger impact on treated water sales: purchasers of treated water (the two municipal councils) were required to reduce their consumption to 50% of nominal usage, while for purchasers of untreated water (industrial customers) the reduction was only to 75% of nominal usage.

The drivers of demand for treated and untreated water are different. Historical demand for treated and untreated water are shown in Figure 1.2. It shows demand for untreated water to be volatile relative to treated water. Treated water, which in 2002-03 accounted for 23% of total demand and 33% of water sales revenue, is predominantly supplied to the Gladstone City Council and Calliope Shire Council. It is used mostly for domestic and commercial purposes. As Figure 1.2 demonstrates, growth in demand for treated water has been relatively steady since 1978-79. In particular, it exhibits little correlation to the business cycle: the sharp decrease in 2002-03 was due to drought/water restrictions, while the recession in 1991-92 had no notable impact on demand. Demand for treated water is quite stable.

Figure 1.2

HISTORICAL DEMAND FOR TREATED AND UNTREATED WATER



Source: QCA

Untreated water accounted for 77% of total demand and 64% of water sales revenue in 2002-03. There are a couple of points to note about demand for untreated water:

- Three companies, CS Energy, Callide Power Management (CPM) and Queensland Alumina Limited (QAL), dominate demand for this product. Such a concentrated client base exposes GAWB financial stress in the event that any go bankrupt.
- The contraction in demand in 1992 was due to a system failure, rather than market developments. Such technical failures represent a non-systematic risk – they are not correlated with broader market conditions.
- Demand from these three companies combined is less stable than for treated water, but still has little correlation to the business cycle. CS Energy and CPM are both electricity generators. QAL supplies alumina to its owners (three aluminium companies) that are international companies with global customer bases. Its demand is therefore unlikely to be affected by domestic economic conditions. This is also the case with CPM, which supplies most of its power to QAL. In contrast, CS Energy supplies the broader domestic market and its demand would share closer correlation with the business cycle.

1.3 Risk factors facing GAWB

GAWB is a monopoly provider of bulk water to its region, however, it is subject to a number of risk factors.

As recent events demonstrate, GAWB is exposed to a considerable degree of *weather risk*, which can significantly weaken operating revenues. The drought that undermined GAWB's financial performance in 2002-03 has been described as the worst in the recorded history of the area; nevertheless, it indicates the volatility such incidents can impose on cash flows. Operating revenues in 2002-03 declined by 17% from the previous year, while average annual growth in the two years preceding 2002-03 was almost 19%.

Weather risk can have ramifications that last beyond the period of detrimental weather. Sustained below-average rainfall has led to an 11% reduction in GAWB's annual water entitlement from the Awoonga Dam. Apart from the obvious reduction in operating revenues imposed on GAWB, this also implies a prolonged period of GAWB's water storage and distribution assets being under-utilised. The high incidence of excess capacity in the water sector (and the uncertainty of associated cash flows) undermines the ability of companies to take on debt to fund capital expenditure.

The drought is not solely responsible for the decline in GAWB's 2002-03 operating revenues – they were also due to responses by government. Water utilities are generally subject to a suite of regulation, other than economic. *Policy risks* are relevant where new standards or requirements are imposed on GAWB, and the expenditures required are not adequately recognised by regulators. Water conservation initiatives have emerged as specific policy threat to water utilities, deflating water demand. It is notable that operating revenues failed to meet forecast in 2002-03 once water restrictions were lifted, which indicates the impact of restrictions may linger. This is especially likely to be the case for industrial consumers, which may have invested in water-savings practices.

A more explicit business risk facing GAWB concerns its lack of geographic diversity. GAWB's operations are centred in a relatively small area of regional Queensland; such a concentrated presence exposes it to risks associated with the local region. Such risks include natural disasters as well as economic recession.

1.4 Outlook for the Gladstone area and GAWB

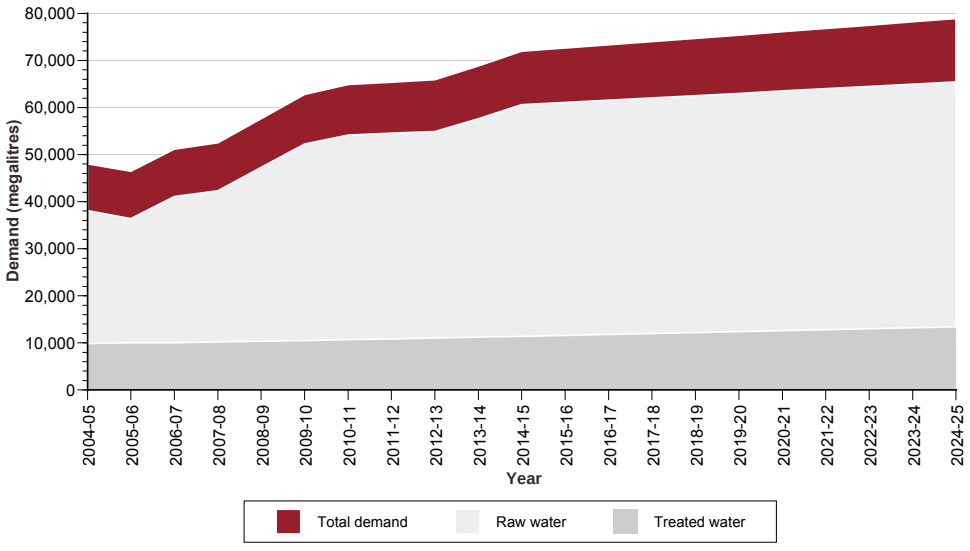
Future demand projections

Current projections of future demand are shown in Figure 1.3. The projections indicate that the existing composition of demand and hence overall volatility will persist, with demand for untreated water comprising the majority of total demand. However, the expected change in the composition of demand for untreated water may offset this risk. QAL is forecast to demand an increasing share of untreated water - in the four years from 2005-06 to 2009-10, its demand is forecast to increase by the most of any existing client (an annual average of 3.6%).

Demand forecasts for untreated water beyond 2010-11 incorporate quantities from unidentified new customers. By 2020-21, these are expected to comprise 5% of all such demand. While existing customers form a reliable revenue stream for untreated water, there is some risk over whether anticipated new industrial customers will materialise. Short to medium-term industrial developments in GAWB will most likely be based around QAL and share a similar exporting focus. Movements in parameters including exchange rates will be influential in determining whether such projects proceed, with consequential impacts on GAWB's 'capacity risk'.

Figure 1.3

PROJECTED DEMAND FOR TREATED AND UNTREATED WATER



Source: QCA

Proposed commercial arrangements

Proposed *new commercial arrangements* should mitigate general demand risks. Under these arrangements, GAWB will sell water only under contract. Contracts will incorporate a reservation volume, which GAWB may increase or decrease to reflect actual customer demand over the previous two years. Customers seeking an increase or decrease in their reservation volume will need GAWB approval, in which case financial impacts are considered. The minimum term of contracts will be 5 years and the default term will be 20 years. These arrangements will generate greater certainty in future demand for water, strengthening the business profile of GAWB.

Chapter 2

Capital Structure

2.1 Introduction

This chapter considers issues relevant to the determination of a regulatory capital structure for GAWB. These include:

- the importance of a firm's capital structure within the WACC framework applied by the QCA;
- comparator entities that may form a basis for establishing a benchmark are then considered; and
- relevant regulatory precedents.

This process concludes that a gearing level of 50%% is reasonable for GAWB.

2.2 Capital structure and the cost of capital in access price determinations

In the course of an access price determination, regulators assess the regulated asset in question on a forward-looking basis to determine a weighted average cost of capital (WACC). The WACC is applied within the building block methodology to estimate a price path that, under forecast volumes and operating efficiencies will provide an appropriate return of and on capital. The aim of this methodology is to derive the revenue stream and regulated price path that will generate returns adequate to attract debt and equity sources to continue to fund the growth of the regulated business and provide the appropriate level of services to customers.

The determination of an appropriate capital structure is critical for the estimation of the regulatory WACC, because it determines the weight attached to the equity and debt components of the calculation. This is demonstrated in the formula for calculating a real 'vanilla' WACC, within the Capital Asset Pricing Model (CAPM) framework applied by the QCA:

$$WACC = k_e(E/V) + r_d(D/V)$$

Where k_e is the cost of equity, r_d is the cost of debt, E is equity, D is debt and V is enterprise value.

Since the seminal work of Modigliani and Miller, which established the principle that under certain assumptions, the cost of capital is independent of capital structure, there has been considerable academic debate as to the degree to which this applies in practice. That debate is beyond the scope of our brief, which is to estimate, on the basis of first principles, regulatory precedent and appropriate comparators, an appropriate regulatory capital structure of GAWB.

We will consider the costs of equity and debt in turn.

Cost of Equity

In the above equation, the cost of equity, ke, is defined as follows:

$$ke = r_f + b_e(MRP)$$

Where, rf is the risk free rate on government bonds, MRP is the Market Risk Premium and b_e is the level of systematic risk (also known as beta risk).

Only the systematic (ie correlated to the general market index) component of a company's total risk profile is relevant in determining its beta risk. This is because, in a diversified portfolio of company securities, those returns that are uncorrelated to the market index may be expected to cancel each other.

Cost of Debt

Cost of debt (r_d) is calculated as the risk free rate on government bonds (r_f) plus a risk margin to compensate for the extra risk associated with the debt of the asset:

$$r_d = r_f + \text{debt margin}$$

The size of the debt margin will depend on the relative risk of the debt. Higher risk debt will require a higher margin than lower risk debt. Debt risk is usually assessed in the form of credit ratings, which are discussed later.

A method that may be employed by a regulator in establishing an appropriate debt margin for debt related to a regulated asset is to derive a credit rating for the debt, and then to determine a debt margin appropriate to that debt rating using market observations.

It is important to note that in the assessment of credit risk associated with debt, in contrast to equity, the total return volatility of the cash flows is important. This is because a breaching of debt covenants can result in business failure. Thus, a low beta risk company may only be able to support relatively low gearing if it has highly volatile cash flows.

In the context of utilities, this implies that operators can support a high level of gearing relative to other businesses. Utilities tend to be characterised by stable, low risk, consistent cash flows suitable for servicing debt. This is evident in the actual gearing levels of utility companies, which are discussed in the following sections.

Determining a benchmark capital structure

The use of a benchmark based on efficient behaviour in regulation ensures that regulated companies bear the cost of inefficient decisions. In the context of capital structures, efficient behaviour in relation to an entity is best identified through identification and comparison with similar entities. Observation and comparison are the cornerstones of benchmarking.

Accordingly, the following sections consider a benchmark capital structure for GAWB by analysing comparable entities in Australia and other jurisdictions, in water and similar industries. Regulatory precedents in Australia are also considered.

While these are the circumstances that may differentiate GAWB and its capital structure from that of a privately-held utility, the pricing review to be undertaken by the QCA should approach GAWB as if it were a private sector entity, as mandated by competition policy.

2.3 Capital Structure Benchmarks

This section considers the actual capital structure of water utilities located in Australia and overseas. With respect to overseas utilities, the focus is on listed entities located in the United Kingdom and the United States – the most comparable international jurisdictions.

Capital structures of Australian urban water utilities

Levels of gearing for Australian urban water utilities at the end of the 2002-03 financial year are shown in Table 2.1. They range from 8% to 46%, with the highest being Melbourne Water and South East Queensland Water.

Table 2.1 also includes GAWB's gearing. GAWB was geared at 41.9%, which is relatively high for Australian water companies. GAWB's current capital structure is the product of a recent and considerable expansion in its debt. In 1999, GAWB's gearing level was only 13.5%. Two years earlier, it was below 5%.

A major influence in the move towards higher gearing appears to be the commercialisation of the entity, which occurred in 2000. This has driven similar moves in other publicly owned utilities, as noted by the QCA in 2003[1]:

> There is a general trend amongst corporatised infrastructure entities to move to more commercial capital structures and typically closer to 50% debt to total assets.

Observations for Melbourne Water and South East Queensland Water support this view. Their relatively high gearing levels also appear driven by an increased commercial emphasis. For example, the South East Queensland Water Corporation (formerly South East Queensland Water Board) was geared at around 12% prior to corporatisation.

One difficulty with Table 2.1 should be noted. For non-Victorian water businesses, there is often an overvaluation of the asset base in the balance sheet relative to the earning capacity of the assets. In other words, the gearing levels are significantly understated relative to the economic value of the assets.

These valuation techniques undermine the capacity of published gearing levels for these entities to form effective benchmarks. In addition, the public ownership of water companies in Australia (and their non-commercial balance sheets), further obscures accurate assessments of efficient/benchmark capital structures. Given these considerations, Melbourne Water (45.4% gearing) probably provides the best individual benchmark among the group.

[1] QCA (2003), *Final Report – Burdekin Haughton Water Supply Scheme: Assessment of Certain Pricing Matters relating to Burdekin River Irrigation Area*, April, p92.

Table 2.1

AUSTRALIAN WATER BUSINESSES - GEARING (02-03)

Water business	Debt / (Debt + Equity) (%)
Brisbane City Council	8.8
Gold Coast City Council	8.5
South East Queensland Water Corporation	45.6
Gladstone Area Water Board	*41.9*
ACTEW	30.7
Melbourne Water Corporation	45.4
Hunter Water Corporation	6.4
SA Water Corporation	19.3
Sydney Water Corporation	17.9

Source: published annual reports

Capital structures of US and UK water utilities

For the reasons discussed above, there are inherent limitations in using Australian water utilities when developing a capital structure benchmark. Accordingly, overseas water companies need to be considered. The overseas jurisdictions providing the best commercial comparators for GAWB are water companies in the UK and the US, although differences in regulatory environments should be taken into consideration.

Figure 2.1 shows the movement in accounting capital structures of the UK water industry, and listed water utilities in the US. In the US, where rate of return regulation prevails, gearing (debt/debt plus equity) has been relatively steady at around 50% over the past seven years, whilst in the UK there has been a steady increase in gearing through the latter part of the 1990s and a steady increase in industry gearing to an average level of 60%[2].

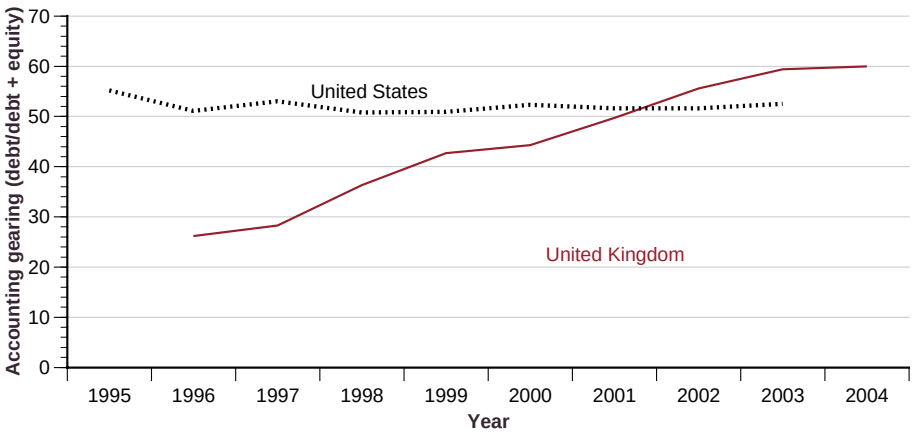
Under the dominant US regulatory approach, book values are equivalent to regulatory asset values. This is not the case in the UK, but the difference between book values and regulatory asset values (RAV) is marginal and does not alter the conclusions[3].

[2] It should be noted that the market gearing of the water companies included in Figure 4.1 has not increased. In fact, it has generally decreased in recent years due to the fallout created by the e-commerce or IT "bubble' in world capital markets, and especially in the US. When the 'bubble' burst in 2000, there was a shift of funds into lower risk utility stocks (including water) and bonds. This had the effect of driving up the value of equity in water stocks and lowering their market gearing ratios (debt/market equity plus debt).

[3] Gearing using regulatory asset values for the UK water industry in 2003-04 is 59.3%, increasing from 43.2% in 1999-2000. The corresponding figures using book values are 60% and 44.2%.

Figure 2.1

WATER COMPANY GEARING LEVELS



United States companies are Artesian Resources, American States Water, Middlesex Water, Aqua American, California Water Service Group, Pennichuck Corporation, Southwest Water, Connecticut Water Service and BIW Limited.

Source: Bloomberg; Ofwat (2004), *Financial performance and expenditure of the water companies in England and Wales: 2003-04 report*, August, p29.

The increase in the debt component of UK water capital structures has been prompted by the financial difficulties experienced by water companies after the 1999 Water Price Review undertaken by Ofwat. At that review the Market Risk Premium applied by the UK Regulator was reduced to 3.5% resulting in a low real regulatory WACC. As a result, the prices of water company equity fell across the board, and companies sought to restructure in order to reduce their cost of capital.[4]

To reduce their cost of capital, UK water companies increased their gearing and pledged to constrain their activities to core water operations. In the case of Welsh Water (Dwyr Cymru) a not-for-profit company was formed and geared to 93.3% of its Regulated Asset Base. With no shareholders, the company must rely totally on retained earnings and bond issues to finance its capital expenditure program.[5]

Ofwat has recently analysed gearing levels for 2003-04 across the UK water industry (including unlisted companies) and calculated industry gearing at 60% (measured as net debt to debt plus the book value of equity). When the highly geared companies such as Dwyr Cymru were excluded, the average declined to 51%[6].

[4] See Morana, Claudio and John Sawkins, (2002), "Stock Market Reaction to Regulatory Price Reviews in the English and Welsh Water Industry," *Journal of Regulatory Economics*, Vol;. 22, No. 2, pp. 185-204.

[5] In a recent study on optimal capital structure for UK water utilities OXERA undertook a survey of investors. Around 45% of respondents thought that optimal gearing was in excess of 65%, with 18% taking the view that it should be in excess of 85%. See OXERA (11 October 2002), *The Capital Structure of Water Companies*, Report to OFWAT, p.27.

[6] Ofwat (2004), *Future Water and Sewerage Charges 2005-2010: Draft Determination*, August, p188.

Conclusions on capital structure benchmarks

Urban water companies within Australia exhibit generally low levels of gearing; however, there is evidence to suggest that companies are taking on more debt in response to greater commercial imperatives. Capital structures for these companies (gearing above 40%) may be approaching the form that might be observed in private sector counterparts, although there are no suitable comparators in Australia.

As a result, we turned to water companies in the US and the UK. This evidence suggested that efficient levels of gearing may lie above that currently observed in corporatised Australian water utilities. Based on 9 listed water companies in the US and over 20 water companies regulated by Ofwat in the UK, the optimal level of gearing appears to lie in the 50% to 60% range.

2.4 Regulatory Precedents

This section reviews estimates of capital structures that have been made in regulatory determinations for energy, port and water companies, mostly in Australia. Whilst such regulatory precedents should be noted, the specific evidence reviewed by the regulators should also be considered. At best, such precedents are a guide to the reasoning and evidence applied by regulators in the past. They are not a substitute for current analysis of relevant market data.

As shown in Table 2.2, recent Australian regulatory decisions have incorporated regulatory capital structures in the range of 40% to 60%. In the energy sector, regulatory practice has uniformly been a 60% gearing assumption. Regulatory capital structures in other sectors are varied. For ports and rail, 40% to 60% gearing has been assumed.

Water company regulatory precedents

In contrast to the uniformity observed for the energy sector, regulation of the water sector is notable for the variation in assumed gearing levels. As demonstrated by the two Australian determinations reached in 2004 in the water sector (50% and 60%), this variation has persisted.

It is notable that these regulatory determinations at times represent a significant departure from actual gearing levels for water companies. For example, in 2003 IPART applied a gearing level of 60% to Hunter Water Corporation; at that time, its actual ratio of total debt to debt plus equity was less than 10%.

Table 2.2

REGULATORY DETERMINATIONS ON CAPITAL STRUCTURE

Regulator	Year	Industry	Gearing (%)
*OFWAT***	*2004*	*Water (UK)*	*55*
GPOC	*2004*	*Water (Tas)*	*50*
ICRC	*2004*	*Water*	*60*
IPART	*2003*	*Water*	*60*
QCA	*2003*	*Water*	*50*
QCA	*2002*	*Water*	*50*
ICRC	2004	Electricity distribution	60
IPART	2004	Electricity distribution	60
ACCC	2003	Electricity transmission	60
ACCC*	2002	Electricity transmission	60
QCA	2001	Electricity distribution	60
OffGAR	2003	Gas transmission	60
ACCC	2003	Gas transmission	60
NTUC	2002	Gas supply	60
ORG	2002	Gas distribution	60
QCA	2001	Gas distribution	60
QCA*	2004	Ports	60
QCA	2001	Queensland rail	55
ORG	2000	Ports	40

* The ACCC made two electricity determinations in 2002 with identical gearing.

** Preliminary/draft determination

Source: Published regulatory decisions

Determinations of gearing below 60% are founded on the view that the water sector has lesser capacity than the energy sector to generate the consistent, stable cash flows required to support a higher level of debt. The QCA ('the Authority') recognised this position in its previous determination in regards to GAWB in 2002[7]:

> …the Authority considers that the lumpiness of water industry capex remains a major constraint on the capital structure. The industry is characterised by long periods of excess capacity and only short periods of operational stability at full, or close to full, capacity.

Consequently, the QCA assumed 50% gearing, as opposed to the 60% it has consistently determined in energy. On the contrary, the ICRC in 2004 found no reason for the assumed capital structure for water sector operators to differ from the 60% benchmark established under general regulatory practice in Australia. It should be noted, however, that this conclusion was reached in the context of a joint water and electricity distribution services provider.

[7] QCA (2002) *Final Report – Gladstone Area Water Board: Investigation of Pricing Practices*, September, pp81-82.

Ofwat's draft endorsement of 55% gearing in the water sector provides an interesting contrast to the 2003 IPART determination: it is actually *below* the industry average level of 60% of net debt to debt plus equity. Australian determinations in the water sector have usually assumed gearing far greater than observed levels.

Comparability of GAWB

As noted by the QCA, water utilities are characterised by long periods of excess capacity of assets, especially storage assets. In the 2002 determination on GAWB, the QCA found the raising of the Awoonga Dam to a full supply level (FSL) of 40 metres in 2002-03 was efficient – despite consigning GAWB to carrying excess capacity until at least 2020-21[8]. The nature of the technology makes such large-scale investment, and asset underutilisation, efficient. Energy companies, in contrast, can achieve efficiencies with incremental expansions reflecting shorter-term load growth forecasts.

This operating risk, faced to various degrees by all water utilities, is compounded by other factors in the context of GAWB. First, there is a relatively high degree of uncertainty over various forecasts that underpin the investment decisions expanding capacity. The recent drought has highlighted risk related to weather – it has led to an 11% reduction in the amount of water GAWB is permitted to take from the dam. Furthermore, while GAWB's demand from existing customers is quite stable, future demand from new clients is less certain – especially from industrial customers. These risks stem from the high concentration of GAWB's operations.

Second, these investments are very large relative to GAWB's entire asset base. For example, the raising of the Awoonga Dam to FSL 40 was valued at around 40% of GAWB's total assets at the time[9]. The considerable size of such an asset relative to the business, combined with its long periods of underutilisation, reduces capacity to finance such investments with debt.

These are further discussed in the following chapter, which considers a credit rating for GAWB. In this discussion on capital structure, they imply a regulatory gearing level for GAWB below energy companies and at the lower end of the range applied to water companies.

Conclusions on regulatory practice

Australian regulatory practice with respect to capital structure has generally been in the range of 40% to 60% gearing. For energy companies, Australian regulators unanimously apply 60% gearing. The water sector exhibits no such consensus, although the variation in assumed capital structures is quite small. Regulators have endorsed gearing of between 50% and 60%. In the UK, Ofwat's preliminary position is to assume 55% gearing. Relative to energy companies, GAWB faces potentially greater volatility in earnings (albeit less systematically related to the economy), and in these circumstances regulatory practice suggests a gearing level below 60%.

[8] GAWB (2002) *Final Decision – Gladstone Area Water Board: Pricing Practices*, September, p. 51.

[9] The regulatory value of the Awoonda Dam raising determined by the QCA in July 2001 was $99.2 million; GAWB's accounts record total asset value at the end of the 2000-01 financial year as $243m.

2.5 Capital structure conclusions

Capital structure benchmarks within the CAPM model utilised by the QCA are important because they determine the weighting of equity and debt costs in the overall calculation of the cost of capital. The appropriate method of determining efficient benchmarks is to gather and compare observed structures across relevant industries. Regulatory precedents also deserve consideration.

Australian water utilities exhibit low levels of gearing, arising from the public ownership of these utilities, and in many cases, inflated asset values relative to earnings capacity. There has been some trend for gearing levels to increase in response to commercialisation.

Water companies in the US and the UK provide better commercial comparators. Their gearing levels are currently within the 50% to 60% range. Recent regulatory determinations in Australia and the UK accept the view that 50% to 60% gearing forms an efficient benchmark for water companies. However, these results relate to relatively larger water companies (with stable domestic and industrial demand) that do not have the large reserve capacity issues that affect GAWB's operations.

We consider there are compelling reasons for applying a regulatory gearing level below 60% for GAWB. GAWB is less able to support debt relative to energy companies, and larger, more diversified water companies. In its last regulatory determination for GAWB, the QCA recommended a gearing level of 50%. We concur with the QCA's approach, and recommend that a regulatory gearing level of 50% be applied in the regulation of GAWB.

Chapter 3

Credit Rating

3.1 Introduction

This chapter examines methodological issues associated with determining company credit ratings and considers a rating for GAWB. It discusses:

- the methodology employed by Standard & Poor's in developing credit ratings and how this relates to ratings used by regulators;
- credit ratings assigned to comparator companies, and the financial ratios that underpin those ratings
- GAWB's profile relevant to determining a credit rating.

The chapter concludes that GAWB should receive a BBB benchmark credit rating.

3.2 Credit rating methodology

Standard and Poor's (S&P) is the premier agency on rating utilities and has a number of publications describing its methodology in some detail. These documents discuss the credit ratings methodology used to evaluate companies, and consider issues specific to water utilities.

A rating for company debt is developed through a process of analysis based on current and prospective company data, information relating to the company's risk environment, and discussions with management about its plans for the company. The framework for analysis considers the business profile and the financial profile of the company. Business profiles consider broad, overarching risks faced by the industry and business of operation, irrespective of its financial structure. The financial profile delves into company financial specifics, covering strategic plans, financial policies and performance. These factors are highlighted in Table 3.1.

Table 3.1

S&P RATINGS: CORPORATE CREDIT ANALYSIS FACTORS

Business Risk	Financial Risk
Industry Characteristics	Financial Characteristics
Competitive Position: Markets	Financial Policy
Competitive Position: Technology	Profitability
Competitive Position: Efficiency	Capital Structure
Competitive Position: Regulation	Cash Flow Protection
	Financial Flexibility

Source: Standard and Poor's (2004) *Credit Ratings Criteria*, March, p. 17.

Companies that have less risk in their operating environment (their *business profile*) are generally able to sustain greater risk in their financial profile (eg, more gearing) for a given rating category.

The analysis of the business / operating risk focuses on:

- regulation, which should be timely and allow consistent, predictable performance;
- markets, including the outlook for the local economy and correlation between water / sewerage demand and economic growth and diversity of the customer base;
- operations, including the capacity, quality and efficiency of service;
- competitiveness, which most often occurs through benchmarking; and
- management.

In assessing the risk inherent in a firm's balance sheet (*financial risk*), S&P will review financial ratios that reveal the firm's capital structure and then assess the cash flows available to support the capital structure, including during times of stress.

Factors reviewed to assess a water utility's financial profile include:

- Capital structure as measured by total debt to total debt plus equity;
- Cash flow analysis including:
  - Funds from operations interest coverage
  - Funds from operations to average total debt
  - Funds from operations minus dividends to capital expenditures
  - Capital expenditures to average total capital (debt plus equity);
- Financial flexibility including the company's ability to accomplish its financing program without damaging creditworthiness; and
- Profitability as measured by return on average equity, pretax interest coverage, pretax return on average capital and operating margins.

S&P also takes a utility's ownership structure into account, in terms of how ownership may impact upon financial flexibility. S&P considers government ownership to provide implicit and explicit support from what is usually a more credit-worthy parent. S&P then takes into account any prior action of a government in relation capital injections and other actions during periods of stress.

Issues in relation to water companies

S&P views water and wastewater businesses as naturally low risk given the predominance of long-life assets as well as protective licensing and regulatory regimes that provide stable and predictable revenue streams. The regulatory environment in the water sector is one of the most important credit determinations for water utilities, as there is limited likelihood of any substantial competition in the sector.

One of the more difficult issues to address for water companies is the methodology used to assign a valuation to a company's assets. This arises because water companies have long life assets where historical versus current asset valuations can lead to great disparities. S&P considers RAV should be used as the measure of asset value, given that this is the value on which the regulator allows a return.

The fact that S&P considers water utilities to be a low-risk utility implies that the financial strategies for these entities can carry greater risk – ie a higher level of gearing – than in other sectors. In addition, government-owned utilities such as GAWB are acknowledged to benefit from implicit and explicit support from a highly creditworthy entity.

Overall, water utilities – particularly bulk suppliers – carry a low business profile risk in the assessment of S&P, as well as other credit rating agencies.

Standard & Poor's credit rating benchmark

The product of the assessments of business and financial risks is a company credit rating, which S&P defines as "a current opinion of the creditworthiness of an obligator with respect to a specified financial obligation, or a specified financial program … [taking] into consideration the creditworthiness of guarantors, insurers, or other forms of credit enhancement on the obligation…" [10]

Long-term credit ratings are assigned to categories reflecting the obligator's capacity to meet financial commitments. The range of long-term ratings is from AAA to C, with a D rating signifying that a default has actually occurred. In Australia, most regulated utilities tend to be assigned an investment grade rating between A and BBB. The descriptions of the A and BBB ratings assigned by S&P are as set out in Table 3.2 below. Ratings from 'AA' to 'CCC' can be modified by the attachment of a '+' or '–' suffix, indicating relative standing within the category.

Table 3.2

STANDARD AND POOR'S LONG TERM CREDIT RATINGS

Rating	Description
A	An obligation rated 'A' is somewhat more susceptible to the adverse effects of changes in circumstances and economic conditions than obligations in higher rated categories. However, the obligator's capacity to meet its financial commitment on the obligation is still strong.
BBB	An obligation rated 'BBB' exhibits adequate protection parameters. However, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity of the obligator to meet its financial commitment on the obligation.

Source: Standard & Poor's (2004), *Ratings Definitions*, March.

[10] Standard & Poor's (2004), *Ratings Definitions*, March.

In addition to the above, S&P has published ratio guidelines for international transmission utilities. The ratios are relevant to GAWB as they are based on data for 75 utilities operating in the high investment grade rated countries of continental Europe and Australasia with developed, disaggregated energy markets. Although the water business is quite different to the energy business, there are many similarities in the business profiles of transmission companies and bulk water suppliers including the long-life, natural monopoly nature of the assets and the stable regulatory environment in which the companies operate.

Table 3.3

RATIO RANGES FOR INTERNATIONAL TRANSMISSION UTILITIES

	AA	A	BBB
Pretax interest coverage (x)	2.0-3.0	1.5-2.5	1.0-1.7
FFO interest coverage (x)	3.0-4.0	2.0-3.3	1.5-2.0
FFO to total debt (%)	12–17	10–15	5 – 10
Total debt to total capital (%)	50–60	55–70	65 – 80

Source: Standard & Poor's (2004) *Project and Infrastructure Finance Review, October,* p. 59

S&P ratings vs regulatory debt ratings

It is important to note that the debt ratings assigned to assets in the course of price determinations are somewhat different to the ratings that are attached to company debt in the market. The most fundamental difference is the fact that the building block methodology is applied to the regulated asset base (RAB) of the regulated assets, and does not take account of the other business operations that may be undertaken by the rated (or unrated) entity that owns the regulated assets. This is one reason why the examination of actual utility ratings may differ from the rating that was employed in an access price determination.

A second reason for potential divergence between ratings assigned in an access price determination and that observed in the market for the same assets, is the actual level of gearing undertaken by the regulated company compared with the gearing assumed by the regulator. The regulator will take the RAB as the 'market value' of the regulated company (ignoring the actual market value of debt and equity), and assign a notional capital structure based on observations for actual companies in a similar line of business. Taking account of the capital structure and assigning a debt rating (as well as a consistent cost of equity), will generate a set of future prices that will result in cash flows that are consistent with the ratings and cost of equity assumptions.

An example of the effect of a utility's potential non-regulated operations has been observed in the UK water industry, where highly geared, and relatively highly rated capital structures have been achieved through covenants restricting (or 'ring fencing') operations to strictly water utility activities.

Therefore, in determining an appropriate credit rating to apply to establish the cost of debt for a utility's regulated assets in the context of an access price determination the regulator must approach market ratings of other utilities with caution. Two factors reduce the comparability of ratings for a regulated utility that is part of a rated entity that owns other, non-regulated assets:

- First, if the gearing applied by the rated entity is higher (say 80%) than the regulatory gearing level (say 60%) the impact of the higher gearing will most likely be expressed in a reduced credit rating level,
- Secondly, if the rated entity undertakes non-regulated activities that are higher risk than the regulated assets, the ratings of the rated entity in the market can be expected to be lower, as a rule, than the assumption made by the regulator in determining a cost of debt in an access price review.

3.3 Credit ratings of comparator companies

This section considers actual credit ratings and financial ratios for a range of comparator organisations. Ratios and ratings are analysed to provide benchmarks for the analysis of GAWB financial ratios provided in the following section. The sample of comparator organisations comprises credit-rated Australian network companies, and listed water companies in the UK and the US.

Australian benchmarks

Table 3.4 lists those Australian network companies with a known credit rating, ordered by gearing level. Two other important financial ratios – FFO to debt and EBITDA cover – are also shown. The companies are all in the energy sector. As regulated utilities, energy companies share several important similarities to water utilities, and are thus valuable for comparative purposes.

Table 3.4

RATED AUSTRALIAN NETWORK COMPANIES – ENERGY

	Gearing (%)	FFO / Debt (%)	EBITDA cover	Rating
Envestra Ltd	80.8	4.2	1.6	BBB
Energy Partnerships (Gas)	80.7	6.9	1.9	BBB
United Energy Distribution	80.1	8.3	1.7	BBB
SPI PowerNet	79.8	8.2	2.4	A+
ElectraNet	72.6	8.0	2.3	BBB+
GasNet Australia	68.9	6.8	1.9	BBB
Country Energy	68.3	10.1	2.2	AA
TXU Australia Holdings	63.8	12.2	2.5	BBB
ETSA Utilities Finance	63.5	9.8	2.3	A–
Alinta Ltd	56.2	17.2	5.7	BBB
Integral Energy	55.4	8.6	2.5	AA
CitiPower Trust	54.1	13.7	3.4	AA–
EnergyAustralia	51.4	11.8	3.3	AA
Ergon Energy Corp	49.3	17.9	4.3	AA+
Powercor Australia	38.1	19.2	3.6	A–
Average	61.3	10.9	2.8	

Source: Standard and Poor's (2004) *Australia and New Zealand Credit Stats 2004*, June, pp 33-34.

Some caution must be taken analysing Table 3.4. As discussed, S&P consider the involvement of parent companies in determining company credit ratings. This may lead company ratings to be artificially high. In Table 3.4, SPI PowerNet is one such company – its rating is strongly influenced by its parent, Singapore Power. Alinta Limited, on the other hand, has a lower rating than would be suggested by its current S&P ratios, due to an expectation that future M&A activity would raise gearing.

The relationship between the financial ratios and associated ratings is quite clear. Obviously, companies with higher levels of debt will generally exhibit lower FFO to debt and EBITDA cover ratios, and a lower credit rating. Treating SPI Powernet as an exception, points to note are:

- no company with an EBITDA cover ratio below 2.0 is rated above BBB;
- companies with less than 60% gearing tend to be in the A range; and
- companies with FFO to debt ratios below 9% tend to be BBB rated.

As mentioned in the previous chapter, there are no suitable Australian water companies against which to compare GAWB. Once again, we turn to listed water companies in the US and the UK.

UK and US benchmarks

Financial ratios and credit ratings, where available, for listed UK and US water companies are shown in tables 3.5 and 3.6.

Table 3.5

LISTED UNITED KINGDOM WATER COMPANIES (2003-04)

	Book gearing (%)	Pretax cover	FFO cover	Rating
Northumbrian Water	79	1.4	2.1	N/R
Pennon Group	60	2.0	3.3	N/R
Severn Trent	56	2.4	4.2	A
Kelda Group	53	2.5	3.8	A
East Surrey Holdings	46	1.7	3.1	N/R
Average	***59***	***2.0***	***3.3***	***A***

Source: Bloomberg

Table 3.6

LISTED UNITED STATES WATER COMPANIES (2002-03)

	Book gearing (%)	Pretax cover	FFO cover	Rating
Artesian Resources	64	2.2	2.9	N/R
American States Water	57	2.4	3.3	A–
Middlesex Water	57	2.8	3.4	A
Aqua America	56	3.6	4.4	N/R
California Water	53	2.5	3.4	A+
Pennichuck Corp.	49	2.6	4.1	N/R
Southwest Water	49	3.2	4.1	N/R
Connecticut Water	47	2.9	3.7	A
BIW Limited	41	2.9	4.4	N/R
Average	***53***	***2.8***	***3.8***	***A***

Source: Bloomberg

The sample of rated US and UK water companies each have an average of A, although this is clearly distorted by the nature of the companies that are rated. For example, the three companies in the UK likely to receive the lowest ratings on the basis of their financial ratios are not rated. The converse is true in the US: those likely to be rated better than A are the ones not rated.

Ratings for the UK companies broadly align with the international transmission utilities benchmarks shown in Table 3.3, suggesting these benchmarks are applicable to the water sector.

3.4 GAWB financial profile

GAWB's business profile, and the various risks it faces were analysed in Chapter 1. Assessing the financial profile of a company for the purpose of assigning a credit rating typically involves modelling and analysis of current and projected cash flows, as well as an assessment of previous performance. Financial ratios for GAWB over the past five years, shown in Table 3.7, have been marked by significant variation. This period captures two notable developments:

- The corporatisation of GAWB in 2000, which led to an increased focus on commercial performance (and capital structures); and
- The worst drought on record in the region, culminating in the imposition of water restrictions for the majority of 2002-03.

Table 3.7

GAWB FINANCIAL RATIOS: 1999 TO 2003

Year Ending	Book gearing (%)	FFO / debt (%)	EBITDA cover	Pretax cover	FFO cover
1999	14	38.2	13.8	7.2	15.7
2000	20	9.1	3.2	0.8	3.0
2001	30	10.8	3.8	2.1	3.7
2002	41	6.6	2.5	1.5	2.8
2003	42	1.7	1.0	0.4	1.3

Source: GAWB (2003), *2002-03 Annual Report*, pp. 32-54.

These two events distort the ratios, in opposite directions: ratios for 1998-99 are exceptionally high (almost certainly associated with a AAA rating) and those in 2002-03 are unusually low (likely to lead to a rating below BBB).

Bearing these factors in mind, the more suitable years on which to base assessments of GAWB's financial ratios are 2000-01 and 2001-02 – especially 2001-02, when gearing was closer to the regulatory gearing level recommended in this report (50%).

Comparison of the 2001-02 financial ratios against the benchmarks in tables 3.3, 3.4, 3.5 and 3.6 indicates a rating of BBB to BBB+ for GAWB in 2001-02. On this basis, we recommend a BBB rating be applied to GAWB.

3.5 Conclusions

Credit ratings are important determinants of the cost of debt to a regulated entity. S&P develops ratings with consideration to a range of factors involving the nature of the industry/business and the financial strategies and performance of the company. Other things being equal, a more highly geared capital structure will attract a lower S&P debt rating, and therefore imply a higher cost of debt.

GAWB is exposed to a number of business risks for a utility. These relate to the weather, its concentrated client and geographic base and policy risks. A distinguishing feature of GAWB is its relatively large excess capacity and the risks associated with demand (largely industrial/commercial) being found to take up the capacity.

In assessing financial performance, S&P relies on a number of financial ratios, whose primary purpose is to measure a company's ability to repay debt. These ratios, applied to GAWB and benchmarked against comparator organisations, suggest a regulatory credit rating for GAWB of BBB.

Chapter 4

Debt Margin

4.1 Introduction

This chapter considers the margin above the risk free rate that GAWB should be allowed to recoup on its debt. For this analysis we assume 50% regulatory gearing and a BBB credit rating, as determined in previous chapters. We discuss Australian regulatory practice regarding debt margins, along with current market evidence on debt margins for issuers of debt with a similar ratings profile as recommended for GAWB. We also recommend a debt issuance transaction cost, which may be added to the debt margin.

4.2 Regulatory Practice

In Australia, regulatory practice has been to establish a debt margin appropriate to the credit rating assigned to the regulated utility. A debt issuance cost margin is then calculated. In some cases, the debt issuance costs are added to cash flows, while in others the combined cost of debt (including debt margin and debt issuance cost) is incorporated in the WACC. This section reviews Australian regulatory practice in relation to:

- Estimating a debt margin for the regulatory WACC.
- Use of the CBA Spectrum benchmark to set a debt margin.
- Estimation of a debt issuance cost benchmark.
- Incorporation of debt issuance costs in the WACC or directly through cash flows.

Australian regulatory practice on debt margin

Regulatory practice in Australia has been to apply a debt margin based on the CBASpectrum service. The CBASpectrum service estimates a 'fair market' yield curve for various maturities and issue credit ratings for Australian corporate bonds. Table 4.1 provides a summary of recent Australian regulatory decisions in relation to debt margins.

Table 4.1

RECENT DETERMINATIONS IN RELATION TO DEBT MARGINS

Regulator	Year	Industry	Margin* (basis points)	Benchmark credit rating
IPART	2004	Electricity dist	90-110	BBB to BBB+
ESCOSA**	2004	Electricity dist	150	BBB+
ACCC	2003	Electricity trans	91	A
ACCC	2002	Electricity trans	110	A
GPOC	2004	Water (Tas)	70	n.a.
ICRC	2004	Water and elec. dist	112	BBB+
IPART	2003	Water	70-100	n.a.
QCA	2003	Water	180	BBB
QCA	2003	Water	160	BBB
OffGAR	2003	Gas trans	120	n.a.
ACCC	2002	Gas trans	159	BBB+
ESC	2002	Gas dist	165	BBB+
QCA*	2004	Ports	117.5	BBB+

** Margin excludes allowances for debt-raising costs*

*** Preliminary/draft position*

Source: published regulatory determinations

Australian regulatory practice is to focus on the debt margins attaching to bond issues. As explained recently by ESCOSA, this is to provide a proxy for borrowing costs, and does not imply that the regulator expects that all debt raised by a company will be through the issue of bonds. However, ESCOSA also notes that[11]:

> No evidence has been presented that the use of the yield on Australian corporate [bonds] systematically understates the cost of debt raising across the full range of funding options, either from ETSA Utilities or – to ESCOSA's knowledge – in other matters before another Australian energy regulator.

In general, there has been an acceptance of CBASpectrum. Advisers of regulated companies have also relied upon the CBASpectrum service. For example, in recent submissions on behalf of energy industry clients Alinta and AGL Gas Networks to the WA Economic Regulation Authority and IPART, KPMG has proposed debt margins based on CBA Spectrum.

Reliance on the CBASpectrum benchmark

The CBASpectrum service estimates a 'fair market' yield curve for various maturities and issue credit ratings for Australian corporate bonds. A similar service is provided by Bloomberg. As stated by Bloomberg, such estimates are 'constructed with an optimisation model that solves simultaneously for all maturity points, or term structures, and volatilities to best fit the existing data.' The pricing influence of various options (such as callability) attaching to different bonds is backed out so that a more comparable 'option adjusted spread' (OAS) can be determined.

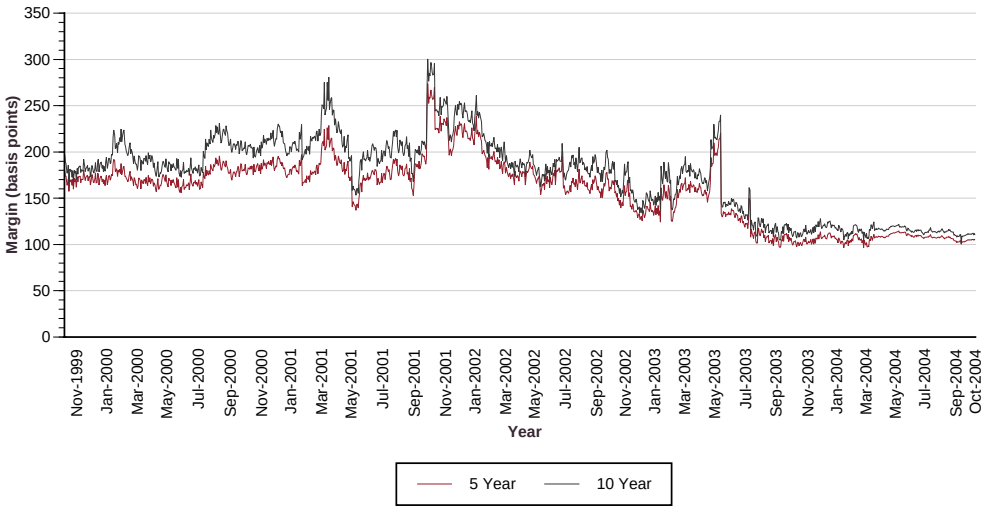
[11] ESCOSA (2004), *Electricity Distribution Price Review: Return on Assets – Preliminary views*, January, pp 70-71.

The CBASpectrum estimate of debt margins has been the dominant influence on Australian regulators setting regulatory debt margins. However, the CBASpectrum data estimates have come under increasing criticism from NERA, which on behalf of its client ActewAGL, has proposed that CBA Spectrum is an inaccurate, statistically based instrument that does not accord with reality. NERA notes that on February 24, 2004, CBASpectrum estimated a BBB+ 10 year bond should trade at 100 basis points over the government bond rate. The only bond with a similar maturity actually in the market is Snowy Hydro, which on that date was trading at 137 basis points. Thus, NERA argues that the CBASpectrum estimate understates the true cost of debt in the market.

NERA also argues that a long-term average of CBASpectrum rates should be relied upon rather than the latest observation. For BBB rated bonds this would imply attaching a debt margin in the order of 170 basis points. The movement in BBB bond spreads for 5 and 10-year bonds is shown in Table 4.2. Current spreads are at historical lows.

Figure 4.1

CBASPECTRUM BOND SPREADS (BBB)



Source: CBASpectrum

Recent determinations on debt margins have adhered closely to the appropriate CBASpectrum benchmark at the time. To illustrate:

- the ACCC's December 2002 decision on the debt margin for ElectraNet (111 basis points excluding debt-raising costs) was based on the prevailing 10-day average CBASpectrum benchmark spread;
- the ICRC's March 2004 final decision on ActewAGL (112 basis points excluding debt raising costs) corresponded to the CBASpectrum benchmark in June 2003; and
- the ESC's October 2002 final decision for Victorian gas distributors (165 basis points excluding debt-raising costs) was based on the 20-day average of the CBASpectrum benchmark.

The IPART decision for NSW electricity distributors in June 2004 also relied heavily on the CBA Spectrum data, which it considered to be 'observed yields on investment grade bonds with a maturity of 10 years.' However, CBASpectrum yields are not 'observed yields' but rather estimates based on observations. There is only one traded 10-year bond with a BBB+ rating, Snowy Hydro.

IPART took the 20-day averages of BBB+ and BBB rated bonds, which were 107 and 117basis points respectively up to and including 5 May 2004. However, IPART chose to apply a lower range of 90 to 110 basis points on the grounds that "not all debt issues are rated as low as BBB+ or BBB." The logic of this argument is difficult to see, given that the aim of the CBASpectrum methodology is to provide an estimate of an appropriate debt margin even when not many debt issues are rated as low as BBB+ or BBB. It would need to be demonstrated that the CBASpectrum estimate is incorrect by overestimating the yield that would be appropriate for a given maturity and rating.

Figure 4.1 shows that the last 12 months has been a low point in the history of CBASpectrum's estimates of margins over commonwealth government bond rates. The longer the period over which the average margin is estimated, the higher is the estimate of the margin. Table 4.2 calculates average margins for 5 and 10 year BBB rated bonds over different time periods. As shown, the period over which the average is calculated has a considerable influence on the average. The 20-day average is over 50 basis points below the 5-year average, for both 5 and 10-year bonds. The reduction in the spread between 5 and 10 year bond yield margins estimated by CBASpectrum has also reduced markedly over time, and is currently only 6 basis points.

Table 4.2

CBASPECTRUM: AVERAGE MARGINS FOR 5 AND 10-YEAR BBB RATED BONDS

Period from 27 October 2004	5 year tenor (basis points)	10 year tenor (basis points)	Spread (basis points)
Last 20 days	104.1	110.1	6.0
Last month	104.1	110.1	6.0
Last 6 months	108.0	114.3	6.3
Last 12 months	106.6	115.0	8.4
Last 2 years	122.6	133.5	10.9
Last 3 years	143.8	156.5	12.7
Last 4 years	153.9	170.1	16.2
Last 5 years	157.6	174.8	17.2

Source: CBASpectrum

Regulators select averaging periods for the benchmark to match the periods over which they calculate the risk free rate. The difference in how they calculate the risk free rate is generally marginal. As noted by the ESC[12]:

> …a reasonably uniform practice has emerged amongst Australian regulators whereby the real risk free rate is derived as a recent average (over 20 or 40 days) of the redemption yield (with terms to maturity of either 5 or 10 years)…

The ESCOSA approach of using a 5-year average is unique, as it relates to the terms under which ETSA Utilities was privatised.

Australian regulatory determinations on debt raising costs

A number of determinations by regulators since October 2002 have considered the costs of raising debt for regulated utilities. These decisions were not made in connection with IDC issues, but rather with issues relating to the re-financing of existing debt and raising of new debt capital to undertake capital expenditure in existing regulated assets. The decisions are summarised in Table 4.3, along with the allowance granted and the benchmark credit rating applied.

The Victorian ESC made the first explicit allowance for the costs of issuing debt in its determination of gas access arrangements of October 2002. The Final Decision retained the position expressed in the draft that an annualised quantum of 5 basis points be added to the cost of debt for establishment expenses. While the ESC accepted the argument in favour of allowing for this cost, no distributors were able to provide estimates of its size. Instead, the ESC based its determination on an indicative figure provided by an electricity distributor in its 2001 Electricity Distribution Price Review.

Table 4.3

DETERMINATIONS IN RELATION TO DEBT-RAISING COSTS

Regulator	Year	Industry	Allowance (basis points)	Benchmark credit rating
IPART	2004	Electricity dist	12.5	BBB to BBB+
ICRC	2004	Water and elec. dist	12.5	BBB+
ESCOSA*	2004	Electricity dist	12.5	BBB+
QCA*	2004	Port	12.5	BBB+
ACCC	2003	Electricity trans	10.5	A
ACCC**	2002	Electricity trans	10.5	A
ACCC	2002	Gas trans	25.0***	BBB+
ESC	2002	Gas dist	5.0	BBB+

** Preliminary/draft position*

*** Refers to two ACCC decisions in 2002 (ElectraNet and SPI PowerNet)*

**** This was the outcome of an appeal to the Australian Competition Tribunal decided in Dec. 2003.*

Source: published regulatory decisions

[12] ESC (2002), *Review of Gas Access Arrangements: Final Decision*, October, p 317.

In revisions to access arrangements for GasNet's transmission network in November 2002, the Australian Competition and Consumer Commission explicitly recognised transaction costs associated with the raising of both debt and equity. The ACCC considered the assessment of debt-raising transaction costs to be an empirical matter and estimated an allowance of 10.5 basis points (bp) to 12.5 bp based on information provided by a number of sources. This figure was essentially calculated from estimates provided by Westpac and verified against other sources. However, GasNet appealed the decision to the Australian Competition Tribunal (ACT), resulting in a doubling of the initial allowance to 25 basis points per annum. There has been no detailed empirical work published to support this level of costs.

In quantifying the allowance for transaction costs incurred raising debt in subsequent determinations, the ACCC relied on the research it undertook for the GasNet decision. The resultant allowances of 10.5 basis points in each of the three subsequent cases were lower than the initial GasNet allowance in reflection of the higher benchmark credit rating applied to electricity transmission businesses.

ESCOSA has reached a preliminary position (as of January 2004) in its price review of electricity distribution, to add 12.5 basis points to ETSA Utilities' overall cost of debt to cover the cost of raising debt. This is the quantum sought by ETSA Utilities. ESCOSA has accepted the proposal because it is consistent with allowances made by the ACCC where it has applied a BBB+ rated debt benchmark (the initial GasNet determination in November 2002).

In March 2004, the ICRC also accepted the proposal of ACTEWAGL for an allowance of debt issuance costs of 12.5 basis points, consistent with the ACCC's initial GasNet decision. Although the subsequent doubling of the ACCC allowance was acknowledged by ICRC, it retained the initial figure partly because it had aroused no discord from the draft report, and because it claimed the overall rate of return was relatively high.

IPART similarly incorporated debt-raising costs of 12.5 basis points in its review of electricity distribution pricing, which it decided in June 2004. The quantum appeared to be calculated with reference to determinations made by other jurisdictions. In this context, IPART claimed that 12.5 basis points was reasonable.

The UK position on debt margins and debt issuance costs

In the UK, OFWAT and OFGEM assess the applicable debt margin by analysing observed bond margins and forming a view on a reasonable benchmark rate for the regulated utility. OFWAT and OFGEM do not provide any specific funding for any costs of raising debt. The UK argument is that the basis points provided for the debt margin errs on the side of caution, and is within such a band of error that debt raising costs are assumed to lie within it.

However, in a recent submission to OFWAT, the adviser to Water UK submitted a claim, based on its market estimates, for 10-15 basis points per annum for debt raising costs, and also an allowance for equity raising costs.

Debt issuance cost adjustment to WACC vs cash flows

In Australia different regulators provide for debt issuance costs either through an adjustment to the total cost of debt, and therefore to the WACC, or through an adjustment in cash flows. An adjustment to the cost of debt, and therefore the WACC, provides a regulator with more scope to provide a smoother cash flow stream to the regulated entity. On the other hand, there is a theoretical viewpoint that such issuance costs should not be applied to the cost of debt, since the cost of debt will be determined independently of the issuance costs associated with any particular debt raising. The present value of these approaches will be equivalent from the viewpoint of the regulated entity.

Conclusions on regulatory practice

Costs of raising debt were initially explicitly recognised by the ORG in October 2002. Since that time Australian regulators have consistently allowed their inclusion as a reasonable cost for regulated entities. Despite early fluctuations in their quantum, a consensus appears to be developing for an allowance of between 10.5 bp and 12.5 bp. The origins of this 'consensus' level lie in an ACCC determination for GasNet, which was subsequently doubled by the ACT even though there is no strong empirical basis for it.

The weight of evidence would suggest the following conclusions with respect to standard regulatory practice in Australia:

- A debt margin based on a recent average of the CBASpectrum benchmark yield for 10 year rated bonds with the relevant credit rating.
- Addition of 12.5 bp for debt issuance costs.
- There is no standard practice with respect to allowing the cost of debt issuance in the WACC equation or through a cash flow allowances and these approaches have the same present value.

4.3 Current Market Evidence

In this chapter we review current market evidence relating to the Australian bond market with an emphasis on determining current yields that may be appropriate for BBB+ rated entities. This evidence includes:

- CBASpectrum and Bloomberg estimates;
- Evidence based on recent BBB+ and BBB rated bond issues; and
- Evidence drawn from other bond issuing options in the Australian market.

CBASpectrum and Bloomberg data

A major problem associated with using CBASpectrum or Bloomberg estimates for 10-year bonds rated at BBB is the fact that there are no such fixed-rate bonds in the Australian market. In addition, there is only one BBB rated bond in the Australian market with a (close to) 5-year maturity: an Energy Partnership (Gas) Pty Ltd (ENP) issue to mature on 29 July 2009. The evidence around 27 October 2004, for bond market data, is displayed in Table 3.1.

Table 4.4

BONDS SPREADS FOR BBB RATING AT 27 OCTOBER, 2004

Maturity	CBASpectrum	Bloomberg	Energy Partnership
5 years (at 27/10/04)	104.9	99.3	104.1
5 years (20-day average)	104.1	96.4	103.3
10 years (at 27/10/04)	110.2	135.9	–
10 years (20-day average)	110.1	134.9	–

Source: CBASpectrum; Bloomberg

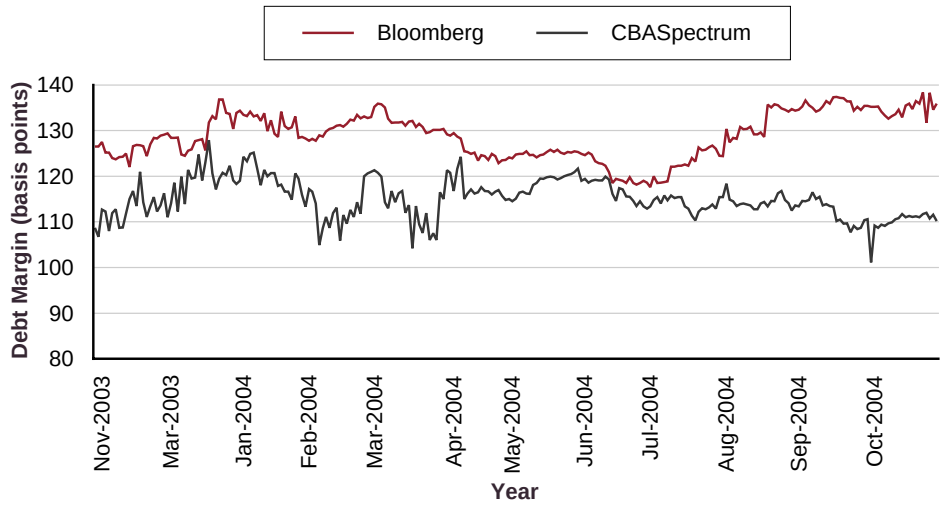
Table 4.4 shows considerable divergence in the CBASpectrum and Bloomberg estimates of a 'fair market' yield for a 10-year BBB rated bond on 27 October 2004. The differential between CBASpectrum and Bloomberg estimates was around 25 bp. This significant discrepancy is almost certainly attributable to the fact that there are no observations of such bonds in the Australian market.

For BBB bonds with 5-years to maturity, there was a differential of 5.6 bp in the Bloomberg and CBASpectrum estimates. The CBASpectrum estimates for 5-year maturity are currently closer to observation for the ENP bond.

Figure 4.2 shows movement in the Bloomberg and CBASpectrum estimates for BBB rated bonds with a 10-year maturity over the past year. Bloomberg estimates have exceed the CBASpectrum estimates over the entire period, although the current differential is of the greatest magnitude.

Figure 4.2

SPREADS FOR 10 YEAR BBB RATED BONDS, 2003-04

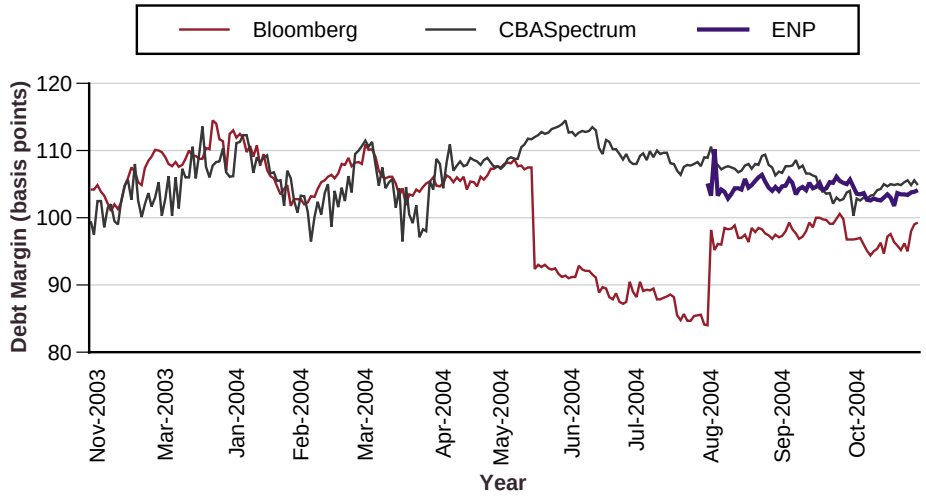


Source: CBASpectrum; Bloomberg

Figure 4.3 shows the spread between Bloomberg and CBASpectrum estimates of the fair market yield for BBB+ bonds with 5-year maturity, along with the observed ENP yield. Over the past year there has been a much closer fit between the Bloomberg and CBASpectrum estimates than for 10-year bonds, although in this instance the CBASpectrum estimates are currently higher. In early May 2004, the Bloomberg estimate dropped significantly to a range around 85-90 bp.

Figure 4.3

SPREADS FOR 5 YEAR BBB RATED BONDS, 2003-04



Source: CBASpectrum; Bloomberg

Evidence from recent Australian corporate bond issues

In this section we review the evidence that exists in the Australian bond market with respect to 5 and 10-year bond issues in the region of BBB credit. In fact, as highlighted, there is little evidence of bond deals with these characteristics. In general, Australian bond markets prefer short term and higher rated debt. Due to this lack of demand for long-dated BBB bonds, Australian corporates respond by:

- credit wrapping their bond issue to achieve a higher rating;
- issuing in private placement markets overseas in the US, Europe or Japan; or
- credit wrapping and issuing in the international markets.

Credit wrapping will be dealt with separately below.

10 year bond benchmarks

There are only two listed bonds that we are aware of that have a BBB or BBB+ credit rating and 10 year tenure. They are Snowy Hydro and AMP Bank, which are discussed below.

- *Snowy Hydro* (BBB+) - This is a $104 million medium term note (MTN) maturing on 25 February 2013 with a fixed coupon of 6.5%, and is traded in the market. Its current yield is around 6.6%, which provides a margin of around 127bp over the 10-year government bond rate.

- *AMP Bank* (BBB+) – This $100 million MTN was announced on 2 April 2004 and matures on 7 April 2014. It bears a floating tiered coupon at the 3-month Bank Bill Swap Rate (BBSW) plus 93 bp to 4 July 2009 (i.e. 5 years) and +143bp thereafter.
- *Adelaide Bank* (BBB) – This $12 million issue was announced on 23 August 2004 and matures on 27 August 2014. Its features are similar to the bonds described above – the coupon rate is set at BBSW plus 93.5 bp to August 2009 (i.e. 5 years) and 143.5 basis points thereafter.

5 year bond benchmarks

Even at 5-year maturities there are not many examples of domestically issued bonds at BBB or BBB+ rating levels. Some examples are provided below.

- *Energy Partnership (Gas) Pty. Ltd.* (BBB) – Energy Partnership's $135 million fixed rate BBB rated MTN was announced on 23 July 2004. It was issued at a fixed coupon of 6.5%, which at that date represented a 94 bp spread over 5 year government bonds.
- *AMP Bank* (BBB) – The AMP Bank issue mentioned above has a tiered rate, so that up to 2009 (5 years) the rate is 93 bp over 3 month BBSW. At the time the transaction was announced on 2 April 2004 this represented a 106basis points margin to the 5-year government bond rate.
- *Investa Property Group* (BBB+) – Investa's $135 million MTN was issued on 23 September 2004 at a fixed coupon of 6.25%. This represented a 97 bp spread over the 5-year government bond rate.
- *CSR* (BBB+) – CSR's $200 million Fixed Rate MTN was issued on 12 March, 2004 at a 6% coupon, representing a 78 bp spread to the 5 year government bond rate.

Corporate bond issuing options

Regulators must also be cognizant of the options available to companies in the market for debt, and of the actual financing practices undertaken by companies. The reason that there is so little debt issued at 10 years (and even 5 years) with BBB or BBB+ ratings is that this would appear not to be the most efficient method of debt raising given market appetite. There are two major options that are followed by relatively (to the market as a whole) highly geared Australian infrastructure utilities. One is to credit wrap the bond and issue for 5 to 7 years (and more rarely 10 years) in the Australian market. The second option is to credit wrap the bond and issue in the international markets, especially the US.

Credit wrapping

Credit wrapping involves the provision of a financial guarantee to the obligations made by the issuer of the bond. There are four major financial organisations (known as "monolines") providing this service (AMBAC, FSA, FGIC and MBIA). They make a non-revokable guarantee to make good to bondholders, on the next business day following notification, the interest and principal that was not paid by the issuer. The monolines are rated AAA and through the payment of an annual fee, provide their own credit rating to the issue. Credit wrapping by non-financial entities in Australia that are credit enhanced has risen from zero in 1998 to around 40% of all issues in 2003. According to the Reserve Bank of Australia, credit wrapping incurs an up-front premium equivalent to 20-60 bp per annum, and is "generally more than half of the spread reduction that the borrower is likely to achieve by issuing a credit-wrapped bond rather than an unwrapped bond."[13] Anecdotal evidence in the market suggests that a wrapping fee of 40 bp is common.

Outlined below are some examples of 10-year credit-wrapped bonds issued in the Australian market by energy and transport infrastructure companies over the last two years.

- *Brisbane Airport* (BBB- to AAA) - On 1 July, 2004, Brisbane Airport announced a $300 million 10 year credit wrapped bond at BBSW+61bp, which at the time of issue was 78 bp above the 10 year government bond rate if a credit wrapping fee of 60 bp is assumed.
- *Brisbane Airport* (BBB- to AAA) - On 8 December, 2003, Brisbane Airport announced a $50 million 10 year credit wrapped bond at BBSW+61 basis points, which at the time of issue was 95 bp above the 10 year government bond rate if a credit wrapping fee of 60 bp is assumed.
- *Citipower Trust* (A- to AAA) – On 24 February 2003 Brisbane Airport announced a $300 million 10 year credit wrapped bond at BBSW+68 basis points, which at the time of issue was 77 bp above the 10 year government bond rate if a credit wrapping fee of 50 bp is assumed.

These issues indicate that by credit wrapping it may be possible for Australian utilities to issue at lower margins to the 10-year government bond rate than indicated by the CBASpectrum or Bloomberg fair market yield curves. Unfortunately, information on credit wrapping fees is not made public. Hence, the estimates made above have been derived by making a conservative assumption about the credit-wrapping fee (60 basis points per annum for BBB- to AAA and 50 basis points for A- to AAA) in terms of the range provided by the Reserve Bank of Australia. In addition to the annual fee, there are some additional documentation costs associated with credit wrapping, however these would not be significant on an annualised basis over 10 years.

[13] Davies, M. and L. Dixon (2004), "Credit Quality in the Australian Non-Government Bond Market," *Financial Stability Review*, March, p.49.

International bond issues

Many Australian regulated utilities are currently seeking long-term debt funding at 10 to 15 year tenors in the international markets, particularly in the US "144A" and "Reg.D" private placement markets. Generally credit wrapped, these bonds are popular with the US insurance company market. Current pricing levels, even after credit wrapping fees and currency swap fees are understood to be very competitive, which explains their popularity. With such pricing and depth of appetite in the US market, there is little scope for development of the Australian 10 year bond market, even with credit wrapping. The Australian Pipeline Trust (APT) recently announced a USD325 million placement to retire bank debt, which was lead-managed by Citigroup. The ASX announcement reads as follows:

> **September 10, 2003 - Australian Pipeline Trust completes US $325 million private placement**
>
> The transaction represents APA's first raising in the bond markets. 13 investors were involved in the transaction, through a combination of A$ and US$ tranches. APA raised money at 7, 10, 12 and 15 years, and was able to achieve a weighted average all-in cost of BBSW +94 basis points with an average tenor of 11 years… APA accessed both Australian and US investors, a key funding objective. "We were very pleased to have been able to generate participation from Australian investors as well as the US investor base." Comments Jim McDonald, Managing Director. "APA enjoys a strong credit story and we were very keen to be able to offer exposure to global investors…"

This was 31 bp over the 10-year government bond rate at the time. The AUD component was for 7 years and represented only 20% of the issue. The USD component's weighted average tenor was 12.15 years. The ASX announcement noted that issue was positioned as a high BBB, and the longer tenor was achieved at "all-in pricing comparable to its current bank facility." Bloomberg reports that APT's "general corporate" 5-year term loan of AUD695 million, with maturity on 29 June 2005 was priced at 90 bp above BBSW, which was 27 bp above the Australian 10 year government bond rate at the time. Hence, it would appear that credit wrapping was not involved, and that 10-year debt may have been obtained at a margin to the 10-year government bond rate that was significantly below the CBASpectrum or Bloomberg benchmarks.

Conclusions

The conclusions that may be drawn from the analysis in this chapter are as follows:

- For 10-year BBB rated bonds, applying the CBASpectrum benchmark that is commonly used by Australian regulators would yield an estimate of 110 bp, both at 27 October 2004 or using a 20-day average up to that date.
- For 10-year bonds applying the Bloomberg benchmark would yield 135 bp at 27 October or 136 bp after averaging over 20 days.
- For 5-year bonds, applying the CBASpectrum benchmark that is commonly used by Australian regulators would yield an estimate of 105 basis points at 27 October 2004 or 104 bp if a 20 day average up to that date were taken.
- For 5-year bonds applying the Bloomberg benchmark would yield 99 basis points at 27 October or 96 bp after averaging over 20 days.

For 5-year BBB rated bonds, the CBASpectrum estimate is slightly above the solitary observation (ENP), while the Bloomberg estimate is around 5 basis points below. There are no 10-year BBB rated fixed coupon rate bonds in the Australian market against which to compare the Bloomberg and CBASpectrum estimates. This fact most likely explains the 25 bp differential between them. Such absence also reinforces our dependence on the two estimates, at the same time that it increases their likely margin of error.

If a domestic bond market benchmark, such as those provided by the Bloomberg and CBASpectrum services is used, it is likely in today's market conditions, that utility companies can benefit from credit wrapping and issuing in the domestic or international bond market. However, most of the examples provided can only be indicative of the level of potential gain to the shareholders of regulated companies in the absence of specific information about credit wrapping margin fees (and additional documentation costs).

4.4 Conclusions on debt margin

Debt issuance costs

With respect to debt issuance costs, the level provided and sought by most regulators and regulated companies has been 12.5 bp. This level was established by the ACCC after taking advice from Westpac and additional analysis of its own. This allowance for transaction costs was raised to 25 bp in the context recent appeal by GasNet Limited to the ACT. However, this level of 25 bp has not been established by comprehensive published empirical analysis.

The 12.5 basis point allowance has been applied to companies with a BBB+ credit rating benchmark. One question that might be raised is whether the allowance needs to be increased if GAWB has a benchmark rating of BBB, as recommended above. This is ultimately an empirical question, yet the evidence in the Australian market is very thin. US studies suggest that for bond issues rated above investment grade (BBB or better), gross underwriter spreads have little correlation with the bond rating[14]. As underwriter fees form the majority of issuance costs, this implies debt issuance transaction costs will be similar for BBB and BBB+ rated bonds.

Therefore, ACG recommends that:

- The QCA adopt a 12.5 basis point margin for debt issuance costs; and
- This transaction cost margin be added to the debt margin.

This approach is consistent with standard regulatory practice in Australia.

[14] For example, see Livingston and Zhou (2002), 'The impact of rule 144A debt offerings upon bond yields and underwriter fees', *Financial Management*, Winter 2002, vol. 31, Issue 4, pp5-28.

Debt margin

Our analysis has demonstrated that, with one exception, recent regulatory decisions on debt margin have generally been referenced from the margin over the 10-year government bond rate estimated by CBASpectrum. We have compared estimates for BBB rated bonds provided by CBASpectrum and Bloomberg over 10-year and 5-year horizons, and shown in the second case that the ENP observation lies between the two estimates. However, we have also provided evidence that the CBASpectrum benchmark may lie above the margins being achieved in the market by utilities through credit wrapping and issuance in international bond markets, particularly the US. The use by regulators of a benchmark such as the CBASpectrum service provides an incentive for regulated utilities to innovate in their financing, and is a fundamental tenet of the CPI-X incentive regulation framework.

On the balance of the evidence, we recommend that the QCA adopt a debt margin that lies within the range of CBASpectrum and Bloomberg benchmark debt margins, applying a 20-day average. Using 27 October 2004 as the cut-off date, ACG would therefore recommend the following ranges of debt margins for GAWB:

- 110 (being the CBASpectrum benchmark margin) to 135 basis points (being the Bloomberg benchmark margin) for a 10-year time horizon; and
- 96 (being the Bloomberg benchmark margin) to 104 basis points (being the CBASpectrum benchmark margin) for a 5-year time horizon.

Combined debt margin and allowance for debt issuance costs

On a combined basis (i.e. including debt issuance transaction costs), reasonable ranges for the total debt margins for GAWB would be:

- 123 to 148 basis points for a 10-year horizon.
- 109 to 117 basis points for a 5-year horizon.

In recent regulatory decisions regulators have adopted the CBASpectrum margin (for 10 year bonds) and have not considered other evidence, such as the Bloomberg estimates. Adoption of Bloomberg estimates or of a mid-point between the CBASpectrum and Bloomberg estimates would be a departure from recent regulatory practice in Australia.

Chapter 5

Factors Influencing Beta and Choice of Comparables

5.1 Introduction

In this chapter we examine from first principles the factors that affect a company's asset beta. For convenience, the factors considered below correspond with the list of factors suggested by Associate Professor Martin Lally in his recent advice to the Authority regarding general cost of capital issues.[15] These effects are discussed with respect to their applicability to GAWB's services and to assist in the choice of appropriate proxy beta comparators for analysis.

In undertaking this analysis from first principles, we are assuming that a domestic WACC framework operates. In other words, the beta that is being derived is a domestic beta, and this is to be applied in conjunction with a domestic market risk premium (MRP) to determine an equity risk premium (ERP) for the regulated entity.

5.2 Nature of Product or Service

The first factor is the nature of the product or service. Since we are concerned with the company's sensitivity to movements in the country's GDP, this issue is concerned with the income elasticity of demand. If income elasticity of demand is very high, we would expect a high asset beta, because economic booms (downturns) would result in a large positive (negative) demand response that would have a large impact on the cash flows, and therefore valuation, of the business.

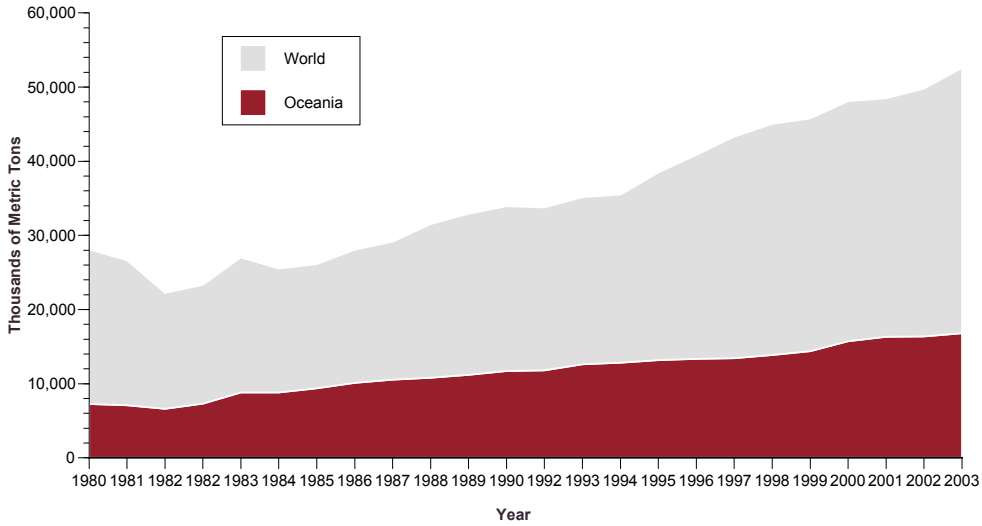
In this case, GAWB provides water and wastewater services to a small number of immediate clients. In the case of treated water the major clients are the Gladstone City Council and the Calliope Shire Council. In Chapter 1 we saw that demand for treated water is quite stable relative to the economic cycle, and this would suggest a low asset beta. However, the demand for untreated water is already around 50% of revenues and is forecast to increase as a proportion of total water consumption, since conservation measures are expected to keep the growth rate of treated water to a minimum. Thus, the question is how sensitive the demand for untreated water is relative to the domestic economic cycle.

Of the total untreated water demand in Gladstone, the vast majority can be traced to the requirements of the Queensland Alumina Limited (QAL), since untreated water is also supplied to CS Energy, which delivers electrical power to QAL. QAL, in turn, is largely dependent on the international market for alumina, and ultimately, for aluminium. Since the 1980s, Australia has produced almost one-third of the world's alumina. As shown in Figure 5.1, world production of alumina has grown steadily, and Oceania's share of production has grown in unison.

[15] Lally, Martin, (2004), *The Cost of Capital for Regulated Entities*, Report prepared for the Queensland Competition Authority, February, pp.80-84.

Figure 5.1

WORLD ALUMINA PRODUCTION

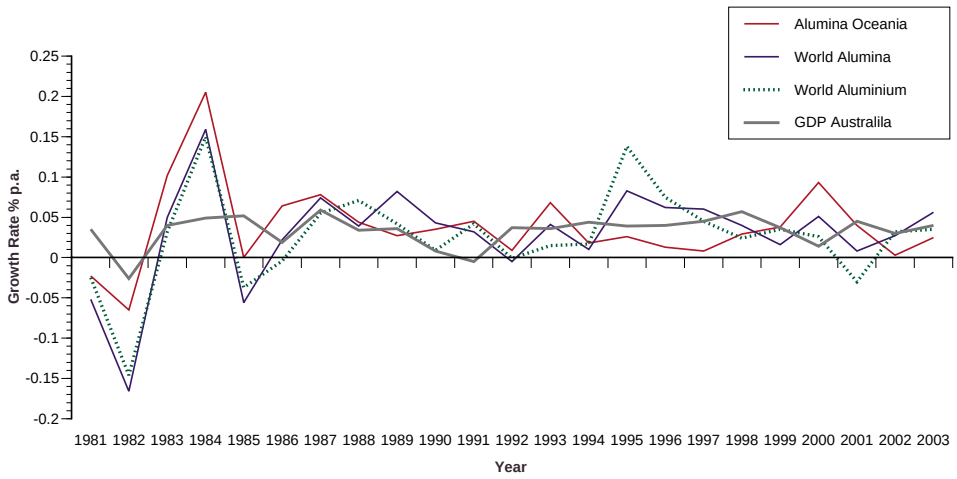


Source: International Aluminium Institute

The relationship between alumina production in Oceania, world aluminium production and Australian GDP growth is displayed in Figure 5.2 below. The world recession in 1981-82 had a marked negative effect on alumina and aluminium production, both in Oceania and the world. This reduction in world alumina demand coincided with the effects of the recession in Australia. However, since that time there appears to have been a disengagement of the linkage with Australian GDP growth. While world (and Oceania) alumina and aluminium production are still correlated, Australia's GDP growth is no longer highly correlated with alumina/aluminium growth.

Figure 5.2

AUSTRALIAN GDP VS ALUMINA AND ALUMINIUM PRODUCTION



Source: International Aluminium Institute, Bloomberg

One reason for the de-coupling of Australian GDP growth and world alumina/aluminium growth is the current lower relative reliance of the Australian economy on resource exports. Aluminium production in the US is still sensitive to the state economy, as illustrated by the sharp decline in production during the US economic slowdown in 2001. However, production of alumina in Oceania increased during 2001, reflecting the increasing diversity of alumina demand in the world. These developments, and records of QAL's usage rates for untreated water indicate that a major component of the demand for GAWB's services is not likely to be sensitive to domestic economic conditions, and therefore indicate a low level of systematic risk.

5.3 Nature of the Customer

The nature of the customer is important since different customer groups may be expected to have varying sensitivity to domestic GDP shocks. We have already seen that domestic demand for GAWB's treated water is not sensitive to economic conditions. We have also found that a large part of the current demand for untreated water, which is industrial, is derived from the demand for world alumina/aluminium. There does not appear to be much linkage between the demand for Australia's alumina and Australia's GDP, and on this basis a relatively low asset beta may be expected.

However, there is another demand factor in that is likely to have some correlation with the Australian economic cycle, which is the new business that could locate in Gladstone. New business establishment is likely to be dependent in some degree on domestic economic conditions at the time. Thus, the potential future growth of demand for untreated water can be expected to have a higher asset beta than existing domestic or industrial customers.

5.4 Pricing Structure

Pricing structure is expected to have an influence on asset beta through the mechanism of home country GDP shocks and the flexibility that a company has to protect its revenue stream in the event of a market downturn. If the pricing structure has a significant fixed component, this will cushion the revenue impact of a reduction in volumes during a downturn in the economy – that is, it would reduce the variation in revenues over the business cycle. We understand that the largest industrial customer, QAL, operates under a CPI-indexed price linked to a deemed volume uptake. Actual usage has tended to be higher than the deemed usage.

5.5 Duration of Contracts

The duration of contracts with suppliers and customers is another potentially important influence on asset beta. If contract prices for customers are set for relatively long periods, this will reduce the ability of a monopolistic firm to raise prices in the event of an upturn in economic conditions. Hence, we would expect that longer contracting periods would reduce a firm's asset beta, as these contracts would span more than the length of a period in the economic cycle.

With respect to the Gladstone City Council, which is the second largest customer after QAL, there are no take-or-pay provisions. However, the demand from the domestic customer base has been found to be extremely stable over time. For industrial demand, GAWB has contracted with CS Energy for 5 years. We understand that discussions are currently underway between QAL and GAWB in relation to a continuation of rolling take-or-pay arrangements.

5.6 Regulatory Framework

CPI-X regulation, because it generally fixes prices for five years, exposes utilities to greater systematic risks since a price-cap will negatively impact the utility in a downturn due to exposure to volume risk. Under a revenue cap risk systematic risk exposure will be lower. Generally speaking, it would be expected that other things being equal, an increase in the number of years for the price reset interval will increase risk. However, such a view would overlook the fact that the manner in which the nature of the regulatory framework impacts on the systematic risk of a utility is by magnifying the impact of underlying systematic risk (i.e., in the absence of any regulation) on its revenues and costs. If the level of systematic risk is very low or absent, then the regulatory framework cannot have an appreciable effect on magnifying the risk. There is not much evidence that the level of systematic risk is very high for the existing demand for GAWB's treated or untreated water services.

In the case of GAWB, the regulatory framework has had an impact on the systematic risk associated with future demand for GAWB's current excess capacity. This is due to the nature of the future asset utilisation target that has been agreed between the QCA and GAWB. If the utilisation target is exceed by GAWB, in which case the uptake by industrial customers will be higher than expected, GAWB will benefit. However, if the utilisation rate is not achieved, GAWB will suffer a penalty. This arrangement raises the asset beta of GAWB, since the take-up of capacity by industrial customers can be expected to have systematic risk.

5.7 Degree of Monopoly: Elasticity of Demand

The influence of the degree of monopoly power, or elasticity of demand, on asset beta is an open question, with various studies showing mixed results.[16] Since the services of GAWB are subject to regulation by the QCA, this factor is not relevant to the consideration of GAWB's asset beta.

[16] See, for example the following exchange: Sullivan, T. (1978), "The Cost of Capital and the Market Power of Firms" *Review of Economics and Statistics*, Vol. 64, pp. 523-25; Curley, A., Hexter, J. and D. Chio, (1982) "The Cost of Capital and Market Power of Firms: A Comment," Review of Economics and Statistics, Vol. 64, pp. 519-23; and Sullivan, T. (1982), "The Cost of Capital and The Market Power of Firms: Reply and Correction," *Review of Economics and Statistics*, vol. 64, pp.523-25.

5.8 Real Options

The relative size of real options available to the firm is expected to be positively related to asset beta since the value of growth options should be more sensitive the state of the domestic economy than the value of the firm without them. A characteristic of a real option is that, if exercised, it would generate rent. Yet the fact that GAWB is price regulated suggests that it would not be permitted to capture rents within the regulated activity. Furthermore, GAWB has few real options to physically expand its operations. Thus, GAWB is unlikely to have any rent-generating real options.

5.9 Operating Leverage

Mandelker and Rhee hypothesised that both operating leverage and financial leverage would have a positive impact on beta and found supportive results based on a sample of 255 US manufacturing firms for the period 1957-1976. [17]

The degree of operating leverage (DOL) can be defined as follows:

$$DOL\ at\ Q\ units\ of\ \ output = \frac{Percentage\ change\ in\ EBIT}{Percentage\ change\ in\ output}$$

where EBIT is Earnings Before Interest and Taxes, or Operating Profit. As the percentage of fixed ongoing costs increases relative to total operating costs, DOL increases. As a result of having a relatively larger element of ongoing costs, a company will experience greater sensitivity to economic shocks. Or stated in reverse, a company's operating leverage will be lower as:

- The share of profit in its revenue stream rises (i.e. as the share of profit rises, the proportionate change in EBIT from a given proportionate change in revenue falls);
- The less its revenue varies with output; and
- The more operating expenses vary with output.

The relationship between a company's asset beta and the relative level of fixed costs (DOL) has been formalised as follows[18]:

$$\beta_{asset} = \beta_{revenue}\left[1 + \frac{PV(fixed\,\cos t)}{PV(asset)}\right]$$

This formula shows that for a given level of systematic risk within the revenue stream (which the variable cost stream will approximately mimic), a company's asset beta will rise in direct proportion to the size of the present value of fixed cost relative to the size of the present value of the asset as a whole. In the limiting case, if the PV of fixed costs were zero, the asset beta would equal the revenue beta.

[17] Mandelker, Gershon N. and S.Ghon Rhee (March, 1984), The Impact of Degrees of Operating and Financial Leverage on Systematic Risk of Common Stock," *Journal of Financial and Quantitative Analysis*, Vol 19, pp.45-57.

[18] Brealey, Richard A. and Stewart C. Myers (1996), *Principles of Corporate Finance*, 6th ed. Chapter 9.

Empirical analysis of the interactions between beta, DOL, and financial leverage has often employed proxies for DOL, such as the variance of operating income.[19] Such measures require a long period of observations to provide statistically meaningful results and in that period changes in the nature of a company's operations can render such data economically meaningless.

To assess the relative operating cost exposure of GAWB, what we require is a cross-sectional measure of operating cost risk. Hence, we define an empirical Operating Cost Ratio as follows:

$$Operating\ Cost\ Ratio = \frac{Cash\ Operating\ Costs}{EBIT + Cash\ Operating\ Costs}$$

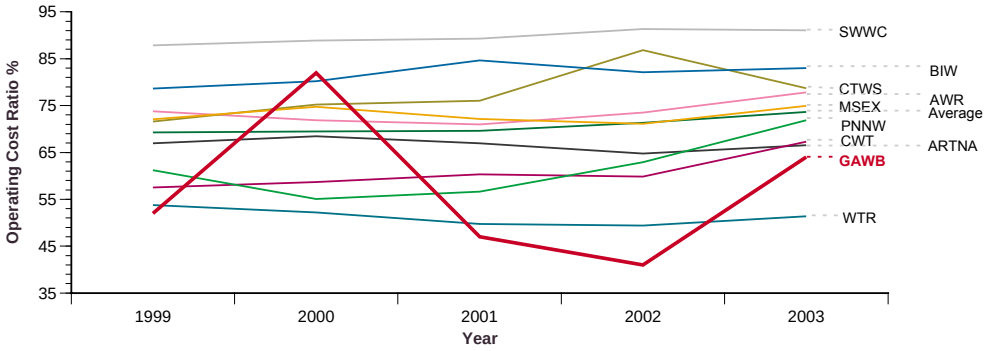
The Operating Cost Ratio is net of depreciation and measures the importance of cash operating costs relative to the revenue required to provide for cash operating costs and a return on investment (EBIT plus cash operating costs):

- If this ratio is high, a relatively small change in revenue or in cash operating costs will have a proportionately large impact on EBIT.
- If the Operating Cost ratio is low, the company's EBIT will be relatively unaffected by a given change in revenue (whether through a change in price or volume demanded) or cost.

GAWB's Operating Cost ratio has ranged from 41% to 82% over the past five years. The average Operating Cost ratio of 57% is not high relative to Australian metropolitan water companies, and may be due to low operating costs associated with the few large industrial customers serviced by GAWB. However, the Operating Cost ratio of GAWB is relatively unstable compared with the ratios of metropolitan city-based water providers. Figure 5.3 below shows how GAWB's Operating Cost ratio has fluctuated relative to a number of US water services providers.

Figure 5.3

OPERATING COST RATIO: GAWB VS US WATER COMPANIES



Source: GAWB annual reports and Bloomberg

[19] See Thompson, D.J. (April, 1976), *Sources of Systematic Risk in Common Stocks*, Journal of Business, 49, pp. 173-188. Also see Mandelker, G.N. and S.G. Rhee (March, 1984) "The Impact of the Degrees of Operating and Financial Leverage on Systematic Risk of Common Stock", *Journal of Financial and Quantitative Analysis*, 19, pp.45-57. Their proxy for DOL is the slope coefficient when the log of operating earnings is regressed against the log of sales.

5.10 Market Weight

A company's relative weight in the market proxy that beta risk is being measured against can have an influence if that weight is large. The larger is the market weight, the closer to unity will the equity beta be drawn. GAWB's relatively small asset size gives it a very small weight relative to the ASX200 Index.

5.11 Conclusion

Our analysis of GAWB's systematic risk profile has identified the following key issues:

- As a supplier of water and wastewater services subject to a CPI-X regulatory regime, we should expect GAWB to experience a lower level of systematic risk than the average company in the market.
- GAWB will be subject to less systematic risk than say, electricity DNSPs, since compared with electricity, water demand is less correlated with domestic economic growth.
- Relative to water companies serving large metropolitan areas, GAWB's demand is more heavily weighted towards industrial demand, which should have a higher systematic risk than domestic demand. However, GAWB's largest industrial customer is QAL, which is engaged in the export of alumina to world markets. We have seen that over the past 20 years there has not been a linkage between Australia's GDP growth and production of alumina, nor with alumina and aluminium production worldwide. This suggests that a large part of GAWB's existing industrial load will be uncorrelated with the domestic economic cycle.
- The regulatory framework has provided an incentive structure for GAWB to achieve utilisation of its excess capacity over time. Since the rate of utilisation of the capacity is likely to be correlated with the state of the domestic business cycle (e.g. through the attraction of new businesses to Gladstone), this component of demand may be expected to have a higher level of systematic risk. However, the demand forecast applied in setting the target utilisation of capacity is not aggressive, and this fact will mitigate any systematic risk arising from the existence of excess capoacity.
- GAWB's average Operating Cost ratio was found to be low relative to that of Victorian metropolitan and rural water utilities. However, GAWB's Operating Cost ratio was also found to be significantly more variable over time than say, US water companies. This would have the potential to raise GAWB's relative risk.

Taken as a whole, these indicators of systematic risk would suggest that the asset beta of GAWB would be less than that of the average company in the market. Some factors (such as international alumina demand driving QAL's consumption) would suggest an asset beta lower than that of the metropolitan water utility. Other factors, such as potential systematic risk associated with the cost structure and the take-up of the current excess capacity would suggest a higher asset beta. On balance, we consider GAWB would face a similar level of systematic risks as a metropolitan water utility.

Chapter 6

Beta Analysis

6.1 Introduction

In this chapter we examine the domestic energy distribution and transmission sector, as well as the US and UK water industries. However, we begin by discussing recent market events surrounding the dot-com 'bubble' that have influenced the measured asset beta of low risk and utility businesses relative to historical experience.

In undertaking the analysis, The Allen Consulting Group has calculated estimates of proxy betas based on a debt beta assumption of 0.10, and de-levering based on the Conine formula.[20] Previously, the QCA has applied the simple Brealey and Myers formula together with a 0.20 debt beta assumption, which was the upper bound of a zero to 0.20 range. ACG has been instructed by the QCA that the new approach and parameters may be applied in the case of GAWB. Therefore, for consistency with the approach that will potentially be applied by the QCA, ACG has adopted the same assumptions when analysing proxy betas for GAWB.

6.2 QCA's beta analysis in 2002

During its review in 2002, the QCA considered a number of submissions relating to the beta risk of GAWB, including from QTC, CS Energy and Comalco.[21] QTC argued that GAWB is different from metropolitan water companies since it has a relatively high industrial load, which is higher risk. On the other hand, customers such as CS Energy and Comalco argued that risk is low because the industrial customers are stable businesses that have take-or-pay obligations.

The QCA's own analysis found the range of asset betas that had been determined by other regulators of water assets was from 0.3 to 0.45, although some higher asset betas had been assessed. The QCA identified a number of factors for GAWB that supported use of an asset beta at the bottom end of the range.

- Urban customers were only 20% of demand, and demand management strategies would be offset by population growth;

[20] See Conine, T. (1980), "Corporate Debt and Corporate Taxes: An Extension," *Journal of Finance*, 35, pp.1033-6. It assumes a passive debt management approach. The formulae for equity and asset betas under the Conine approach are as follows:

$$\beta_e = \beta_a + (\beta_a - \beta_d) \times (1-T) \times \frac{D}{E} \quad \text{and} \quad \beta_a = \frac{\beta_e + \beta_d \times (1-T)\frac{D}{E}}{1 + (1-T)\frac{D}{E}}$$

where:
β_e = equity beta
β_a = asset beta
β_d = debt beta
D = value of debt
E = value of equity
T = imputation adjusted corporate tax rate
The QCA's version of the Conine formula defines T as the imputation adjusted tax rate taking account of dividend imputation. Hence, T = t (1 - γ), where γ = proportion of imputation credits that can be utilised by shareholders. The QCA sets t = 0.30 and γ = 0.50. The Conine formula differs from the simple Brealey and Myers formula to the extent that T is positive, and is equivalent if γ = 1.

[21] QCA, (September, 2002), *Final Report, Gladstone Area Water Board: Investigation of Pricing Practices*, pp. 85-86.

- Historically, demand from large industrial customers has been stable regardless of economic cycles;
- Revenue from large industrial users is protected by long term take-or-pay contracts; and
- Supply capacity was based on a historical no failure yield, although the emerging drought risk meant that this factor had less weight.

Against these factors, the QCA considered the main factor supporting a beta towards the upper bound of the range to be the uncertainty associated with future demand for the current 40,000 megalitre capacity augmentation. Due to the risks associated with this new capacity, the QCA viewed GAWB as being subject to more risk than a larger metropolitan-based water company. An asset beta of 0.45 was chosen, which together with the assumed debt beta of 0.27 and a 50% gearing assumption resulted in an equity beta of 0.63.

6.3 GAWB's submission to the current review

GAWB's submission to the current review submitted that, "the QCA should adopt an asset beta for GAWB of at least 0.60."[22] Compared with 'incremental utilities' such as urban electricity, gas or water distribution businesses, GAWB saw itself as being subject to greater risk due to:

- A small proportion of GAWB's revenues are based on sustaining life, while other uses are discretionary and dependent on economic factors;
- More than 50% of water is supplied for cooling processes that have substitutes;
- The regulatory regime imposes higher risk through asset optimisation and an undefined scope for regulatory intervention;
- There is higher demand and cashflow uncertainty; and
- There is a higher correlation of returns with market returns.

According to GAWB, its business risk is more similar to an electricity generator, since:[23]

> Urban [electricity, gas or water] distributors have lower systematic risk because their returns are dependent on migration, birth rates and local economic performance (and other specific factors such as take-up rates of air-conditioning, etc.). Returns are therefore likely to be uncorrelated with market returns. By comparison, GAWB's industrial customer activity varies more directly with changes in international markets.

[22] GAWB, (2 July, 2004), *Queensland Competition Authority (QCA) – 2004 review of GAWB's pricing practices: Response to the QCA's Issues Paper*, p.67.

[23] GAWB, (2 July, 2004), p.66.

Despite these claims, GAWB's submission does not provide any evidence that its business risk is similar to that of an electricity generator. Recent US research has investigated, and found empirical evidence supporting, a significant relationship between changes in GDP and electricity consumption.[24] As the domestic economic cycle fluctuates, so too does the demand for electricity, and particularly the demand by industry at peak times. GAWB has not demonstrated any connection between the domestic economic cycle and its own revenues derived from water and wastewater services. Our examination of GAWB's historical revenues from its various major customers demonstrates the opposite.

6.4 Infrastructure Betas, the 'New Economy' and the Stock Market

The techniques for estimating the expected beta for an asset involves estimating the historical relationship between the returns to that asset and the market as a whole. An implicit assumption of this approach is that the historical relationship between an asset (or a particular type of asset) and the market as a whole is an accurate predictor of the expected (future) relationship.

In the late 1990s to the early 2000s, many of the world's major share markets experienced a substantial rise in the share of technology-related stocks and with it their markets as a whole, followed by a later substantial fall in these stocks and the markets as a whole. In parallel with the rise in technology related stocks, the value of safe types of assets – such as utilities – initially fell (as investors substituted 'old economy' stocks for 'new economy' stocks) and then experienced a rise when the prices of technology stocks fell, as investors sought out safe investments.

The effect of utility stocks moving contrary to the general movements in the share market over an extended period was to depress their beta estimates. Whether the lower beta estimates are likely to be accurate estimates of the expected (future) betas then depends upon whether the dot-com 'bubble' is considered a normal or abnormal event. It is now generally accepted that events over this period were extraordinary, and that beta estimates obtained over this period are biased downwards. As noted in a US study of this phenomenon:[25]

> Sharp recent declines in telecom, media and technology valuations suggest that the past three to five years were truly extraordinary… But in assessing future values for betas, most practitioners look to the equity returns of the recent past – and the most recent three to five-year averages and correlations of returns to shareholders are of course quite extreme. By excluding the bubble years entirely, it is possible to calculate betas that are more consistent with the long-term historical results and indicate more accurately the relative risk borne by companies in other sectors. In the absence of such a correction, data drawn from the bubble years may generate artificially low betas for the next couple of years.

Unlike many of the other share markets – and particularly the US – the Australian share market did not experience a substantial rise overall during this period, and equally did not experience a substantial later correction, but rather experienced a sustained period of side-ways movement. However, while the share market as a whole appeared largely unaffected by the dot-com 'bubble' that affected many other share markets, there were sizeable impacts on specific sectors of the market.

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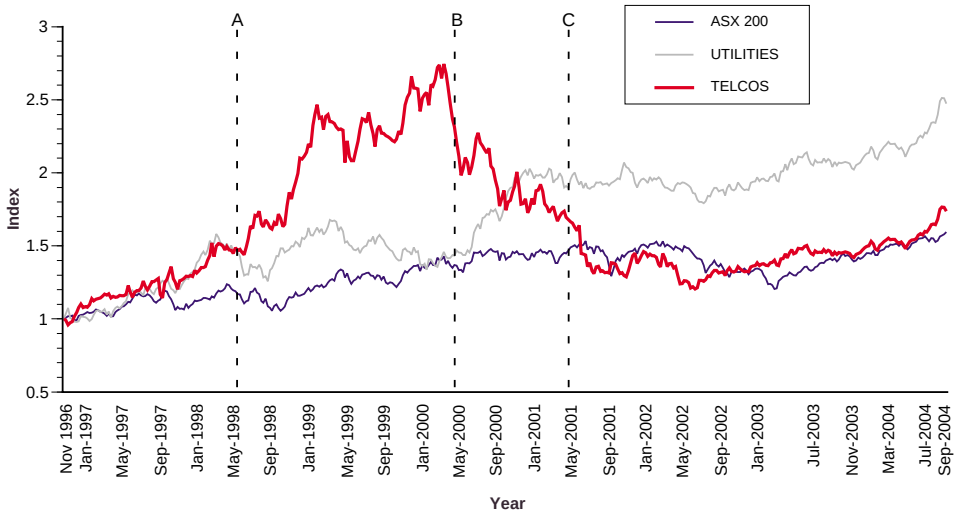
[24] Thoma, Mark, (2004), "Electrical energy usage over the business cycle", *Energy Economics*, Vol. 26, pp.463-485.

[25] Annema A. and M. Goedhart, 2003, 'Current Research – A Better Beta', *McKinsey Quarterly*, No.1, p.8. The authors classified the abnormal period for the US market as between January 1998 and December 2001.

Figure 6.1 shows the ASX 200 share market index over the period since 1 January 1996 to the present, along with the relevant indices for telecommunications stocks and infrastructure stocks, all re-based unity at the start of the period.[26]

Figure 6.1

AUSTRALIA: EFFECTS OF THE DOT-COM 'BUBBLE '



Source: Bloomberg

While the behaviour of the Australian market as a whole over the period was largely unexceptional, there were substantial differences in the relative performance of some of the sectors. In particular, the telecommunications sector (the proxy for the 'new economy') experienced substantial growth over the period beginning in mid 1998 (indicated by line A), and then an equally substantial decline from the peak experienced in March 2000 (indicated by line B). In contrast, the utilities sector moved largely counter to the telecommunications sector and counter to the market as a whole – particularly during the subsequent decline in the telecommunications sector from March 2000 until the end of 2001 (in the period indicated by lines B and C), when the utilities experienced substantial growth and the price index for the market as a whole barely changed.

Current beta estimates for Australian and US utility firms over a 4-5 year period include observations from the unusual market periods discussed above. In particular, the current 60-month beta estimates include the period after November 2000, and so include much of the period of the dot-com 'bubble'. Given the discussion above, we consider there to be a sound basis for questioning whether the estimates of betas that include data between the period commencing in about mid 1998 and the end of 2001 would deliver an unbiased estimate of the expected (future) beta for these stocks.

Accordingly, in this report, we have used two approaches to attempt to remove the potential bias in the forward-looking beta estimates, discussed above.

[26] The relevant sectoral indices were the telecommunications and infrastructure and utilities indices until 5 July 2002, and then telecommunications services and utilities indices thereafter (the original indices were not published after this date). The new indices were 'spliced' to the old to create a continuous series.

First, we have presented beta estimates for entities using the reasonably standard 5-years of monthly observations over a period that predates the commencement of the dot-com bubble, that is, for the period prior to about mid-1998. Secondly, we have also presented beta estimates using a shorter estimation period (60 weeks) and higher frequency data (weekly observations). The 60 -week beta estimates will be free of the effects of the utility boom after about February 2003.[27] It is noted that there *may* be some risk that the latter set of results provide downward biased beta estimates if the stocks in question are traded more thinly than the market.[28] However, it is also noted that higher frequency data are often frequently applied by financial analysts, and has been recommended in a recent independent review of cost of capital matters for the UK regulators.[29]

6.5 Australian electricity and gas transmission and distribution

Since there are no listed Australian water companies, we have first reviewed betas of Australian energy distribution and transmission businesses, which could be expected to be subject to higher systematic risk than metropolitan water businesses. Figure 6.2 shows 'rolling' equity beta estimates for both 60 monthly and 60 weekly observations since the early 1990s for a group of companies that includes AGL, Alinta, Australian Pipeline Trust, Envestra, GasNet and United Energy (which has subsequently de-listed). This figure shows that the weekly beta estimates tend to lead to monthly estimates, which have lower volatility, reflecting the fact that the weekly estimates are more quickly affected by more recent developments. The weekly estimates – after hovering between about 0.6 and 1.4 since the end of 1994, started to fall quickly from early 1998. The trend in weekly estimates was subsequently followed by the monthly estimates. However, the weekly estimates rose sharply from early 2003, and sharply from the end of 2003, coinciding with the 'bubble' observations dropping out of the sample set. If this trend is followed by future monthly estimates, it follows that the current monthly estimates would materially understate the expected (future) equity beta for a regulated Australian energy utility.

[27] That is, estimates of betas using 60 weeks of weekly observations in February 2003 would have used observations back to about January 2002, which would have excluded the 'bubble' observations.

[28] A cursory perusal of trading data suggests that thin trading was not a significantly biasing issue for the Australian utility stocks examined.

[29] A recent report to the UK energy and water regulators, OFWAT and OFGEM, concluded that there was no necessary reason to use monthly sampling intervals for all firms, and suggested that weekly – or even daily – observations may have substantial advantages, subject to the thin trading and other problems of more frequent sampling either not being substantial or being dealt with through econometric techniques See, Wright, S., R. Mason and D. Miles, (February, 2003), *A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K.*, Study for the Joint Regulators, pp.103-104.

Figure 6.2

AUSTRALIAN ENERGY: AVERAGE BETA (RE-LEVERED TO 60%)

Source Bloomberg; ACG analysis

Table 6.1 shows that the average of current (at 11 November, 2004) data indicates an average equity beta of 0.73 based on 60 weekly observations, which is similar to the average level of equity betas observed (for AGL and Envestra only) in June 1999 using 60 monthly observations. Recent 60 week estimates have been in the order of 0.75 to 0.85. Whilst such evidence is not conclusive on the question of where observed 60 month equity betas for Australian energy utilities will settle at over the next 5 years, there is strong evidence that they will be considerably higher than present levels.

Table 6.1

AUSTRALIAN ENERGY: EQUITY BETA RE-LEVERED TO 60%

Re-levered (to 60%) equity beta:	At June 1999 (monthly)	At Oct. 2004 (monthly)	At 11 Nov. 2004 (weekly)
AGL	0.80	-0.30	0.66
Alinta		0.69	1.73
Australian Pipeline Trust		0.67	0.65
Envestra	0.60	0.09	0.58
GasNet Australia		-0.10	0.62
Average	**0.70**	**0.21**	**0.73**

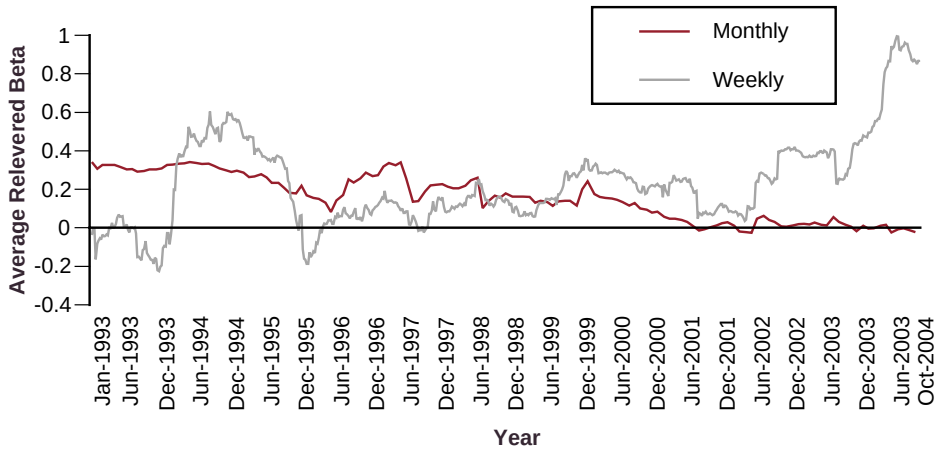
Source: Bloomberg; ACG analysis

6.6 US water companies

Figure 6.3 shows estimates of rolling re-levered betas (at 40% gearing) for listed US comparable entities in the water sector for both the 60 weeks of weekly observations and 60 months of monthly observations. Of interest in this figure is the reasonably constant average of the monthly betas for the proxy group between about 0.30 and 0.40 before the start of 1998, and then a substantial decline in the weekly estimates followed by the monthly estimates. This is very similar to the temporal pattern found in the US electricity and gas industries, although the water industry betas are at a lower level.

Figure 6.3

US WATER: AVERAGE BETA (RE-LEVERED TO 50%)



Source: Bloomberg; ACG analysis

In the US water sector the weekly beta estimates have since risen to levels that are more consistent with the pre-1998 period, while the monthly estimates are have not yet begun to rise.[30] We expect that future levels of US water company betas are also likely to be significantly understated by current estimates, which average near zero. Table 6.2 below shows that the current weekly beta estimate of 0.86 is significantly higher than the monthly average of 0.34 at June 1997. This contrasts with the currently observed monthly beta estimate of –0.02, which includes observations from the dot-com 'bubble' period.

[30] This contrasts with the US electricity industry, where 60 week betas are rising and the 60 month betas are also rising, albeit more slowly.

Table 6.2

US WATER: RE-LEVERED EQUITY BETA (TO 50%)

Re-levered equity beta:	At June 1997 (monthly)	At Oct. 2004 (monthly)	At 19 Nov. 2004 (weekly)
Artesian Resources Corp		0.22	0.65
American States Water Co	0.43	-0.17	1.22
BIW		.08	0.30
Connecticut Water Service	0.20	-0.15	1.10
California Water Service Grp	0.96	-0.18	1.06
Middlesex Water Co	0.02	0.30	1.35
Pennichuck Corp		-0.16	-0.18
Southwest Water Co	-0.51	0.14	1.14
Aqua America	0.94	-0.29	1.10
Average	**0.34**	**-0.02**	**0.86**

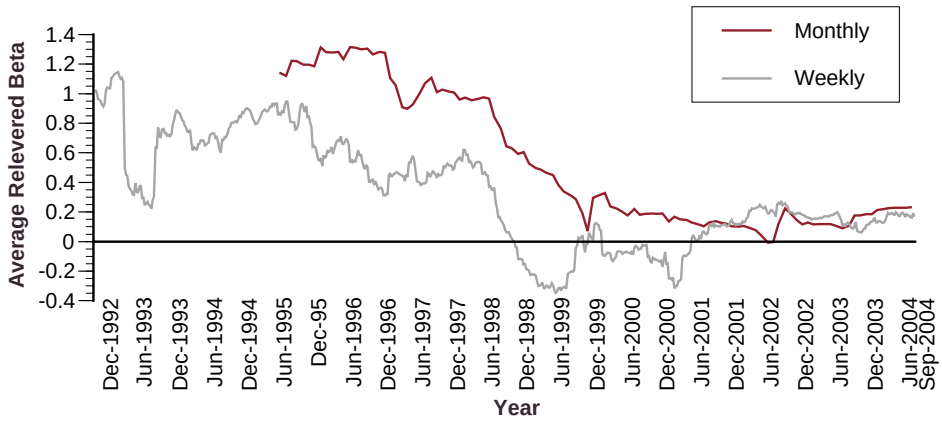
Source: Bloomberg; ACG analysis

6.7 UK water companies

We also estimated rolling weekly and monthly re-levered (to 50%) equity betas for UK water companies. The results are displayed in Figure 6.4, and show essentially the same picture of monthly asset betas fluctuating between 0.90 and 1.30. Whilst the current monthly and weekly equity beta estimates are roughly equal at 0.23 and 0.17 respectively, there has been a small positive trend since the end of the bubble period. In contrast to the US water industry, the electricity and gas industries, and the Australian energy sector, there has been no significant upward spike in weekly equity betas since the end of the dot-com bubble.

Figure 6.4

UK WATER: AVERAGE BETA (RE-LEVERED TO 50%)



Source: Bloomberg, ACG analysis

One major difference between the US and UK water sectors is the change in the regulatory approach that took place at the 1999 prices review in the UK. OFWAT's reduction in the assumed regulatory Market Risk Premium to 3.5% led to a significant reduction in the cash flows of the water companies relative to previous periods. This, in turn, resulted in a restructuring of many companies in the industry, including higher debt structures and pledges to debt holders constraining activities to the core water activities. In addition, operating cost structures had fallen relative to earlier regulatory periods. Hence, there may have been some permanent reduction in the asset beta of the UK water companies, which may become visible in market data over the next 4-5 years.

Table 6.3

UK WATER: RE-LEVERED EQUITY BETA (TO 50%)

Re-levered equity beta:	At June 1998 (monthly)	At Sept. 2004 (monthly)	At 8 Oct. 2004 (weekly)
AWG	0.90	0.45	0.19
Dee Valley Group		0.05	0.25
East Surrey Holdings	0.60	0.42	0.17
Kelda Group	1.38	0.30	0.15
Pennon Group	0.81	-.06	-0.22
Severn Trent	1.13	0.25	0.48
Average	**0.96**	**0.23**	**0.17**

Source: Bloomberg,

In its most recent review of water and sewerage prices, the UK regulator, OFWAT concluded the following in relation to water equity betas[31]:

> There are significant difficulties interpreting equity beta values. Time series data shows that equity betas of the listed water companies have been on a downward trend since their initial flotation in 1989. In the early 1990s average betas for the water sector were about 0.9 but they fell steadily to about 0.5 in 1999. They have continued to decline to a low of about 0.3 in 2002-03 although the most recent data suggests they are on an upward trend. Taken at face value this would imply that the equity market regards investment in water stocks since the 1999 review as considerably less risky relative to the market than prior to it. Although we have taken steps to reduce regulatory uncertainty the low beta factors are unlikely to reflect a real decrease in the riskiness of the water sector but are more likely a statistical product of the increase in market volatility… We have used a value of 1 for the geared equity beta. This is a pragmatic approach, but is consistent with that taken by other regulators and the Competition Commission.

It should be noted, however, that whilst OFWAT assumed an equity beta of 1.0, this was applied to a Market Risk Premium (MRP) assumption of 4.5% (mid-point of a range from 4% to 5%). This is equivalent to an equity beta assumption of 0.75 when attached to an MRP assumption of 6%, which is the standard assumption among Australian regulators.[32]

[31] OFWAT (5 August, 2004), *Future Water and Sewerage Charges, 2005-10: Draft Determinations*, August, p.190.

[32] This raises the issue of whether there is a difference in the MRP between the UK and Australia. For a discussion of this issue see ACG (March, 2004), *Review of Studies Comparing International Regulatory Determinations*, Report to the Australian Competition and Consumer Commission.

6.8 Australian regulatory decisions in the water sector

A number of Australian regulatory decisions in the water sector are summarised in Table 6.4. On average, the five decisions reviewed had a gearing of 54%, debt beta of 0.17, an asset beta of 0.40 and an equity beta of 0.69. Equity betas assumed by regulators with respect to urban water and wastewater operations have tended to be higher than this, within a range of 0.73 to 0.90. Given the wide range in debt betas (0.06 to 0.30) assumed by different regulators, little weight can be placed on the relative asset beta levels.

The QCA's 2002 determination in relation to GAWB differed from the average through a lower gearing, higher debt beta and asset beta, and lower equity beta. The lower equity beta was largely due to the assumption of lower gearing.

Table 6.4

AUSTRALIAN REGULATORY DECISIONS ON BETAS IN THE WATER INDUSTRY

Regulator/ Assets	Year	Gearing (%)	Debt beta	Asset beta	Equity beta
GPOC: Hobart, ESK, Cradle Coast	2004	50	0.12	0.30 – 0.55	0.4950 – 0.9575
ICRC: ACT	2004	60	0.06	0.40	0.90
IPART: Sydney Hunter	2003	60	0.06 – 0.14	0.30 – 0.45	0.65 – 0.90
QCA: Burdekin	2003	50	0.30	0.35	0.40
QCA: GAWB	2002	50	0.27	0.45	0.63
Range		*50-60*	*0.06 – 0.30*	*0.30 – 0.55*	*0.4 – 0.9575*
Average		*54*	*0.17*	*0.40*	*0.69*

Source: published regulatory decisions

6.9 Summary and Conclusions

This chapter has examined the effects of the dot-com 'bubble', which in May 2000 led to a short period in which utilities were demanded and their measured betas based on 60 monthly observations fell to low or negative values. Our analysis has shown that the effects of the 'bubble' on equity betas were temporary, and that current 60-week beta estimates are generally rising to levels similar to or higher than those experienced prior to the 'bubble'. Over the next 4 years we would expect monthly equity beta estimates of water companies to revert to levels that are more in line with current (and pre-bubble) weekly beta estimates in the US. Such a result cannot as yet be predicted for the UK water industry. Significant changes have occurred in the UK regulatory approach since 1999, and these have had significant impacts on the capital structures and scope of operations of water companies.

Taking account of current measurement difficulties and the systematic risk factors discussed in Chapter 5, The Allen Consulting Group considers that it is appropriate to apply an equity beta of 0.66 for a gearing level of 50% when deriving a WACC for GAWB, which is consistent with an asset beta of 0.40, a debt beta of 0.10 and the use of the Conine de-levering approach. The asset beta of 0.40 compares with an asset beta of approximately 0.76 for the average company in the market (geared at 30%), reflecting the lower risk nature of GAWB's operations.

Appendix A

Company descriptions

A.1 Australian energy company descriptions

Australian Gas Light

Australian Gas Light Company Limited sells and distributes gas and electricity through various networks along with the operation of natural gas transmission pipelines. The company also extracts and sells LPG, provides power generation and energy infrastructure, invests in energy and telecommunications businesses and is involved in property rentals.

Alinta

AlintaAlinta Limited is a natural gas distribution and gas retail company in Western Australia. The company delivers natural gas to approximately 450,000 Western Australian households through its network of pipelines. Alinta also has an interest in National Power Services (Western Australia) Pty Ltd a construction and maintenance company.

Australian Pipeline Trust

Australian Pipeline Trust has interests in a portfolio of high-pressure gas transmission pipelines in Australia covering four states and two territories which transport natural gas. Some of the Trust's pipeline systems include the Moomba to Sydney and Roma to Brisbane.

Envestra

Envestra Limited operates natural gas distribution networks in South Australia, Queensland and the Northern Territory. The Company's networks distribute gas to households and businesses in Adelaide, Brisbane (north of the Brisbane River), Alice Springs and various regional centres in South Australia and Queensland.

GasNet Australia Group

GasNet Australia Group, through its subsidiary, owns and maintains gas transmission pipelines in Victoria and New South Wales. The Group also owns and operates a liquefied natural gas storage and vaporization facility, compressor stations and metering, odourant, injection, monitoring, control and communication systems.

A.2 United States water company descriptions

Artesian Resources Corporation

Artesian Resources Corporation, through its wholly-owned subsidiary Artesian Water Company, Inc., provides water utility service to customers primarily in New Castle County, Delaware. The Company sells its water services to residential, commercial, industrial, utilities, and municipal customers.

American States Water Company

American States Water Company purchases, produces, distributes, and sells water. The Company also distributes electricity in one community. American States operates within various customer service areas in California.

BIW Limited

BIW Limited is the parent company of Birmingham Utilities, Inc., a collector, distributor, and seller of water. The Company's water services are for residential, commercial, and industrial purposes and fire protection in Ansonia and Derby, Connecticut, and in small parts of the contiguous town of Seymour, Connecticut.

Connecticut Water Service

Connecticut Water Service, Inc. is a holding company for The Connecticut Water Company. The Company supplies water to residential, commercial, industrial, and municipal customers located throughout Connecticut.

Cailfornia Water Service Group

California Water Service Group is the parent company of several water utility companies. The Company provides regulated and nonregulated water utility services to customers in California, New Mexico, and Washington.

Middlesex Water Company

Middlesex Water Company treats, stores, and distributes water for residential, commercial, industrial, and fire prevention purposes. The Company operates in New Jersey and Delaware. Middlesex also provides contract water and wastewater management services to municipalities in New Jersey.

Pennichuck Corporation

Pennichuck Corporation collects, stores, treats, distributes, and sells potable water throughout southern and central New Hampshire. The Company also provides real estate development and contract operations for billing, operations, and maintenance services to municipalities.

Southwest Water Company

Southwest Water Company operates and manages water-supply and wastewater-treatment systems. Some of the systems are owned by the Company and are regulated public utilities, while the remainder, owned by cities, utility districts, and private companies, are operated and managed under contract.

Aqua America

Aqua America Inc. is a water utility company. The Company supplies water to residential, commercial, industrial, and public customers. Aqua America serves residents through its water and wastewater operations in Pennsylvania, Ohio, Illinois, Texas, New Jersey, Indiana, Virginia, Florida, North Carolina, Maine, Missouri, New York, South Carolina, and Kentucky.

A.3 United Kingdom water company descriptions

AWG

AWG plc offers utility infrastructure maintenance services. The Company constructs, maintains, and manages infrastructure for the natural gas, water, telecommunications, and electricity distribution sectors, participates in projects with government, and develops commercial and residential property. AWG operates in Europe, South America, and Asia.

Dee Valley Group

Dee Valley Group plc is the holding company for Dee Valley Water plc, a drinking water supply company. Dee Valley Water plc provides its services to customers predominantly in Chester and North East Wales.

East Surrey Holdings

East Surrey Holdings plc is a water company. They supply drinking water to the London Boroughs of Croydon and Sutton, East Surrey and parts of Kent and Sussex. The Group also owns various non-regulated businesses, including an aggregates and specialized minerals company, a water treatment operation, a natural gas supply operation, and a plumbing services company.

Kelda Group

Kelda Group PLC, through its wholly-owned subsidiary, Yorkshire Water Services Ltd., provides drinking water and waste water services to the Yorkshire region. The Group's other core activities include treatment of liquid and solid wastes, collection and disposal of medical waste. Aquarion offers water services in the US. The company also has interests in water engineering and property management.

Pennon Group

Pennon Group Plc operates and invests primarily in the areas of water and sewerage services and waste management. Their principal subsidiary, SouthWest Water Limited, holds the water and sewerage appointments for Devon, Cornwall and parts of Somerset and Dorset. Viridor Waste Limited operates a waste treatment and disposal businesses in the United Kingdom.

Severn Trent

Severn Trent plc supplies water, waste, and utility services throughout the United Kingdom, Europe, and the United States. The Group offers a range of water purification, sewage treatment and disposal, and recycling services. Severn also provides utility companies with a range of information technolgy services and software solutions, as well as engineering consultancy services.

Appendix B

S& P Ratios

Financial ratios

As discussed, S&P calculate a number of financial ratios in their assessment of a company's financial risk. These cover the broad spectrum of areas assessed, including profitability, capital structure, cash flow protection and capacity to meet debt obligations. Reliance on ratios is tempered by other qualitative information, such as the impact of future plans on the financial profile of the company.

Common ratios calculated by S&P to assist in the ratings process are outlined below.

Interest coverage

Interest coverage ratios are a direct measure of the proportion of earnings or cash to the forecast interest payments; the ability of a company to meet its debt obligations. A higher ratio implies a greater safety margin. Three measures for interest cover are used in the report, which are:

- $Pretax\ (EBIT)\ interest\ Cover = \frac{EBIT}{Interest}$
- $EBITDA\ interest\ Cover = \frac{EBITDA}{Interest}$
- $FFO\ interest\ Cover = \frac{FFO + Interest}{Interest}$

The first two measures use different measures of accounting earnings to test the safety margin over interest payments, the difference being whether earnings are measured before or after depreciation and amortisation. A concern over both measures is that accounting earnings may misstate the cash generated by the entity – either including non-cash items as revenue (such as the fair-value of gifted assets) or under or overstating cash expenses – and so misstate its ability to service debt.[33] Both measures also focus on earnings before tax, and so do not take account of this cash expenditure item.

The third interest cover measure – funds from operations interest cover – focuses on the cash generated by an entity in respect of a year – and so avoids the potential distortions arising from accounting policies. Funds from operations (or net cash flow from operations) reflect the difference between revenue and operating expenditure, including taxation and interest payments.

[33] Cash expenses would be overstated (all else constant) where provision is made for expenditure in respect of a period that will be required in the future. Cash expenses would be understated (all else constant) where the expenditure is made on an item for which a provision was made in a previous period.

Cash Flow

- Cash flow ratios measure the ability of the company to generate cash from its operations to service outstanding debt principle and other obligations. As considered above, cash flow measures tend to overcome distortions accounting measures of profit can generate. The primary cash flow measure used in this report is:

- $$FFO \text{ to total debt} = \frac{FFO}{Total\,debt}$$

Capital structure

Capital structure ratios indicate the degrees to which a company is funded by debt and equity. The conceptually correct measure of gearing for an entity is the ratio of the market value of debt liabilities to the market value of the entity as a whole (that is, the sum of the market values of debt and equity). However, while an estimate of the market value of the equity portion of finance is easy to obtain for listed entities at least, the market value of debt finance cannot be observed. Accordingly, the book value of the debt is taken as a proxy for its market value – which is generally a reasonable close proxy.[34] This provides the following formula:

$$Gearing\ (Market\ Value) = \frac{Total\,Debt(BV)}{Total\,Debt(BV) + Equity(MV)}$$

where BV and MV refer to book and market values, respectively.

For GAWB, the market value of equity cannot be observed. A proxy based upon accounting values is required.[35] The measure of 'book' gearing that is used primarily in this report is debt as a proportion of the book values of debt and equity (often referred to as 'debt to total capital'), that is:

- $$Gearing\ (Total\ Capitalisation) = \frac{Total\,Debt(BV)}{Total\,Debt(BV) + Equity(BV)}$$

'Book gearing' is a measure of gearing based on the accounting records of a company. It is analogous to the regulatory gearing ratio applied to the regulated asset base (RAB) when calculating the regulatory WACC, except that the regulatory gearing ratio is based on market value. Accounting measures of gearing have an advantage in providing comparative ratios for both listed and unlisted companies. On the other hand, accounting values will differ from market values for numerous reasons. For example, whilst the book value of shareholders' equity will depend on capital contributions and historical retained earnings, the market value of equity will reflect future earnings potential. While book gearing may indicate relative risks of default, the EBITDA/Interest Cover ratio is a much more direct indicator of such risks.

[34] Australian accounting standards now require firms to provide an estimate of the 'marked to market' value of outstanding debt liabilities. For most entities (including utilities), the difference between the market and book values of debt is relatively minor.

[35] It is also more common for firms to set target gearing levels on the basis of accounting values given that gearing levels based upon market values can vary widely over time.