Financing the water industry: lessons from PR 04

The 2004 water industry price control review, and the parallel review in the electricity distribution industry, tackled important issues that are relevant for the future of utility regulation in the UK in these sectors and more widely. Keith Palmer, NM Rothschild & Son and Cambridge Economic Policy Associates, and Hannah Nixon, Cambridge Economic Policy Associates, discuss the lessons that can be learnt

In the run-up to the 2004 water industry price control review in England and Wales (PR 04), significant concerns were raised about the ability of the industry to finance the huge capital expenditure programmes to be incurred throughout the remainder of this decade and beyond.[1] In particular, there was evidence of a 'flight of equity' from the sector and a growing risk that excessive levels of debt would increase systemic financial risk to potentially damaging levels.[2] In the event, the outcome of the 2004 review is widely seen as a considerable success. PR 04 is considered by many commentators to have achieved an appropriate balance between the interests of consumers and providers of finance. The response of the financial markets has been such as to allay earlier concerns about the ability of the water companies to finance their activities, at least over the next five years.

Determining the allowed cost of capital

Price cap regulation has become the standard approach to setting price controls for regulated utility businesses throughout most of the UK. It involves the regulator setting a five-year trajectory of maximum prices at levels judged sufficient to enable an 'economic and efficient' regulated business to earn the allowed cost of capital. The allowed cost of capital is set equal to the regulator's estimate of the weighted average cost of debt and equity capital (WACC). The capital asset pricing model (CAPM) has been the universally adopted methodology for estimating the 'market' cost of equity.[3] The WACC has usually then been estimated using a 'notional' debt:regulatory capital value (RCV) ratio.[4]

The 2004 price control reviews in water and electricity distribution marked an important shift in the approach adopted by the regulators when determining the allowed

cost of capital. Although both Ofwat and Ofgem retained the WACC/CAPM framework as a basis for presenting the allowed cost of capital, in reality, when determining the WACC parameters, they placed little or no reliance on the CAPM-derived estimate of the cost of equity. Instead they based their cost of equity determinations largely on wider market evidence, which gave a very different (and significantly higher) estimate for the cost of equity. As Ofwat noted, 'the CAPM evidence [about the cost of equity] appears to conflict with market reality, and we have discounted it.'[5]

Figure 1 shows the equity betas for the listed water companies over the period 1997–2005. A marked trend decline in the average beta value is evident. Over the last price control period (2000–05) the average equity beta value was around 0.4, and in 2003/04 it was around 0.3. For plausible CAPM parameters of the risk-free rate and equity risk premium, an equity beta of 0.4 implies a CAPM-derived real cost of equity in the range of 4.6–4.75%.

Why would Ofwat conclude that these CAPM-derived values are in conflict with market reality? First and foremost there is the evidence of the market value that financial investors put on regulated water businesses.[6] The price control mechanism in effect sets future cash flows of an 'economic and efficient' regulated business such that it can expect to earn the allowed cost of capital on the RCV of its regulated assets. If the allowed WACC equals the 'market' cost of capital, the market's valuation of the regulated assets will equal the RCV. The ratio of the market value/RCV (the MR ratio) will be 1.0.[7] Equally if the market cost of capital is higher than the allowed cost of capital, the observed MR ratio will be less than 1.0; if it is lower, the MR ratio will be greater than 1.0. In 2000, following Ofwat's previous price control determination, the sector average MR ratio—which, prior
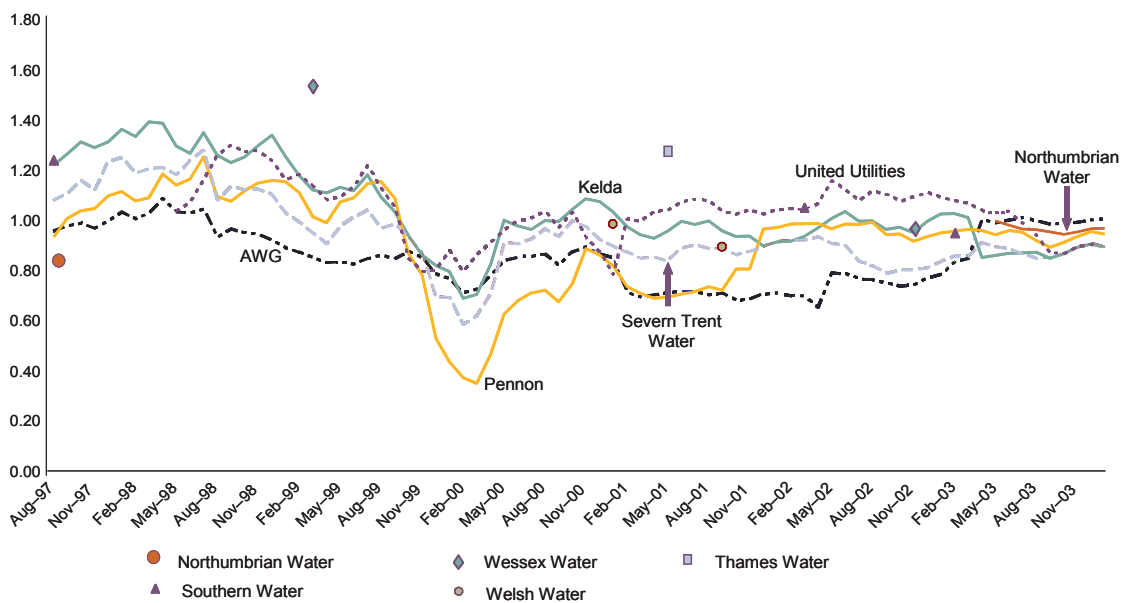
Figure 1   Equity betas in the water sector
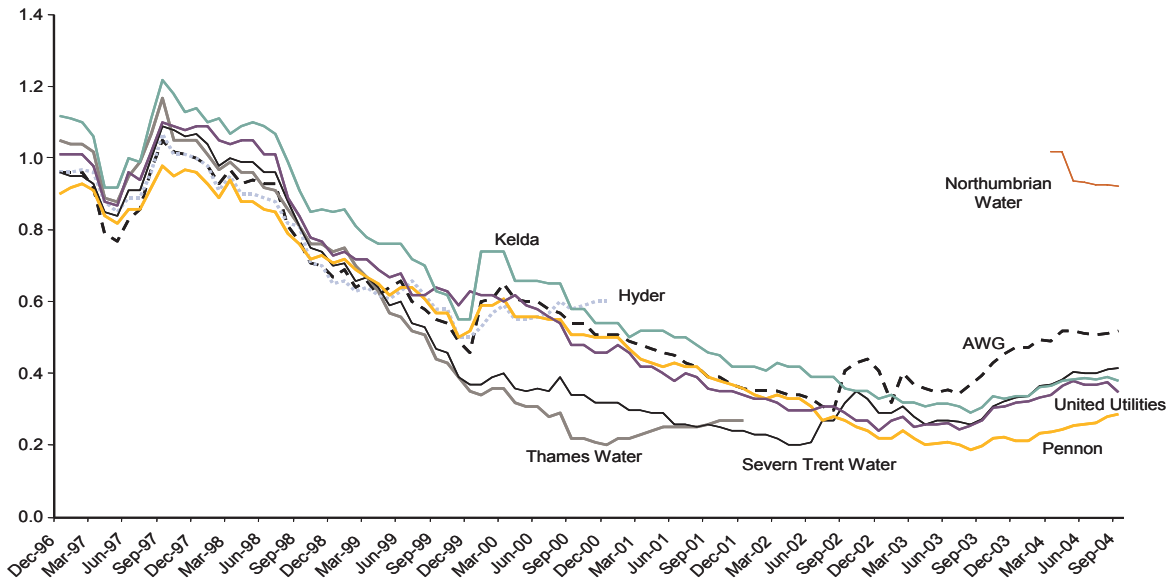
Source: London Business School risk management service.

Figure 2   MR ratios

Note: The lines represent MR ratios for listed water companies; the symbols are estimated MR ratios for asset sale transactions.
Source: CEPA calculations.

to the 1999 review, had been greater than 1.0—fell sharply to a value well below 1.0. It then remained significantly below 1.0 throughout the period 2000–04 (see Figure 2). This MR discount was observed despite the fact that the actual cost of debt to regulated water companies throughout the period was significantly lower than the allowed cost of debt provided for in the 1999 price control review. The persistent MR value of less than 1.0 provided direct market evidence that, over the period 2000–04, the allowed WACC was lower than the true 'market' cost of capital. Since the allowed cost of debt was higher than the actual cost of debt over the period, the 'problem' appeared to be that the allowed

cost of equity was significantly lower than the 'market' cost of equity. Yet the allowed cost of equity in 1999 had been derived using a 0.7–0.8 equity beta—ie, much higher than observed betas over the 2000–04 period. This observation was in direct conflict with assessments of the cost of equity derived using the CAPM.

Additional evidence about the market cost of equity was available from estimates derived using the dividend growth model (DGM). In early 2004, the average sector prospective dividend yield was 7.25%.[8] DGM-derived cost of equity estimates were much higher than CAPM-derived estimates; however, they were similar to the

higher estimates derived using MR ratio analysis. The problems involved in deriving robust cost of equity estimates using the DGM are well known; in the past, they have caused regulators to place greater reliance on the CAPM. However, in 2004 there were good reasons to consider that the higher DGM-derived values were more reliable. Sector average prospective total dividend returns[9] were in the range 7–8%. CAPM-derived estimates of the cost of equity as low as 4.6–4.75% were wholly implausible. Had the market cost of equity been as low as that, equity prices would have risen, bringing down the dividend yield on water shares. This had not happened. The CAPM-derived value for the cost of equity was inconsistent with the direct market evidence.[10]

Further evidence about the 'market' cost of capital was available in the form of valuations of regulated assets by buyers and sellers in arm's-length sale/purchase transactions. Most buyers and sellers during that period valued regulated assets at less than their RCV, even though the actual cost of debt was lower than the allowed cost of debt. This supported the inference that the allowed cost of equity set in 1999 was lower than the true 'market' cost of equity over that period. Moreover, buyers and sellers were implicitly taking the view that they did not expect this situation to change following PR 04. This evidence, while fully consistent with MR ratio- and DGM-derived estimates of the cost of equity, was in clear conflict with the CAPM-derived estimates.

It is apparent from Table 1 that Ofwat concluded, rightly in our view, that greatest weight should be placed on the direct market evidence when determining the allowed cost of equity and the allowed WACC. Although the cost of capital was presented by Ofwat within a CAPM framework, the adopted value for the equity beta cannot be derived from the observed beta values and the adopted value for the cost of equity cannot be derived using the CAPM. In effect, Ofwat was saying, sotto voce, that the CAPM cannot be relied on to give robust usable estimates of the cost of equity.

At the same time, in 2004, Ofgem was reaching the same conclusion in its price control review of electricity distribution companies. It, too, adopted a value for the cost of equity (7.5%) that can only be derived using CAPM if an equity beta value equal to 1.0 is assumed— a value much higher than the observed beta values in that sector over the past five years.

The conclusion reached by both regulators—that CAPM-derived estimates of the cost of equity are not robust for price cap-regulated industries, and that greater reliance should be placed on wider market evidence to estimate the cost of equity—is important. It has clear implications for price control determinations in other price-regulated industries and for the deliberations of the Competition Commission when concerned with those industries.

We should not really be surprised that the CAPM performs poorly for regulated businesses: it ignores regulatory risk. Yet regulatory risk is viewed by investors as an extra risk that has to be incurred if they invest in regulated businesses, and they undoubtedly demand a regulatory risk premium to compensate for these sector-specific risks. We should expect that the use of average equity betas observed over the previous price control period will systematically underestimate the cost of equity for regulated industries. Once a price determination is made, the sector share prices will settle at a level reflecting the net cash flows allowed by the determination. For the next four to five years, the volatility of share prices will be low (because all business risks other than regulatory risk are low) and measured betas will be low reflecting this. However, ahead of, and immediately following, each price control review, there will be sharply increased regulatory risk, depressing share prices and accompanied by a short period of sharply increased volatility as the sector re-rates or de-rates in light of the most recent determination. This is what happened in 1999–2000 and again in 2004–05. Given this picture, there is no reason to expect the average of the daily or weekly beta values over the price control period to give an appropriate measure of the risk premium required by investors over the period.

Table 1 Estimates of the cost of equity: five approaches

	CAPM-derived (observed betas)	Ofwat 1999 assumptions	Using MR ratios	Using DGM	Using transaction values	Ofwat PR 04 determination[1]
Equity beta	0.4	0.7–0.8	–	–	–	1
Equity risk premium (%)	4–5	3–4	–	–	–	4–5
Cost of equity (real, %)	4.6–4.75	6.2	7–8	7.25	7.25	7.3
WACC (post-tax real, %)[2]	–	4.75	–	–	–	5.1

Notes: [1] The regulator's cost of equity value often cannot be derived arithmetically from the assumed equity risk premium and measured historical equity betas; an element of judgement has been used to determine the allowed cost of equity. Nor can the allowed WACC be derived from the estimates of the cost of debt and equity. [2] WACC is net of debt tax shield.
Source: Ofwat (2004), 'Future Water and Sewerage Charges 2005–10: Final Determinations', December, and CEPA calculations.

The cost of regulatory risk for customers

Another lesson from the water and electricity distribution reviews is that regulatory processes and mechanics can, and do, have an impact on the 'market' cost of capital and therefore on the prices paid by customers for regulated services. In the water sector in 1999, a sharp unwelcome shock was administered to financial investors by the regulator. Rightly or wrongly, the 1999 determination was seen by the financial markets as 'changing the rules of the game' and 'unduly harsh'. The determination was made and announced in a way that was not anticipated by the market. Predictably, the result was a sharp fall in market confidence, a related sharp increase in the market's regulatory risk premium and a corresponding fall in the share prices of the regulated companies, with a significant MR discount emerging and remaining for the next four years.

As a result of this regulatory 'shock' in 1999, in 2004 Ofwat had to contend with a situation where the regulatory risk premium, and therefore the cost of capital to the sector, had been raised. In forming its judgement about an allowed cost of capital consistent with companies financing their activities, Ofwat was bound to recognise this higher regulatory risk premium. In PR 04, it went out of its way to ensure a highly transparent and well-communicated review process (ie, no surprises), but the damage had been done in 1999. Based largely on the direct market evidence, the allowed WACC was set at 5.1% real.[11]

Contrast this position with the electricity distribution industry where there had not been a similar regulatory shock in the late 1990s. In 2004, despite the need to set price controls that would enable the companies to finance a much increased capital programme, a lower allowed cost of capital (4.8%) was set for the electricity distribution companies. It is probable that the main reason that Ofgem was able to determine a lower allowed cost of capital was the lower perceived regulatory risk in that sector.

Which of the regulators—Ofwat or Ofgem—was 'right' in its judgement about the cost of capital? The probable answer is that both were right. The market cost of capital was higher in water because of the higher perceived regulatory risk persisting since the regulatory 'shock' administered in 1999. The post-determination reactions of the financial markets and of customer groups suggest that both Ofwat and Ofgem set prices at about the right level. In the water sector, the sector average MR ratio is currently in the range 1.05–1.1, suggesting that the determination was neither too harsh nor too generous. However, customers have ended up paying about 1% per annum more than they might have done if the lower cost of capital embedded in electricity distribution tariffs could have been adopted by Ofwat. The lesson to be learned is clear: the process for determining maximum prices of regulated businesses can have a significant impact on the cost of capital and therefore on customer bills.

Improving price regulation

Price cap regulation of the privatised water companies in England and Wales has been a considerable success. Regulation has facilitated a huge investment in improving the quality of water and sewerage services. Much of the required finance has been generated internally as a result of efficiency improvements brought about by incentive regulation, without increasing customer bills. The external financing (mostly debt) required to fund the balance of the capital expenditure programmes has been raised at low cost and over long maturities, thereby mitigating the need for customer real price increases. Over the 15 years since privatisation, more than £50 billion has been invested by the water and sewerage companies. Over the same period, real average customer bills have risen by less than 1% per annum.

Since privatisation, there has been a steady improvement in the process and mechanics of price regulation. Price controls in the water sector are now much more responsive and flexible than they were originally; yet they retain strong incentives on companies to achieve high operating and capital efficiency. The process adopted for the recent water price control review was, in our judgement, exemplary and a good example of regulatory 'best practice' in very complex and difficult circumstances.

Nevertheless there remain concerns around the timing mismatch inherent in a five-year cycle for setting prices and heavy investment in assets with an average life four or five times longer. Although in the short term, with a successful review recently completed, there are few regulatory concerns, it is likely that, within about three years, the old concerns about regulatory risk will recur and depress asset prices in the sector. Before then, Ofwat intends to launch a public debate to review the regulatory processes and mechanics to see if there are improvements that could be adopted that would benefit both customers and financial investors. If there are gains to be had, they probably lie in the area of reducing regulatory risk, since that is a cost to everyone and a benefit to no one. Options that deserve further consideration include:

– extending the period of the price control beyond five years, while retaining and perhaps enhancing the intra-period adjustment mechanisms to take account of unanticipated and non-controllable deviations from expectations;

– reducing the amount of regulatory risk at future reviews. One approach that could achieve this goal would be to lock in the cost of capital allowed in respect of 'sunk' capital expenditure for the full life of the assets. Each future review would address only the allowed cost of capital in respect of incremental capital expenditure.[12]

Other options should be debated. All have pros and cons. Ofwat will no doubt be influenced by the knowledge that the financial markets value above all consistency and predictability, and must be paid a higher price for greater risk. At the end of the day, it may turn out that the old adage is the right one—'if it isn't broke, don't fix it'.

Keith Palmer and Hannah Nixon

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[1] See, for example, Helm, D. (2003), 'Whither Water Regulation?', in D. Helm (ed) (2003), *Water, Sustainability and Regulation*, Oxford: Oxera.

[2] See, for example, Palmer, K. (2003), 'Financing the Water Industry', in D. Helm. (2003), ibid.

[3] The market cost of equity is the expected rate of return required by providers of equity if they are to invest equity in these businesses.

[4] In water and electricity distribution, the notional gearing (debt:regulatory capital value) used is in the range of 50–60%.

[5] Ofwat (2004), 'Future Water and Sewerage Charges 2005–10: Final Determinations', December.

[6] The market enterprise value of the regulated businesses is derived for quoted businesses by deducting from the total enterprise value (ie, the sum of debt and equity) of the business an estimate of the enterprise value of its non-regulated businesses.

[7] This will only be the case if the markets expect the regulated businesses in the sector to perform in line with the regulator's operating and capital efficiency assumptions. If there is expected sector-wide outperformance, the sector average MR ratio will be slightly greater than 1.0.

[8] The dividend yield fell slightly in the late stages of the review as share prices strengthened.

[9] Total dividend returns are the sum of the dividend yield and rate of growth of dividend per share. In regulated businesses with limited earnings growth potential, the sustainable growth rate of real dividend per share is expected to be very low, in the range 0–2%.

[10] The CAPM-derived estimates could only have been valid if the markets anticipated a large sector-wide slashing of the water company dividends. There was no suggestion by the commentators or the companies themselves that this was likely.

[11] 5.1% is the allowed WACC expressed on a net of debt tax shield basis. The allowed cost of capital for some water and sewerage companies is higher than this because they were allowed additional revenue to enable them to maintain investment-grade financial ratios.

[12] This is broadly the approach used to review charges periodically in the London Underground Private–Public Partnership.

If you have any questions regarding the issues raised in this article, please contact the editor, Derek Holt: tel +44 (0) 1865 253 000 or email d_holt@oxera.co.uk

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