

Review of the relationship between financing allowances and water company performance

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1. Summary

Context

As part of its PR19 redeterminations, the CMA must determine an overall cost of capital allowance for water companies, which involves selecting a specific point estimate for each of the WACC components. Selecting a specific point can be difficult given that there is a considerable amount of uncertainty in setting the WACC – for instance, components can be estimated using different methodologies and data sources, which means a degree of judgment is inevitable when setting a return allowance.

In its provisional findings, the CMA has decided to aim away from the midpoint within the range for the weighted average cost of capital (“WACC”) components. Specifically, the CMA finds that the significant investment required within the water sector over AMP7 alongside reasons relating to financeability and asymmetric risks within the regulatory package, warrants ‘aiming up’¹ in its PR19 redeterminations.

Different views on the validity of ‘aiming up’

The Disputing Companies² support ‘aiming up’ because they believe that there is a high level of uncertainty in estimating the WACC, especially as the ‘true’ WACC is unobservable. They suggest that ‘aiming up’ poses less risk to companies and customers compared to an underestimated WACC. Further evidence is presented by the Disputing Companies on areas such as asymmetric risk from outcome delivery incentives (ODIs), the risk to financeability when underestimating the WACC, and investment incentives and requirements.

On the contrary, Ofwat’s view is that ‘aiming up’ is unlikely to result in more investment nor significantly increase welfare for consumers. Ofwat presents data to show that Market-to-Asset ratios (“MARs”) have been significantly above 1.0x since the PR19 FD suggesting that its cost of equity allowance is above the market required return. They also argue that the incentive mechanisms set as part of the regulatory regime, such as totex cost sharing rates and ODIs, will protect customers from underinvestment.

Scope and our approach

In this report we assess the relationship between allowed return assumptions and the historical performance of water companies. This is to test the implications of setting ex-ante allowed returns which are more or less than return requirements.

There are two ways to assess the impact of setting an allowed cost of capital above the midpoint of a range on company behaviour and performance. The first is to assess where the ex-ante cost of capital has been set in comparison to the midpoint of the range in previous price control periods. The limitation of this approach is that at the time when Ofwat sets the allowed cost of capital, it does not know the ‘true’ cost of capital, nor it is totally transparent on the degree of any aiming up in its decisions. This means it is difficult to test for the impact of any historical aiming up (or down) in Ofwat’s past regulatory decisions.

The second approach is an ex-post assessment of the cost of capital which allows a comparison between the evolution in return expectations and company behaviour and performance. The benefit of this approach is that we can use market data to reliably inform whether return expectations reduced or increased compared to fixed, set return allowances (Ofwat only introduced indexation for the new cost of debt at PR19). It therefore doesn’t require knowing the ‘true’ cost of capital. The limitation of this approach is that, as we can only observe the ex-post WACC at the end of the price control period,

¹ Aiming-up means picking a point estimate above the midpoint of the range

² The Disputing companies refer to Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited.

we cannot be sure that companies or investors have had the time during the price control to respond to evolution in return expectations during the price control.

However, weighing up the two approaches, we consider it is more instructive to conduct an ex-post assessment of the WACC and compare it to the point estimate WACC set at the beginning of each price control period to determine whether companies have benefited from a WACC that has been set higher or lower than the ex-post WACC. Given the large changes in interest rates over the past 20 years, this second method is likely to capture bigger movements in return requirements than any initial differences between ex-ante point estimates set by Ofwat and the midpoint of its range.

While this second approach does not directly test the impact of where to set ex-ante returns, it does provide a good proxy, or indication of the effect of setting allowed returns at a different point to the midpoint estimate. In both cases companies have realised a return which is different to the midpoint expectation, so our second approach provides helpful insights to the CMA on the possible impact of its own ex-ante assessment of required returns.

We suggest analysis of observable historical data in the water sector is therefore a 'natural experiment'. It provides insight into the relationship between evolving financing costs and company behaviour and performance beyond the more theoretical justifications and out-of-sector comparisons set out by Disputing Companies.

We use empirical analysis to assess water company performance over the past four price control periods compared to the evolution in required return initially set by Ofwat and then driven by market movements. We do this by first estimating the ex-post WACC³ using outturn market data. We then compare this to the ex-ante WACC allowance set by Ofwat to estimate the ex-ante/ex-post 'WACC wedge', which enables us to see how return requirements have evolved in each price control period relative to the allowances set by Ofwat.

We compare the 'WACC wedge' against measures of company operational and financial performance to assess whether movements return requirements had any implications for company investment, financing or customer outcomes. The areas we consider are totex, investment, service levels, dividends, gearing and deals values.

Key findings

From our analysis we find that:

- **Movements in financial markets have been favourable to companies across the past four price control periods, leading to a 'wedge' between set return allowances and the evolution of required returns:** As interest rates have declined over recent decades, Ofwat's risk-free rate and cost of debt assumptions have been higher than the evolution in required returns. This contributed to financial outperformance across the sector. Some regulatory finance decisions in price control periods were tougher than others, for instance, PR99 was particularly challenging while in PR09 Ofwat set higher allowances to account for the risks associated with the aftermath of the 08/09 financial crisis, which subsequently subsided.
- **An increase in the wedge between ex-ante set returns and movements in required returns during a price control does not increase expenditure or investment above regulatory targets:** In our analysis of water company performance compared to the movement in return requirements, we found that there is no direct relationship between companies expenditure performance (totex, opex and capex) and the WACC wedge i.e. a higher WACC wedge does not incentivise higher levels of expenditure or investment by companies. For the PR04 and PR09 price controls, in particular, we assessed the largest difference between ex-ante WACC and evolution (down) in return requirements, but this did not result in higher expenditure or investment.
- **When performance targets are skewed to the downside, water companies perform in line:** When reviewing companies' outcome incentive performance, we find that even though outcome incentives were set with a larger negative potential downside, many companies receive positive rewards for their service quality (SIM) and on average companies' outturn performance on outcome delivery incentives was around zero. The relatively small WACC

³ I.e. the actual cost of financing within each price control period as observed from financial market data.

wedge in PR14 did not result in companies, in aggregate, over-delivering on their PR19 performance commitments, but it is possible that this wedge supported companies performing in the upper end of the performance incentive range.

- **Favourable financial market movements which have contributed to a positive WACC wedge, have enabled companies to increase gearing and dividends:** Over the past four price reviews, we find that, on average, the gross dividend yield has been greater than the allowed cost of equity set by Ofwat. Dividend flows have also been enhanced by an increase in gearing (particularly following PR04) – with part of the dividend flow being financed by debt rather than annual earnings. Furthermore, we find that over the past three price control periods equity investors have been willing to pay a premia above regulatory capital for regulated water assets.

Conclusion

We consider our findings are helpful in guiding the CMA on the likely implications of its decision on where to choose its point estimate for setting allowed returns; whether to 'aim up'. Experience from the water sector suggests that providing a return allowance which is more than required from market data does not result in increased investment into the sector. Rather, it is more likely to channel increased dividend payments and maintain MARs markedly above 1.0x. The historical evidence suggests that companies have rarely struggled to secure investment from investors and securing financing does not seem to have been a problem for water companies post-PR19 FDs.

When performance targets are set skewed to the downside, water companies have performed towards the upside of the performance range, and on average do not face losses. This suggests that companies do not need additional compensation on the WACC to mitigate against losses in the price control period.

While there are inherent difficulties in setting the correct or 'true' ex-ante WACC, over time financial market information means it is possible to assess whether customers have benefited from regulators' decisions. In its review of PR09, the NAO highlighted that customers had been overcharged by c.£840 million as a result of Ofwat's cost of debt being higher than actual performance in PR09. If consumers bear further costs from PR19 as a result of 'aiming up' on WACC allowances, this will increase scrutiny on the sector and regulators' future decisions to 'aim up'.

2. Introduction

As part of its PR19 redeterminations, the CMA must determine an overall cost of capital allowance for water companies, which involves selecting a specific point estimate for each of the WACC components. Selecting a specific point can be difficult given that there is a considerable amount of uncertainty in setting the WACC – for instance, components can be estimated using different methodologies and data sources, which means a degree of judgment is inevitable when setting an allowance.

Broadly speaking, there are two main approaches to selecting a point estimate for either the overall WACC allowance or for a particular WACC component. The first is to target a point estimate directly as a best estimate of efficient cost of finance. The second is to set out high and low points to define the range for each component, and then assess how to choose an appropriate point estimate within the range. Using this approach the decision on whether to ‘aim down’, ‘aim straight’ or ‘aim up’ has a significant impact on the resultant allowed returns.

While there has been a history of a variety of approaches to setting the WACC, the CMA notes *“the most common decision has been that some ‘aiming up’ has been merited”*⁴. This tendency has faded in more recent regulatory decisions. More recently, in the RIIO-2 Draft Determinations (July 2020⁵), Ofgem decided to ‘aim down’ on the cost of equity allowance based on the expectation that companies will outperform the expected cost of equity in RIIO-2. In the NERL/NATS CMA appeal case (July 2020⁶), the CMA decided to use the midpoint of their range for the cost of capital on the grounds that: (1) there was no reason to give more weight to either end of the range for individual components used in estimating the cost of capital; (2) that there was no evidence of asymmetric effects of the price control; and (3) that there were clear incentives for NERL to undertake investment.

For PR19, Ofwat, the Disputing Companies submitted evidence relating to where the CMA should choose their point estimates within their estimated ranges in order to best meet their regulatory duties. These submissions primarily focused on arguments related to both financing duties and customer duties. Ofwat focused on choosing point estimates which were most likely to be representative of the cost of capital faced by the notionally geared company over 2020-25. The regulator’s starting point was to pick from the midpoint of the range and only deviate from this where there is strong evidence to suggest the best estimate lies away from this position. Ofwat further stated that its financing duty requires Ofwat in setting price controls to ensure that an efficient company is able to secure a reasonable return, and when considered alongside the duty to protect the interests of consumers, ‘aiming up’ would be an ineffectual use of consumers’ funds, and would therefore be against their interests.

In contrast, the Disputing Companies argue that there is a high level of uncertainty in estimating the WACC, especially as the ‘true’ WACC is unobservable. They suggest that ‘aiming up’ poses less risk to companies and customers compared to setting controls using an underestimated WACC. Further evidence is presented on areas such as asymmetric risk from outcome delivery incentives (ODIs), the risk to financeability when underestimating the WACC, and investment incentives and requirements.

Based on its review of the evidence, the CMA concludes in its provisional findings that there is reason to choose a point estimate away from the midpoint within its range for the WACC components. Specifically, the CMA finds that the significant investment required within the sector over AMP7 and beyond alongside reasons relating to financeability and asymmetric risks within the regulatory package, warrants ‘aiming up’ in its PR19 redeterminations.

Following the CMA’s provisional findings, PwC has been commissioned by Ofwat to review the relationship between historical financing allowances and water company performance. We first set out

⁴ CMA (29 September 2020) ‘Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations: Provisional findings’, Page 671

⁵ Ofgem (9 July 2020), ‘RIIO-2 Draft Determinations - Finance Annex’

⁶ CMA (23 July 2020), ‘NATS (En Route) Plc / CAA Regulatory Appeal Final report’

the numerous reasons suggested on where to choose the point estimate in a given range in setting allowed returns. We then examine how return requirements have materialised in relation to the ex-ante return allowances set by Ofwat. Rather than review ex-ante decisions by Ofwat, we do this because the movements in required returns after they were set are potentially larger than the size of any aiming effect in ex-ante decisions. We use this movement in return requirements during the price control as a useful guide to indicate likely company behaviour from ex-ante return decisions.

For company behaviour, we review both operational and financial performance in comparison to price control targets across four previous price control periods.

In the rest of this report we set out the following sections:

- **Section 3:** Review of reasons for 'aiming up'
- **Section 4:** A 'natural experiment' from the water sector
- **Section 5:** Conclusion

3. Review of reasons suggested for ‘aiming up’

In this section, we set out the CMA’s approach to ‘aiming’ in the PR19 appeals; the factors which it considers drive its decisions and the applicability of these to the water sector.

3.1 The CMA approach to ‘aiming’ in the PR19 appeals

In its provisional findings the CMA considers evidence on whether to ‘aim up’ presented by Ofwat, the Disputing Companies, and Third Parties. Specifically the CMA considers:

- A. ‘Aiming up’ to promote investment in new assets in AMP7;
- B. ‘Aiming up’ to promote investment in the water sector more broadly;
- C. Asymmetry of returns; and
- D. Other cross-checks on the overall level of the WACC.

The CMA does not consider that there is a “sufficiently strong case for ‘aiming up’ solely to ensure that the firms have incentives to undertake specific new asset investments in AMP7”. Instead it agrees that there are sufficient regulatory mechanisms within the regulatory regime to ensure that the required investment takes place. The CMA also refers to the current MARs⁷ evidence from financial markets, which suggest that “investors would continue to provide capital at Ofwat’s WACC”.

However, the CMA also observes that if the cost of capital is set too low this could reduce the attractiveness of the sector, and consequently result in a higher WACC being required in future price controls. It also notes that there is significant investment required in AMP7, in particular to support environmental objectives.

The CMA refers to two specific aspects of the regulatory package:

- **Asymmetric risk:** The CMA observes that its proposed package of penalty-only and asymmetric ODIs exposes companies and their investors to asymmetric risk, noting that “The addition of downside-only risks to an otherwise balanced package of incentives means that the expected return for an average investor will be slightly below the cost of capital... if the expected return is below the allowed return, this also provides justification for a small adjustment to the allowed WACC”.
- **Financeability:** The CMA does not take the same comfort with Ofwat’s view that accelerated revenue can be used to improve the credit metrics, and suggests that there is a risk that if the WACC is set too low, notional companies may not be able to maintain strong investment grade ratings.

Based on these two factors, the significant investment required over PR19, and the uncertainty involved in estimating WACC, the CMA concludes that it’s appropriate to move away from the midpoint within the range for the WACC components. It acknowledges that some components are subject to greater uncertainty than others, with cost of equity estimates based on forward-looking estimates of beta, RFR and EMRP, while the cost of embedded debt is calibrated based on debt that has been raised by companies in the sector over the last 20 years. Hence, the CMA views that the need to ‘aim up’ is more relevant to cost of equity where there is greater uncertainty.

The CMA uses different approaches to ‘aiming’ across the various WACC parameters. Most notably:

⁷ Market to asset ratios

- (a) **The cost of embedded debt** - The CMA selects a point estimate of 2.76%, which is at the bottom of its range. The point estimate is selected from the lower end of its range to account for the falling average embedded costs of debt for the notionally geared company over the price control, with the higher historical cost of debt dropping out of the financial structure.
- (b) **The cost of new debt** - the CMA has decided a point estimate at the midpoint of the metric range. The point estimate for new debt is 0.37% while the point estimate for the proportion of new debt is 17%.⁸
- (c) **The cost of equity** - To acknowledge potential uncertainties within estimates, the CMA have picked a point estimate of the cost of equity at 5.08% (using the 75th percentile of each component of the cost of equity). This point is calibrated using point estimates for each cost of equity component between the midpoint and the top of the range.

We do not comment on the validity of the range of estimates used by the CMA. In this paper we focus primarily on the choice of point estimate within its range.

The table below provides the full breakdown of the CMA's WACC estimates. The point estimate of 3.50% is at the 58th percentile of the overall range, which indicates that despite choosing point estimates at different percentiles within the range across the different components, in overall terms, the CMA has 'aimed up'.

Table 3.A: CMA range and point estimate of WACC components for PR19 (CPIH-real)

WACC component	CMA Low	CMA High	CMA point estimate	Percentile within the range
Total market return	6.20%	7.21%	6.95%	74th
Risk-free rate	-1.40%	-0.81%	-0.96%	75th
Equity risk premium	7.59%	8.00%	7.91%	78th
Unlevered Beta	0.27	0.32	0.31	80th
Debt beta	0.00	0.15	0.04	27th
Equity beta	0.65	0.80	0.76	73th
Cost of new debt	0.21%	0.52%	0.37%	52nd
Cost of embedded debt	2.76%	3.16%	2.76%	0th
Proportion of new debt	21%	13%	17%	50th
Issuance and Liquidity Costs	0.10%	0.10%	0.10%	n/a
Pre-tax cost of debt	2.32%	2.92%	2.45%	22nd
Post-tax cost of equity	3.56%	5.60%	5.08%	75th
Gearing	60%	60%	60%	n/a
Appointee-level Vanilla WACC	2.82%	3.99%	3.50%	58th

Source: Competition Market Authority and PwC analysis

⁸ The cost of new debt is subject to a reconciliation mechanism.

3.2 The applicability of aiming up reasons to the water sector

While the reasons outlined by the CMA and the Disputing Companies for 'aiming' are helpful in understanding the possible motivations for selecting a point estimate from within a reasonable range, some of these reasons are taken from more theoretical literature, or from experience outside the water sector. It's therefore important to assess (where possible) the relevance of these factors to the water sector.

For example:

- in relation to investment incentives, the water sector faces a specific investment incentive regime, first involving regulatory scrutiny of water company investment plans, then, through totex sharing rates, a clear incentive to underspend allowances, provided customer outcomes can be delivered;
- in relation to wider investment into the sector, the regulatory regime has a range of features to encourage investment into the sector, including the use of the Regulatory Capital Value to provide a return of capital, indexation of cost of capital elements to align allowed returns to market movements (e.g. cost of new debt indexation) and regulatory sense-checks to market values;
- In relation to asymmetries, there are a number of downside protections in the regulatory regime, including the regulatory ring-fence and special administration regime which wouldn't not reduce business impact, but are designed to avoid any interruption to supply and short-term detrimental impact on customers; and
- In relation to asymmetries of returns elsewhere in the regulatory package, the ODI package is calibrated using historical performance as a guide to future expected performance.

This means that there are reasons to suggest that the benefit to customers of aiming up may not be the same as indicated from theoretical literature, or from experience outside the water sector. For this reason, this report provides a detailed review of the historical experience of the water sector in England and Wales.

In the next section, we carry out a review of the relationship between historical financing allowances and water company performance.

4. A ‘natural experiment’ from the water sector

In this section we consider historical evidence of the evolution of return requirements in each price control period and how water company behaviour and performance has responded.

There are two ways to assess the impact of setting an allowed cost of capital above the midpoint of a range on company behaviour and performance. The first is to assess where the ex-ante cost of capital has been set in comparison to the midpoint of the range in previous price control periods. The limitation of this approach is that at the time when Ofwat sets the allowed cost of capital, it does not know the ‘true’ cost of capital, nor it is totally transparent on the degree of any aiming up in its decisions. This means it is difficult to test for the impact of any historical aiming up in Ofwat’s regulatory decisions.

The second approach is an ex-post assessment of the cost of capital which allows a comparison between the evolution in return expectations and company behaviour and performance. The benefit of this approach is that we can use market data to reliably inform whether return expectations reduced or increased compared to fixed return allowances (Ofwat only introduced indexation for the new cost of debt at PR19). It therefore doesn’t require knowing the ‘true’ cost of capital. The limitation of this approach is that, as we can only observe the ex-post WACC at the end of the price control period, we cannot be sure that companies or investors have had the time to respond to evolution in return expectations during the price control.

However, weighing up the two approaches, we consider it is more instructive to conduct an ex-post assessment of the WACC and compare it to the point estimate WACC set at the beginning of each price control period to determine whether companies have benefited from a WACC that has been set higher or lower than the ex-post WACC. Given the large changes in interest rates over the past 20 years, this second method is likely to capture bigger movements in return requirements than any initial differences between ex-ante point estimates set by Ofwat and the midpoint of the range.

While this second approach does not directly test the impact of where to set ex-ante returns, it does provide a good proxy, or indication of the effect of setting allowed returns at a different point to the midpoint estimate. In both cases companies have realised a return which is different to the midpoint expectation, so our second approach provides helpful insights to the CMA on the possible impact of its own ex-ante assessment of required returns.

We suggest analysis of observable historical data in the water sector is a ‘natural experiment’. It provides insight into the relationship between evolving financing costs and company behaviour and performance beyond the theoretical justifications. While the data captures only four price control periods, this covers 20 years of financial market movements and company performance, which provides a good evidence base from which to draw conclusions.

In this section, we consider how water companies responded to movements in return requirements and the consequential changes to investment, service levels, and financing decisions. In the remainder of the section, we conduct an ex-post assessment based on the past four price control periods (PR99, PR04, PR09 and PR14) as outlined in the Table 4.A.

Table 4.A: Overview of price control periods considered in this analysis

Overview of price control period	Broad characterisation of price control settlement: ex post
<p>PR99 The price review in 1999 (“PR99”) set out Ofwat’s decision on price limits for 2000-2005. The main focus in PR99 was the improvement in quality of water services and protecting the environment within a falling prices framework. Two companies appealed to the Competition Commission on their determinations.</p>	<p>Challenging settlement with minimal finance outperformance</p>
<p>PR04 The price review in 2004 (“PR04”) set out the determinations of price limits from 2005 to 2010. In PR04, Ofwat decided to increase customer bills to cover the rising running costs faced by companies and the c.£16.8 billion of capital programme for further service and environmental advancement. All companies accepted Ofwat’s final determination.</p>	<p>Settlement overcompensated for challenging PR99 - and beginning of long-term decline in interest rates</p>
<p>PR09 In the price review 2009 (“PR09”) Ofwat set price limits for customers’ bills for the five years from 2010-2015. For PR09 there were high levels of uncertainty from several factors, but more significantly the price review was taking place during the Global Financial Crisis. Economic uncertainty was material as shown in Section 4.1 (cost of debt and risk free rate). This had an impact on the customer’s ability to pay their bills and a company’s ability to finance the necessary investment. One company appealed to the CMA.</p>	<p>Generous settlement at the time reflecting perceived potential risks associated with the Global Financial Crisis</p>
<p>PR14 The price review in 2014 (“PR14”) set out Ofwat’s decision on price limits for 2015-2020. A key theme for this price review was enabling customers to get more from water companies while paying less for the services over the five years. One company appealed to the CMA.</p>	<p>Challenging settlement at the time, but continued fall in interest rates allowed moderate levels of finance outperformance.</p>

We break our ex-post analysis of these price control periods down into two parts:

1. **Ex-post WACC compared to the ex-ante WACC.** This assesses how the cost of financing evolved over each price control period in comparison to the ex-ante allowed return set by Ofwat. We quantify an ‘ex-ante/ex-post wedge’ from PR99, PR04, PR09 and PR14. We note that these findings are based on ex-post analysis, reviewing how the ex-post WACC compares to the ex-ante WACC given changes in financial markets during the price control. This assessment is conducted at the industry-level. It is not the same as measuring the actual finance costs which are driven by individual company finance decisions. This means that individual companies may have experienced a higher or lower outperformance on finance costs, but the focus of this study is industry-wide incentives.
2. **Water company behaviour, performance and financial decisions compared to initial regulatory targets.** This assesses how companies responded to evolution in return requirements over the course of the price controls. In particular, we assess whether there are any differences in operational performance or company financing / investment decisions where companies have received higher ex-ante return allowances compared to ex-post return requirements. We assess the movement in return requirements against performance against regulatory plans for the following variables:
 - Totex
 - Investment
 - Service levels
 - Dividends
 - Gearing
 - Deals values.

4.1 Ex-post WACC compared to the ex-ante WACC

We first consider how return requirements have evolved over the past four price control periods in comparison to Ofwat’s return allowances. We focus on the cost of debt and risk-free rate components of the WACC as they are more easily observed from movements in market data rather than other components, such as total market return and the equity risk premia.⁹

Cost of debt evolution

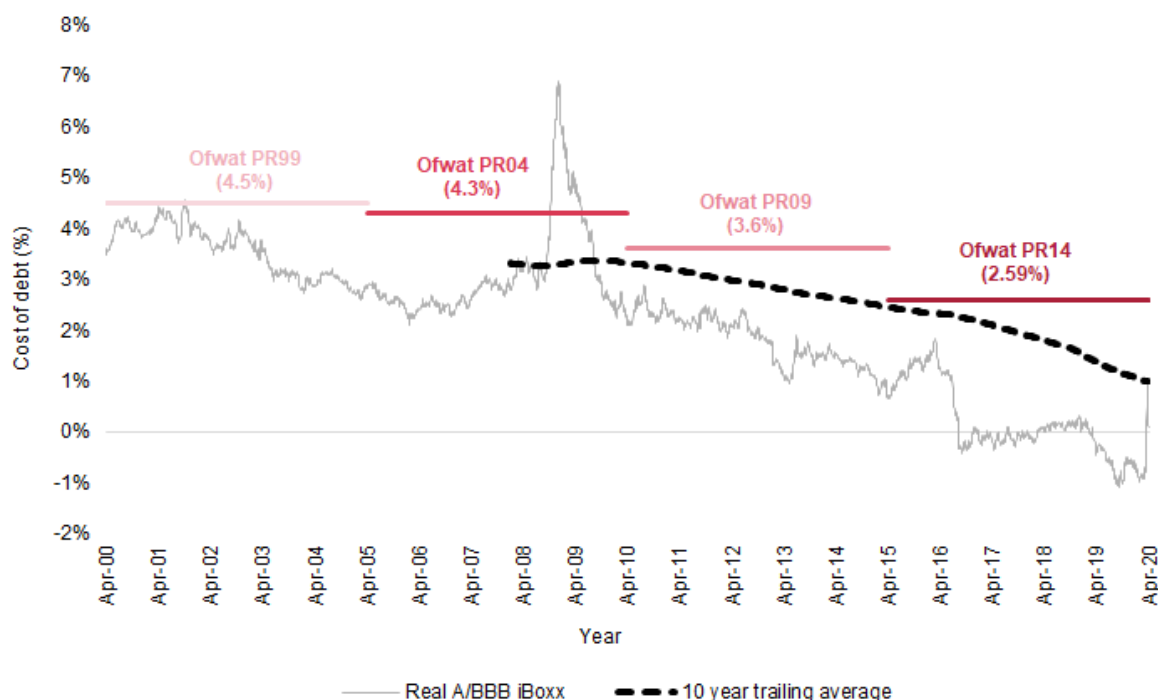
Ofwat sets its cost of capital allowances on an ex-ante basis. This means that there is scope for companies to under/over perform the allowances set by Ofwat. Indeed, this has been the case in recent price control periods during which the market cost of debt has been lower than Ofwat had anticipated before the start of the respective price control periods, reflecting the fall in UK interest rates over recent decades.

Figure 4.1 below compares Ofwat’s cost of debt allowance¹⁰ for the four previous price reviews (PR99, PR04, PR09 and PR14) against the A/BBB iBoxx index, which was used at the benchmark for debt costs in both PR14 and PR19. For simplicity, we do not recalculate new and embedded costs of debt and their relative ratios, nor additional outperformance wedge adjustments.

It shows that the cost of debt for A and BBB rated companies (10 year trailing average) has fallen substantially over PR99, PR04, PR09 and PR14. On average the cost of debt permitted by Ofwat prior to the price control period remains consistently higher throughout, partly reflecting the allowance for embedded or historic debt costs.

Some of the outperformance on the cost of debt allowance will have come from prudent and efficient financing decisions by companies, however, for the most part the structural decline in interest rates has led to lower debt financing costs for companies relative to the cost of debt allowance provided by Ofwat.

Figure 4.1: A/BBB iBoxx index compared to Ofwat’s cost of debt allowances in PR99, PR04, PR09 and PR14, real terms



⁹ We do not examine the impact of variation in inflation on equity returns because inflation hasn’t persistently undershot forecasts like interest rates, so it’s unlikely to have a material impact on our findings. There is also a natural inflationary hedge within the regulatory regime which protects investors’ real returns.

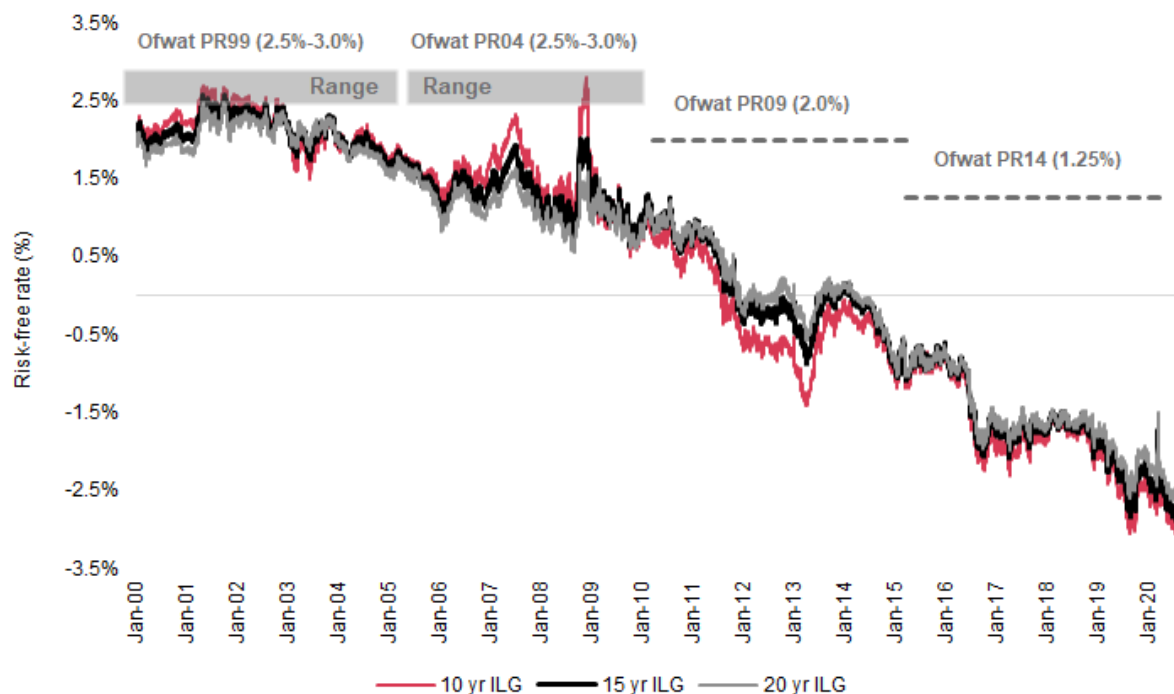
¹⁰ We use the overall cost of debt allowance which includes new and embedded debt, as well as any associated costs such as issuance costs.

Source: Refinitiv, Ofwat, PwC analysis

Risk-free rate evolution

As a result of the structural decline in interest rates, water companies have also been overcompensated on the risk-free rate assumption. Figure 4.2 below shows that for all four price control periods, Ofwat’s ex-ante risk-free rate assumption was set above the rate implied by 10, 15 and 20 year index-linked gilts (“ILGs”)¹¹, and yields on these instruments fell even further in the subsequent years of each price control period.

Figure 4.2: Evolution in the risk-free rate¹²



Source: Bank of England, Ofwat, PwC analysis

Calculating the ex-ante/ex-post wedge

In this section we set out the approach we take to estimate each WACC component on an ex-post basis. For simplicity, we calculate a 5-year average WACC to compare with Ofwat’s ex-ante WACC allowance. This exercise is not intended to involve a comprehensive assessment of the approach taken by Ofwat to estimate each WACC component, rather a consistent way of determining how required returns have evolved over price controls and showing which price controls had the biggest variation between ex-ante return allowances requirements and the subsequent evolution in return requirements.

We use well-known methodologies and updated market data to assess how the WACC components have evolved in each price control period. Where possible we keep the same approach across each component.

Risk-free rate (RfR)

To calculate the ex-post estimate of RfR we calculate the 5-year average yield on the 10-year index-linked gilt. We use the 10 year gilt as it has been used in previous price control periods and is aligned to the 10-year trailing average we use in the cost of debt calculation.

¹¹ We use index-linked gilts as they are used by the CMA in the determination.

¹² Ofwat provided a risk-free rate range in PR99 and PR04 instead of a point estimate.

Cost of debt

We estimate the cost of debt financing in each price control period using the 10 year trailing average of the iBoxx A/BBB index¹³. We recognise that in more recent price control periods significant focus has been placed by Ofwat on estimating the cost of new and embedded debt, and their relative weightings in order to produce an overall cost of debt estimate. However, conducting bottom-up analysis in each of these areas is not the focus of this work and would likely introduce unnecessary complexities. Instead we use a simple 10-year trailing average to proxy the overall cost of debt across all four price controls, which has been used in the past by Ofwat.

Given that the iBoxx series does not start until 1998, for PR04 we average the 10-year trailing average across 2008-2010. For PR99, we assume that the cost of debt evolution reflects the risk-free rate movement observed from Ofwat's ex-ante allowance to our estimate of risk-free rate (i.e. based on the assumption that the cost of debt is the risk-free rate plus compensation for credit risk, and assuming a constant credit spread, we adjust the risk-free rate based on observed market movements and assume a constant credit spread).

Equity beta

It is harder to estimate the changes in the actual equity beta, given the range of judgement required in relation to estimation periods and frequency, selection of comparators and movements in wider equity markets. We observe that in PR99 and PR04 Ofwat used equity betas of 0.8 and 1.0, respectively. We note the step up in PR04 was not followed in the empirical data¹⁴ and therefore suggest, in hindsight, this was set too high.

We therefore assume an equity beta of 0.9 (i.e. the midpoint of Ofwat's two PR99 and PR04 estimates) for both periods. We make this assumption on beta to obtain a neutral view given that, in our view, there did not appear to be significant shifts in the regulatory regime between these periods to justify large changes in the beta. We also use a figure of 0.9 for the equity beta used PR09 for the same reasons, which aligns with Ofwat's view at the time. A reduction in equity beta to 0.8 in PR14 was justified at the time by changes in the regulatory regime from a price to revenue control combined with changes in totex incentivisation during PR14. This is supported by the lower raw equity betas provided in the CMA provisional findings.¹⁵

Equity risk premium

To calculate the equity risk premium, we start with a total market return (TMR) assumption and subtract the RfR. In PR99, Ofwat estimated TMR to be 7%, which is broadly aligned with our view of 7% (see Table 4.1) of TMR in this period. We hold this assumption constant at 7% in PR04, before reducing it to 6.5% for PR09 and PR14 based on the continued fall in interest rates.

Gearing and tax

We align with Ofwat's notional gearing and tax assumptions in each of the four price control periods (see Table 4.B and Table 4.C)

Summary

In the tables below we compare the ex-ante post-tax WACC set by Ofwat¹⁶ for the previous four price control periods to our ex-post estimate of the post-tax WACC. We focus on the overall cost of capital used by Ofwat and we do not consider adjustments such as company-specific adjustments.

¹³ Again, we note that we have simply used the 10 year trailing average to estimate the actual cost of debt financing within each regulatory period.

¹⁴ Our report "Cost of capital for PR14: Methodological considerations" showed that equity betas for the water sector did not go above 1.0 over the period 2005-2010. Figure 4.1.

¹⁵ CMA, "Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations Provisional findings", Table 9-8

¹⁶ We note that in some of the earlier determinations considered in this analysis, it's not clear the exact point estimate used by Ofwat across each of the WACC components. For instance, for PR99 and PR04 Ofwat sets out a range for each component and the overall cost of capital, but it does not specify point estimates for each component. We therefore use the overall cost of capital estimate and the description of each component provided by Ofwat to select a point estimate.

In Table 4.B, we calculate a wedge of 0.2% for PR99 and 0.9% for PR04 respectively when comparing the ex-ante return allowance to the ex-post return requirements (i.e. in hindsight, companies were overcompensated by 0.2% and 0.9% in PR99 and PR04). This indicates that companies have been overcompensated in these two price control periods, primarily due to favourable changes in interest rates. This also suggests that the PR99 price control was far tougher from a financial perspective than the PR04 price control.

Table 4.B: Quantification of the ex-ante/ex-post wedge from PR99 and PR04¹⁷

Components	PR99		PR04		Comments
	Ex-ante (Ofwat)	Ex-post (PwC)	Ex-ante (Ofwat)	Ex-post (PwC)	
Cost of equity					
Risk-free rate	3.0%	2.2%	2.9%	1.5%	5-year average of yields on 10 year gilts
Equity beta	0.8	0.9	1.0	0.9	PwC estimate is average of Ofwat's PR99 & PR04 estimate
Equity risk premium	4.0%	4.8%	4.8%	5.5%	PwC assume a constant TMR of 7%
Cost of equity (post-tax)	6.2%	6.5%	7.7%	6.4%	
Cost of debt and gearing					
Cost of debt (gross of tax shield)	5.0%	4.2%	4.2%	3.2%	Based on 10 year trailing average iBoxx
Gearing (debt: RCV)	55.0%	55.0%	55.0%	55.0%	PwC align to Ofwat notional assumption
WACC – gross of tax shield (Vanilla)	5.5%	5.2%	5.8%	4.7%	
WACC – post-tax	4.7%	4.5%	5.1%	4.1%	
Ex-ante / ex-post financing wedge calculation					
Wedge applied to Ofwat's estimate (post-tax)	4.7% - 4.5% = 0.2% (1 d.p)		5.1% - 4.1% = 0.9% (1 d.p)		

Source: Ofwat, PwC analysis

In Table 4.C below, we calculate a wedge of 0.8% for PR09 and 0.4% for PR14 respectively when comparing the ex-ante return allowance to the ex-post return requirement. Again this implies that companies have been overcompensated in these two price control periods, with the continued decline

¹⁷ The WACC is calculated on a real basis.

in interest rates being the primary cause. It also suggests that PR14 was a more challenging price control period from a financial perspective.

Table 4.C: Quantification of the ex-ante/ex-post wedge from PR09 and PR14¹⁸

Components	PR09		PR14		Comments
	Ex-ante (Ofwat)	Ex-post (PwC)	Ex-ante (Ofwat)	Ex-post (PwC)	
Cost of equity					
Risk-free rate	2.0%	0.0%	1.25%	-1.50%	5-year average of yields on 10 year gilts
Equity beta	0.9	0.9	0.8	0.8	PwC estimate is average of Ofwat's PR99 & PR04 estimate
Equity risk premium	5.4%	6.5%	5.5%	8.0%	PwC assume a constant TMR of 6.5%
Cost of equity (post-tax)	7.1%	5.8%	5.65%	4.90%	
Cost of debt and gearing					
Cost of debt (gross of tax shield)	3.6%	2.9%	2.6%	2.3%	Based on 10 year trailing average iBoxx
Gearing (debt: RCV)	57.5%	57.5%	62.5%	62.5%	PwC align to Ofwat notional assumption
WACC – gross of tax shield (Vanilla)	5.1%	4.2%	3.7%	3.3%	
WACC – post-tax	4.5%	3.7%	3.5%	3.0%	
Ex-ante / ex post financing wedge calculation					
Wedge applied to Ofwat's estimate (post-tax)	4.5% - 3.7% = 0.8% (1 d.p)		3.5% - 3.0% = 0.4% (1 d.p)		

Source: Ofwat, PwC analysis

In summary, as outlined in the table below, while there have been differences across each of the last four price control periods; in each period companies have received a higher return allowance than implied by the ex-post return requirements¹⁹. In some periods the 'wedge' was higher than others, for instance, in PR09 large movements in interest rates and generous allowances to account for the risks following the 08/09 financial crisis meant that companies had a greater level of financing outperformance.

¹⁸ The WACC is calculated on a real basis.

¹⁹ We note that it is not the precise numbers themselves that should be of focus but the fact that (i) they are all positive wedges and (ii) there is some variation in the degree of wedge across the four previous price control periods.

Table 4.D: Summary of ex-ante/ex-post WACC wedge across price control periods

	PR99	PR04	PR09	PR14
Ex-ante risk-free allowance	2.5%-3.0%	2.5%-3.0%	2.0%	1.3%
Ex-post risk-free rate (5-year average of 10 yr ILGs)	2.2%	1.5%	-0.3%	-1.8%
Ex-ante cost of debt allowance	4.5%	4.3%	3.6%	2.6%
Ex-post cost of debt (5-year average of real A/BBB iBoxx index)	3.6%	3.1%	1.8%	0.2%
Ex-ante WACC allowance	4.7%	5.1%	4.5%	3.5%
Ex-post WACC estimate	4.5%	4.1%	3.7%	3.0%
WACC wedge	0.2%	0.9%	0.8%	0.4%

Source: Ofwat and PwC analysis

4.2 Water company performance and investment decisions given WACC allowances and actual financing costs.

In this section we investigate the relationship between ex-ante set returns compared to the ex-post movement in required returns - as measured by the WACC wedge in the previous section - and consumer and financial outcomes. We consider this against the reasons the CMA suggest for aiming up as outlined in Section 3 including:

- A. Aiming up to promote investment in new assets in AMP7;
- B. Aiming up to promote investment in the water sector more broadly;
- C. Asymmetry of returns; and
- D. Other cross-checks on the overall level of the WACC.

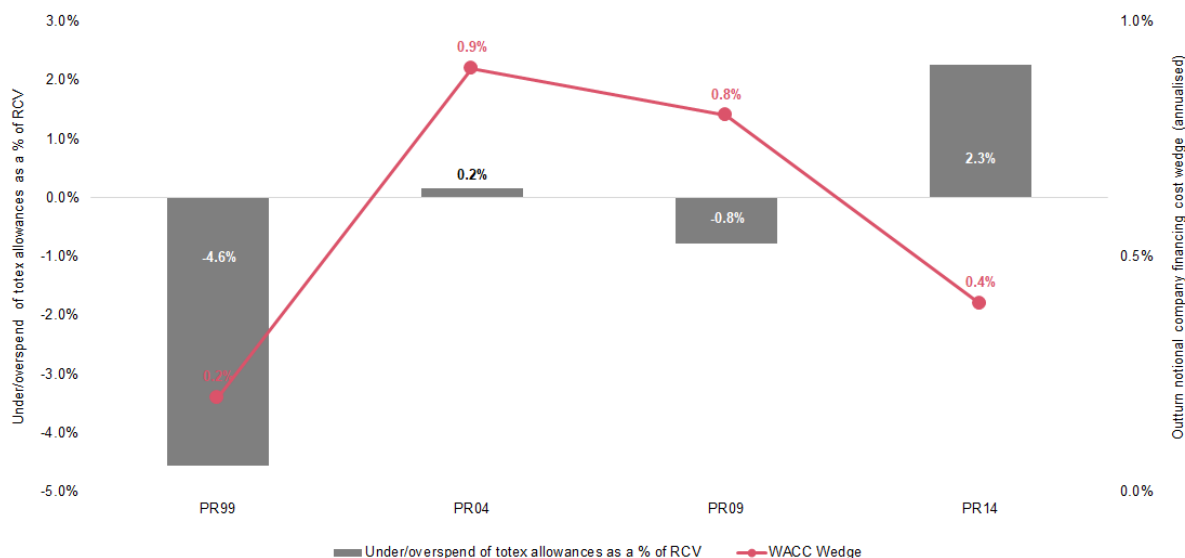
To investigate point (a) further on 'aiming up' to incentivise new investment, we analyse the companies' expenditure performance (totex, capex and opex) over the four price control periods. To assess point (b) we review MARs evidence in the water sector over the past 20 years. For point (c) asymmetry of returns, we review companies' outcome incentives performances (ODI performance and SIM score). Lastly, in addressing (d) other cross-checks on the overall level of the WACC, we explore financing decisions and financial performance within the water sector (dividend yield, total shareholder returns and MARs).

Expenditure performance (Totex, Capex and Opex)

The Disputing Companies and their advisors²⁰ argue that a higher WACC will help promote investment in the water sector. We explore the validity of this argument by looking at the previous four regulatory periods (PR99, PR04, PR09 and PR14) and the outturn levels of totex, capex and opex compared to regulatory targets. We show historical outturn totex performance of the sector compared with the WACC wedge (i.e. difference between ex-ante and ex-post WACC) in the figure below. If a higher WACC does promote greater investment, then the regulatory periods with a higher WACC wedge should lead to higher levels of investment. However, our analysis in Figure 4.3 below shows that there is no such relationship between totex performance and the WACC wedge.

²⁰ The water companies and their advisors are as following: Vivid Economics and Oxera had advised Anglian Water, NERA consulted Bristol Water, Europe Economics advised Northumbrian Water and Oxera advised Yorkshire Water

Figure 4.3: Totex under/overspend (5yr) as a percentage of RCV and the difference between ex-ante WACC and ex-post WACC



Source: Ofwat, PwC analysis

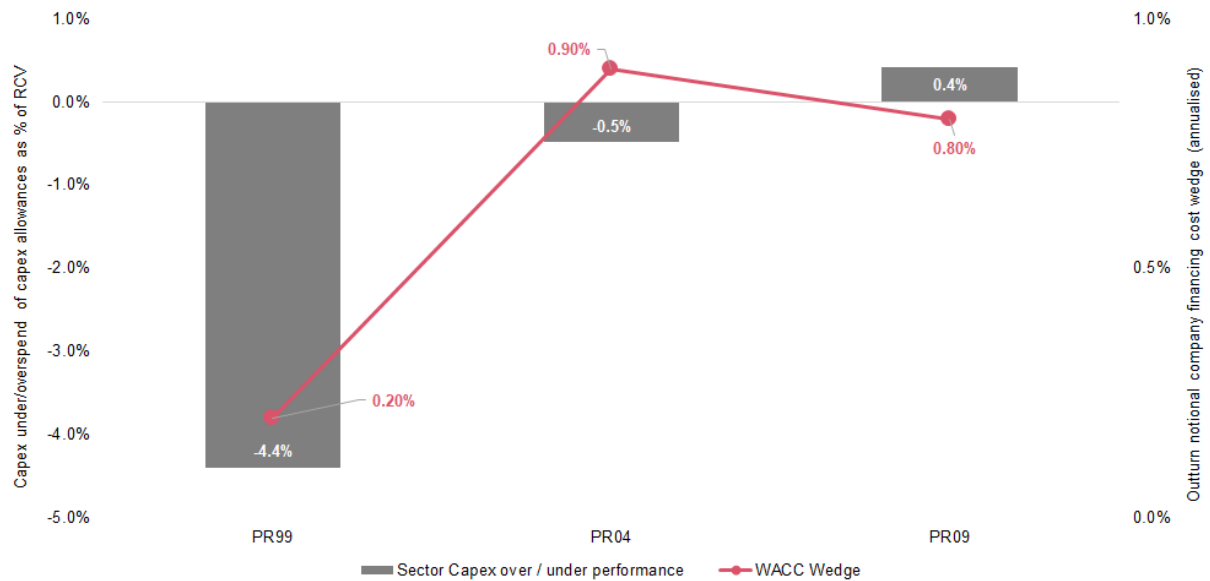
In PR99 when the WACC wedge was at its lowest (compared to other periods) and therefore companies may have least incentive to invest, companies underspent their totex (capex and opex in PR99) allowances by -4.6%. In PR04 when the estimated WACC wedge is at its greatest (90 bps higher than the actual cost of financing during this period), companies only overspent their allowances by 0.2%. In PR09, companies experienced a relatively large WACC wedge, but also underspent their allowances by close to 1%. On the other hand, in PR14, the industry overspent on its totex allowance by 2.3% despite receiving a smaller positive WACC wedge.

In summary, there does not appear to be a strong relationship between the WACC wedge and investment by companies within the water sector. In the two price controls with the biggest differences between ex-ante WACC and the evolution in required returns, companies did not increase totex expenditure. This suggests that totex incentives are stronger than movements in required returns. This is unsurprising given the strong incentives Ofwat sets around totex performance, so that companies deliver outcomes for customers cost effectively. In Appendix 1 we show how ‘aiming up’ is unlikely to materially impact incentives for additional expenditure.

The figure below shows the level of capex under/overspend as a percentage of RCV over the five year period. It broadly mirrors the totex analysis in Figure 4.3 above. In PR99 the sector spent 4.4% less capex than allowances (as a percentage of RCV) which coincides with the lowest WACC wedge (relative to other periods). However, in PR04 when the WACC wedge increases, we still observe underspend from the sector. As with totex, the WACC wedge does not seem to incentivise companies to increase capital expenditure above their allowances.²¹

²¹ Note that cost allowances in PR14 were assessed at the totex level. This means capex comparisons are not possible for PR14. At PR19 costs are also assessed at totex level to allow greater flexibility on how to reduce overall costs and achieve outcomes.

Figure 4.4: Capex under/overspend (5yr) as a percentage of RCV and the difference between ex-ante WACC and ex-post WACC

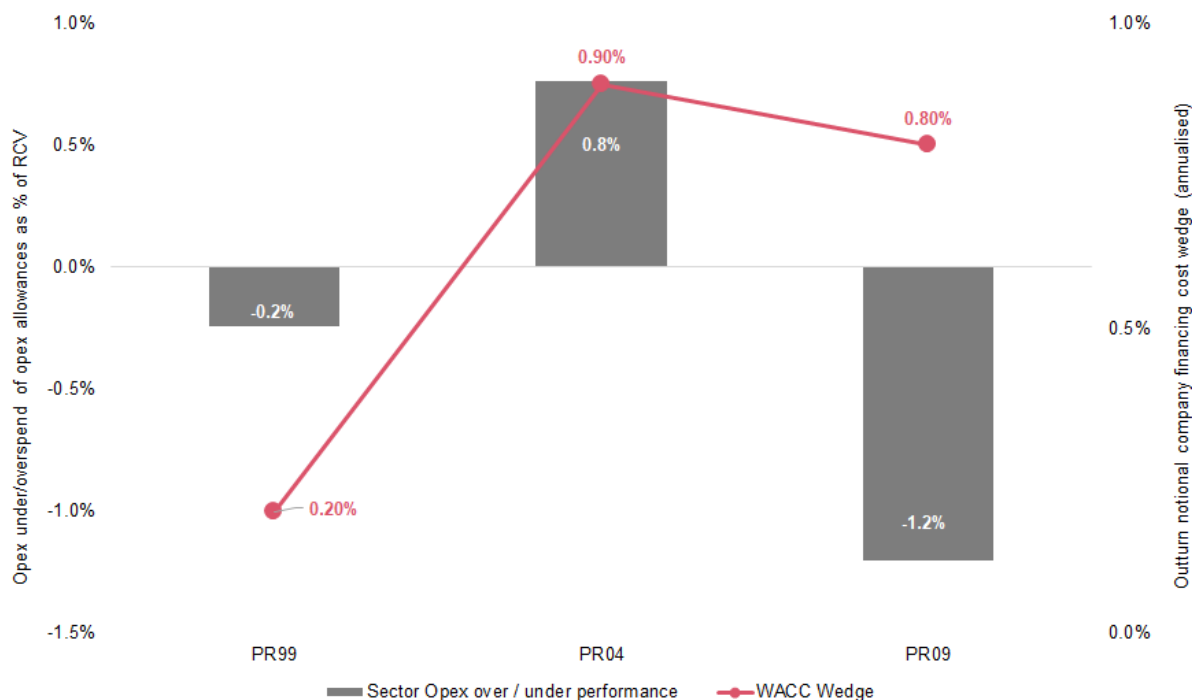


Source: Ofwat, PwC analysis

In the figure below we focus on opex under/overspend as a percentage of RCV over the five year periods. While investment is more directly linked with capital expenditure, it is useful to observe how trends in operating expenditure have progressed over time as well. The CMA does not suggest any links between the degree of ‘aiming up’ in the WACC and customer benefits from operational expenditure.

The figure below does not appear to show a relationship between opex under/overspend and the WACC wedge. For example, when the WACC wedge was at its lowest level in PR99 (i.e. when companies are benefiting the least from evolution in required returns), the sector underspend in opex was marginal. In contrast, in PR09 when the WACC wedge was significantly higher, the sector still underspent (and relatively more) in opex.

Figure 4.5: Opex under/overspend (5yr) as a percentage of RCV and the difference between ex-ante WACC and ex-post WACC²²



Source: Ofwat, PwC analysis

Outcome incentives performance (ODIs and SIM scores)

In the CMA's assessment of 'aiming up', the asymmetry of risks and returns was considered. The CMA argues that the addition of downside-only risks in the package of outcomes (on PCs and ODIs) to an otherwise balanced package of incentives means that the expected return for an average investor will be slightly below the cost of capital. The CMA suggests an average performing company could face a potential loss of around 0.1% to 0.2% of RoRE on penalty-only and asymmetric ODIs.

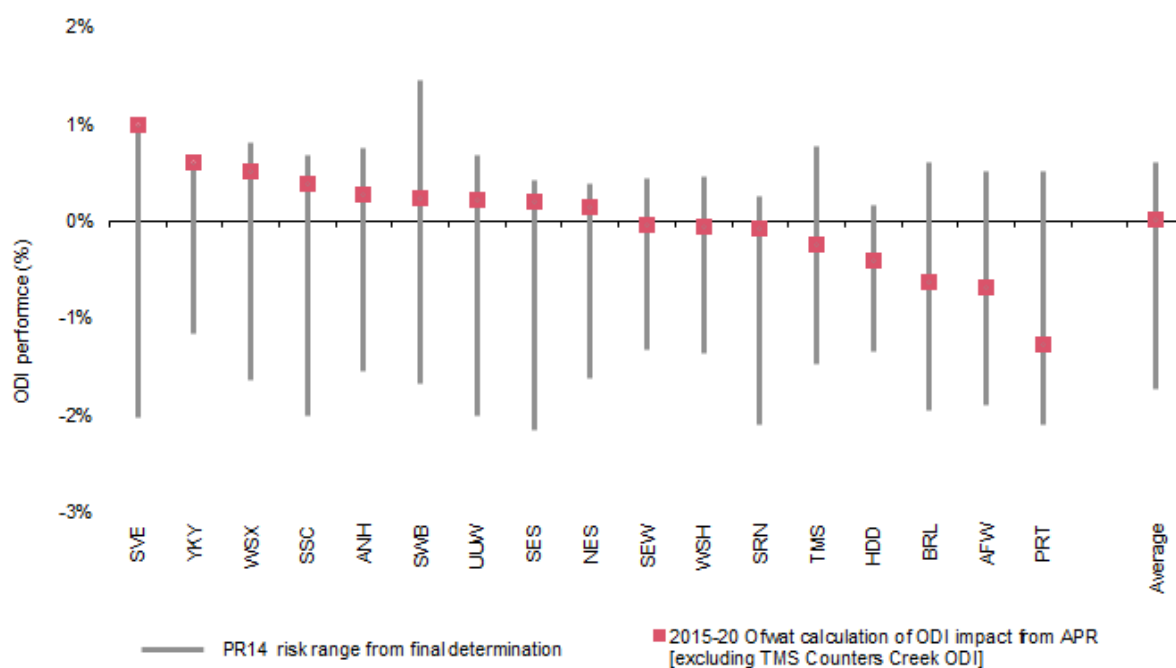
To assess this conclusion, we review the historical evidence on ODI performance in the water sector. Figure 4.6 below shows that despite outcomes incentives being skewed to the downside in PR14, on average the outturn performance was not negative. Between 2015-20, the majority of PCs were outperformed.

The figure below shows that 9 out of the 17 companies outperformed their ODIs in PR14. Over the period, the average outperformance on RoRE was 0.0%.²³ This compares to the ODI risk range from the PR14 final determination of -1.7% and 0.6%. Even though there was a downside skew in the incentive regime, the outturn average performance lies at the upper end of the risk range (75th percentile) suggesting that a downside skew on incentives does not necessarily lead to a downside skewed performance.

²² Note that cost allowances in PR14 were assessed at the totex level. This means opex comparisons are not possible for PR14. At PR19 costs are also assessed at totex level to allow greater flexibility on how to reduce overall costs, and achieve outcomes.

²³ Note that this is a simple average of companies' performance in percentage terms.

Figure 4.6: Forecast PR14 RoRE ODI vs Actual Performance (2015-2020)



Source: Ofwat, PwC analysis

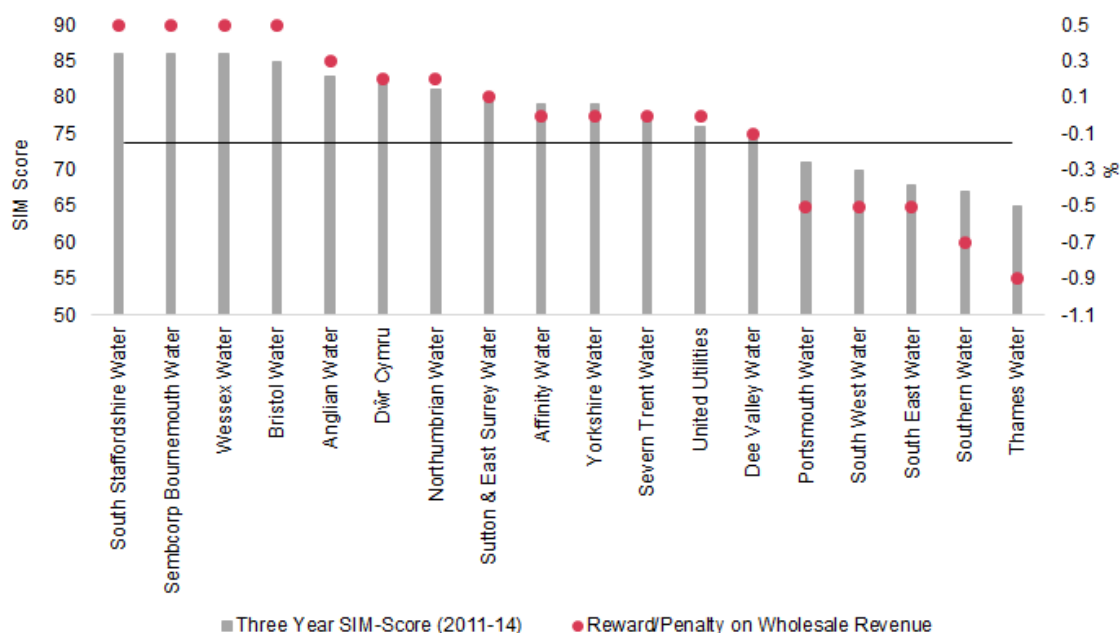
Note: The figure for Thames excludes the Leakage ODI as the underperformance payment relates to a failure of duties and the Counters Creek ODI which relates to the clawback of totex for the non-delivery of a scheme. The figure for Southern excludes an underperformance payment for Wastewater Asset Heath PC as the underperformance payment relates to a failure of duties. This figure excludes SIM for the 2015-20 period.

There are two possible interpretations from this analysis: (i) either that performance incentives mean companies can perform towards the higher end of the outcomes regime, overcoming the negative skew on the ODI ranges; or (ii) the WACC wedge in PR14 has enabled companies to perform towards the upper end of the performance range. Since there is only one price control period to assess ODI performance, and because the calibration of hundreds of ODIs is both complex and judgmental is it difficult to determine whether outturn ODI performance was due to strong incentives, initial calibration at PR14, or positive support from the WACC wedge. However, we can tell that the relatively small WACC wedge in PR14 did not result in companies, in aggregate, over delivering on their PR14 performance commitments.

Prior to PR14, the outcomes incentive mechanisms used different methodologies. The service incentive mechanism (SIM) was a financial incentive mechanism introduced for PR09. This replaced the overall performance assessment (OPA) score which was used in PR04 and PR99. The OPA-related price limit adjustments allowed high performing companies to raise prices by up to +0.5% and poor performing companies to reduce prices by -1.0%. The SIM was applied at the wholesale revenue level and also rewarded or penalised companies in the range of +0.5% to -1.0% of revenue. Reviewing the impact of SIM on wholesale revenue for the 2011-14 period in the Figure below, 8 companies received a positive reward for good performance, 6 companies received a penalty and 4 companies did not receive either a penalty or reward. The average reward/penalty for the sector was 0.0%. Again, this shows that even though there is a greater risk of a negative outcome, the majority of companies received a positive reward for service quality.

Overall, it seems that despite a positive WACC wedge of 0.4% in PR14, companies did not use this benefit to over-deliver on outcomes (i.e. on average ODI performance was 0.0%).

Figure 4.7: Three-year average SIM performance and resulting rewards and penalties on wholesale revenue (2011-14)



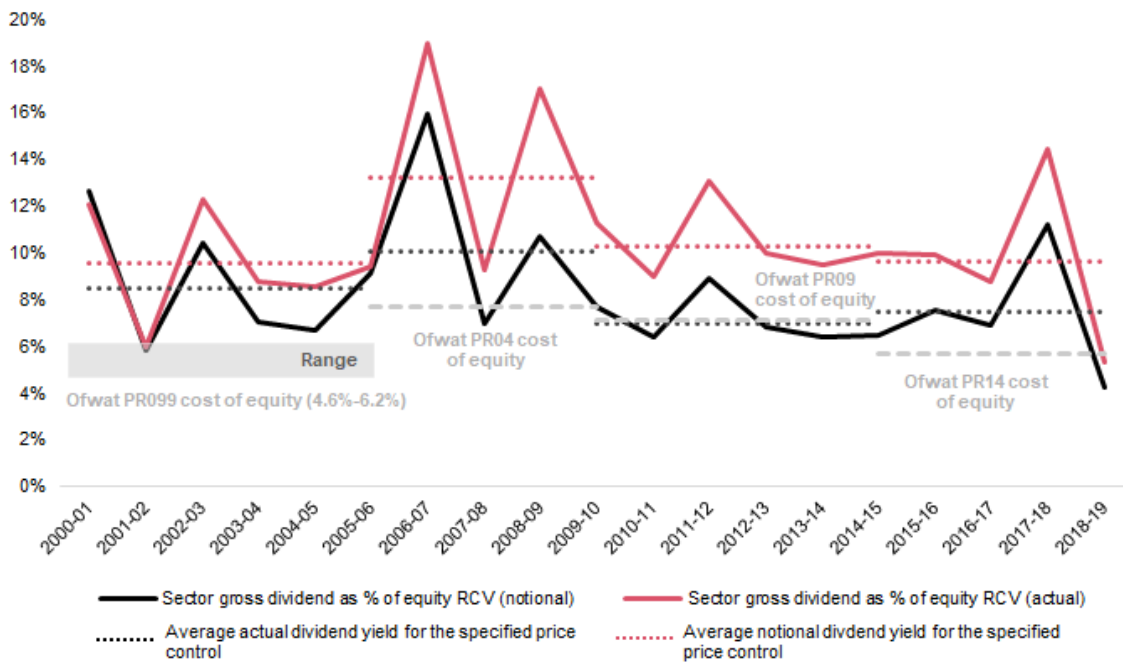
Source: Ofwat, PwC analysis

Financing decisions and performance

We also assess the financing decisions made by companies in previous price control periods in response to their WACC allowances and evolution in return requirements.

As shown in Figure 4.8 below, returns on equity above the allowed cost of equity have enabled strong dividend flow to shareholders over PR99, PR04, PR09 and PR14. Dividend flows have also been enhanced by an increase in gearing – with part of the dividend flow being financed by debt rather than annual earnings. In particular, dividend payments were highest during PR04 where we observed a large wedge between the ex-ante WACC allowance and the ex-post WACC. We also observe a reduction in dividends towards the end of PR14 when Ofwat signalled its intention to increase its focus on financial resilience and set a lower WACC.

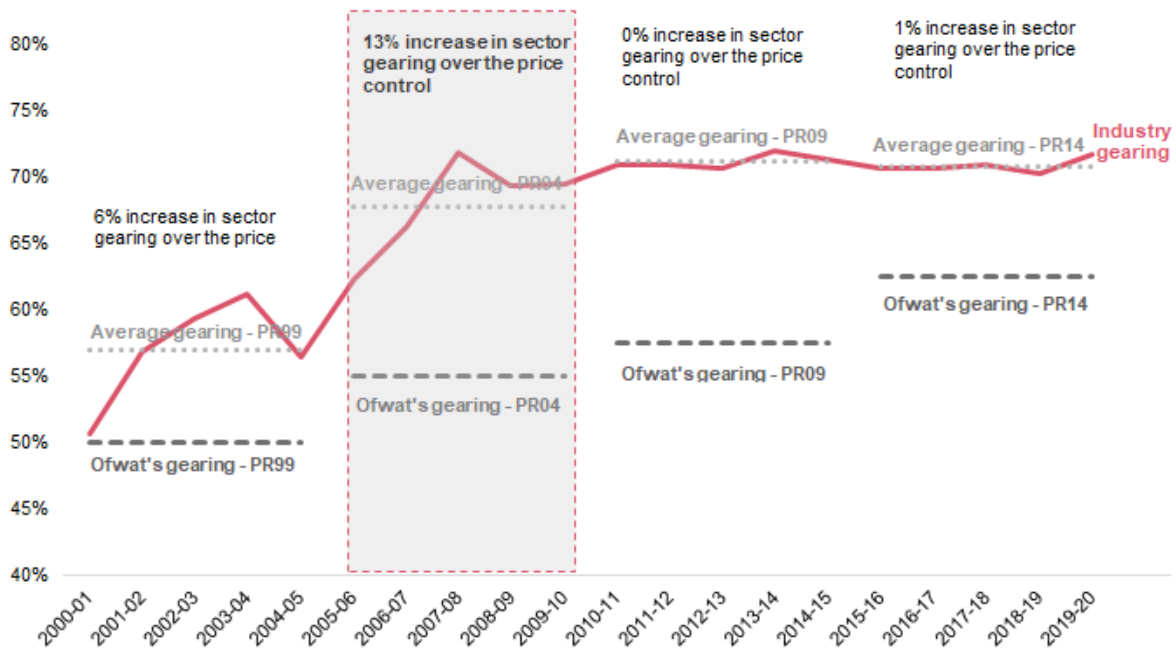
Figure 4.8: Water sector gross dividend yield in PR99, PR04, PR09 and PR14



Source: Ofwat, PwC analysis

As mentioned above, higher dividend flows were partly financed through higher gearing with the figure below showing that water sector gearing has increased materially over the past four price control periods. The biggest step change in gearing was in PR04 over the period 2005-10, which coincided with a high ex-ante/ex-post WACC wedge.

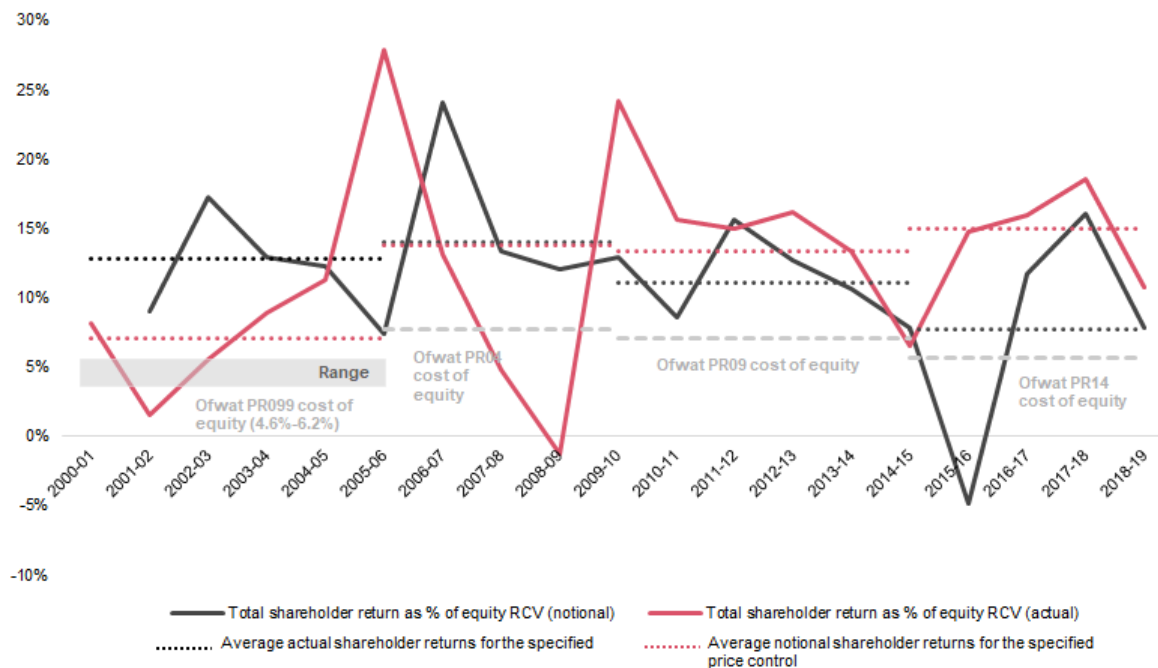
Figure 4.9: Water sector industry gearing



Source: Ofwat, PwC analysis

The figure below shows that, on average, shareholder's returns are greater than the cost of equity set by Ofwat across the different price control periods. On average, actual shareholder return as a percentage of equity RCV increased in PR14 (2014-2019), even though the cost of equity set by Ofwat was lower than in PR09. This shows that on average, water companies have comfortably outperformed their cost of equity allowances across the past four price control periods.

Figure 4.10: Water sector total shareholder return in PR99, PR04, PR09 and PR14



Source: Ofwat, PwC analysis

The figure²⁴ below shows the market-to-asset ratios (MARs) for transactions in the water sector for the past four price control periods. The average price control period premia range is 13.5% to 32%, indicating that, on average, equity investors have been willing to pay a premium above regulatory capital for regulated water assets in each of the four price control periods. These relatively high MARs suggest that there has been a consistent expectation from equity investors that water companies will outperform either the return allowances or cost and incentive performance. We observe that transactions following PR99 were undertaken at a lower premia, which could be directly linked to the lower WACC wedge in this period.

²⁴ From PR04 onwards the premiums are estimated by the Royal Bank of Canada. We use PwC estimates for PR99.

Figure 4.11: UK water historic market to asset ratios, calculated by RBC and PwC (for PR99 only)²⁵

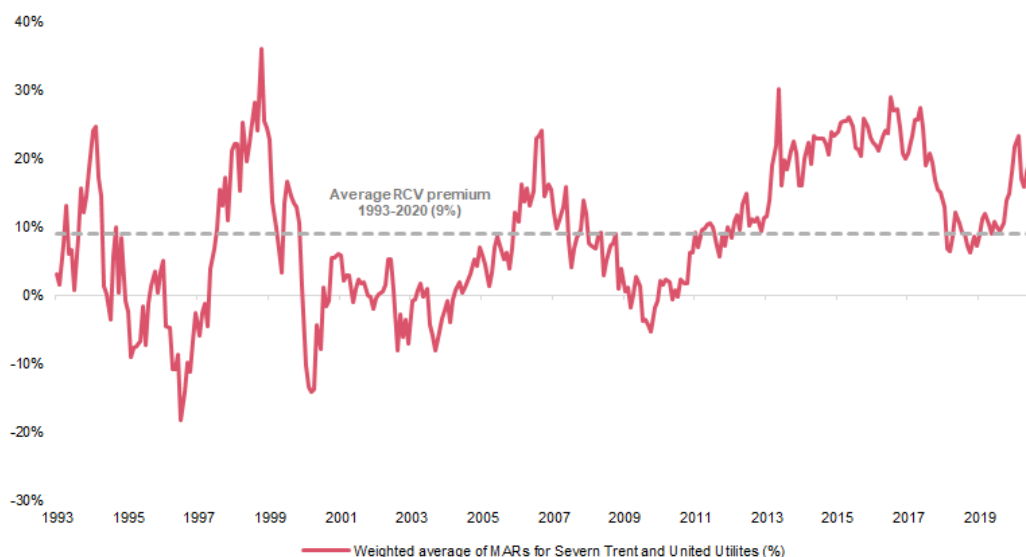


Source: Royal Bank of Canada, Dealogic, Capital IQ and PwC analysis²⁶

The figure below shows the MARs for listed companies, Severn Trent and United Utilities. The average MARs premia for these two companies across 1993 to 2020 is 9%. This is consistent with the RBC’s findings and highlights investor’s willingness to pay a premium above the regulated capital for regulated water assets on average.

We also find that in 2009, market prices traded at a lower premia ranging between -5% and -1%. This could be attributable to the impact of the 08/09 financial crisis, which resulted in greater uncertainty in the financial markets across all investors.

Figure 4.12: Historic market asset ratios for Severn Trent and United Utilities



Source: Ofwat, Refinitiv and PwC analysis

²⁵ Royal Bank of Canada (2020), ‘Severn Trent Plc Downgrade to Sector Perform on valuation’, p.6

²⁶ Multiples for September 2000-September 2006 are calculated by PwC using data from Dealogic and Capital IQ; all other data points are from the Royal Bank of Canada capital market report

4.3 Conclusions from the ‘natural experiment’ in the water sector

We present an overview of our findings in Table 4.E and 4.F below. Table 4.E summarises the financial, investment, and performance metrics that we have considered across the four price control periods. Table 4.F summarises the implications of these metrics.

Table 4.E: Review of ex-ante/ex-post WACC and sector performance

	PR99	PR04	PR09	PR14
WACC (ex-ante, post-tax)	4.7%	5.1%	4.5%	3.5%
WACC (ex-post)	4.5%	4.1%	3.7%	3.0%
Wedge	0.2%	0.9%	0.8%	0.4%
M&A market-to-asset ratios (sector average)	13.5%	30.5%	19.3%	32.0%
Change in gearing level (within price control period)	+5.7%	+13.0%	+0.4%	+1.1%
Average dividend yield (actuals, within price control period)	9.5%	13.2%	10.3%	9.6%
Average total shareholder return (actuals, within price control period)	7.1%	13.7%	13.3%	15.0%
Totex under / over spend	-4.6%	+0.2%	-0.8%	+2.3%
Capex under /over spend	-4.4%	-0.5%	0.4%	Not available
Opex under / over spend	-0.2%	0.8%	-1.2%	Not available
SIM and ODIs performance	Not available	Not available	0.0% (average SIM reward/ penalty on revenue)	0.0% (average ODI reward/ penalty on RoRE)

Source: Ofwat, PwC analysis²⁷

²⁷ Note: x% is the highest value, x% the higher middle value, x% the lower middle value and x% is the lowest value. For totex, capex, opex and ODIs we calculate the 5-year performance. Gearing is changed over the price control period. All other parameters are annual averages.

Table 4.F: Summary of the performance of the industry and ex-ante/ex-post WACC wedge

	PR99	PR04	PR09	PR14
Characterisation of price control period settlement: ex-post	<ul style="list-style-type: none"> Challenging settlement with minimal finance outperformance 	<ul style="list-style-type: none"> Settlement overcompensated for challenging PR99 - and beginning of long-term decline in interest rates 	<ul style="list-style-type: none"> Generous settlement at the time reflecting perceived potential risks associated with the global financial crisis. 	<ul style="list-style-type: none"> Challenging settlement at the time, but continued fall in interest rates allowed moderate levels of finance outperformance
Financial outcomes	<ul style="list-style-type: none"> Weaker deal values, but still an investable sector (although some transactions at MARs below 1). Some increase in gearing Lowest equity returns over the whole period 	<ul style="list-style-type: none"> High equity values Significant step change in gearing Highest equity returns across the whole period 	<ul style="list-style-type: none"> Lower equity values (at a time of weak equity markets generally) No change in gearing Strong equity returns 	<ul style="list-style-type: none"> High equity values No change in gearing Strong equity returns
Operational outcomes	<ul style="list-style-type: none"> Considerable underspend in costs (overperformance) Considerable underspend in investment 	<ul style="list-style-type: none"> Similar spend to allowance Small underspend in investment Small overspend in opex 	<ul style="list-style-type: none"> Minimal underspending in costs Small overspend in investment Small underspend in opex 	<ul style="list-style-type: none"> Biggest overspend in costs which possibly relates to perceived challenge on service performance at PR19, hence willing to spend more to improve service. Service outperforming performance commitments leaving ODI rewards close to zero

Source: Ofwat, PwC analysis

5. Conclusion

In this report we assess how historical market movements have evolved the required returns for regulated water companies. We compared this evolution to how water companies have performed and made financial decisions.

Our main findings are:

- **Movements in financial markets have been favourable to companies across the past four price control periods, leading to a ‘wedge’ between set return allowances and the evolution of required returns:** As interest rates have declined over recent decades, Ofwat’s risk-free rate and cost of debt assumptions have been higher than the evolution in required returns. This contributed to financial outperformance across the sector. Some regulatory finance decisions in price control periods were tougher than others, for instance, PR99 was particularly challenging while in PR09 Ofwat set higher allowances to account for the risks associated with the aftermath of the 08/09 financial crisis, which subsequently subsided.
- **An increase in the wedge between ex-ante set returns and movements in required returns during a price control does not increase expenditure or investment above regulatory targets:** In our analysis of water company performance compared to the movement in return requirements, we found that there is no direct relationship between companies expenditure performance (totex, opex and capex) and the WACC wedge i.e. a higher WACC wedge does not incentivise higher levels of expenditure or investment by companies. For the PR04 and PR09 price controls, in particular, we assessed the largest difference between ex-ante WACC and evolution (down) in return requirements, but this did not result in higher expenditure or investment.
- **When performance targets are skewed to the downside, water companies perform in line:** When reviewing companies’ outcome incentive performance, we find that even though outcome incentives were set with a larger negative potential downside, many companies receive positive rewards for their service quality and on average companies’ outturn performance on outcome delivery incentives was around zero. The relatively small WACC wedge in PR14 did not result in companies, in aggregate, over delivering on their PR14 performance commitments, but it is possible that this wedge supported companies performing in the upper end of the performance incentive range.
- **Favourable financial market movements which have contributed to a positive WACC wedge, have enabled companies to increase gearing and dividends:** Over the past four price reviews, we find that, on average, the gross dividend yield has been greater than the allowed cost of equity set by Ofwat. Dividend flows have also been enhanced by an increase in gearing (particularly following PR04) – with part of the dividend flow being financed by debt rather than annual earnings. Furthermore, we find that over the past three price control periods equity investors have been willing to pay a premia above regulatory capital for regulated water assets.

We consider our findings are helpful in guiding the CMA on the likely implications of its decision on where to choose its point estimate for setting allowed returns; whether to ‘aim up’. Experience from the water sector suggests that providing a return allowance which is more than required from market data does not result in increased investment into the sector. Rather, it is more likely to channel increased dividend payments and maintain MARs markedly above 1.0x. The historical evidence suggests that companies have rarely struggled to secure investment from investors and securing financing does not seem to have been a problem for water companies post-PR19 FDs.

When performance targets are set skewed to the downside, water companies have performed towards the upside of the performance range, and on average do not face losses. This suggests that companies do not need additional compensation on the WACC to mitigate against losses in the price control period.

While there are inherent difficulties in setting the correct or 'true' ex-ante WACC, over time financial market information means it is possible to assess whether customers have benefited from regulators' decisions. In its review of PR09, the NAO highlighted that customers had been overcharged by c.£840 million as a result of Ofwat's cost of debt being higher than actual performance in PR09. If consumers bear further costs from PR19 as a result of 'aiming up' on WACC allowances, this will increase scrutiny on the sector and regulators' future decisions to 'aim up'.

Appendix 1: Stylised example to illustrate cost sharing mechanism and return to the investor

In this appendix we explore the interaction between the incentives set by the cost sharing mechanism and the rate of return to a water company for a hypothetical project.

Ofwat provided reasons to the CMA suggesting that ‘aiming up’ would not increase consumer welfare.²⁸ In particular, Ofwat states that ‘other incentives matter more to investment decisions than aiming up in determining the allowed return’. Within the PR19 framework, the financial incentives to a company underspending (through the totex cost sharing rates) are greater than the earning from an ‘aiming up wedge’ on new investment. To demonstrate this point we have created a stylised example of a project to show how under/overspending impacts returns materially more than changing the allowed rate of return and therefore provides a higher-powered incentive.

We use our stylised example to show at which point an investor would be indifferent between the incentive to underspend and capture benefits through cost sharing and capture benefits through the ‘aiming up’. These are assuming the marginal investments have no impact on financial rewards or penalties ODIs.

We note that it is possible that companies may have some ODI investment which has a marginal benefit but not sufficient to offset the cost of the scheme and related cost sharing incentives. ‘Aiming up’ could make some of those schemes NPV positive and therefore encourage investment into those schemes. However, this is not possible to measure as we do not know the marginal benefits of ODI schemes, but cost performance incentive payments have historically been greater than ODI payments, so cost performance is likely to be the stronger incentive.²⁹ Furthermore, if Ofwat or the CMA consider that ODIs do not provide sufficient incentive to invest then this should be addressed through the setting of ODI rewards and penalties. The rest of this appendix focuses on a simplified scenario where marginal investment does not impact ODI reward/penalties.

For the stylised example we make the following assumptions:

Table 1.A: Assumptions for the stylised example

Assumption	Parameter
Project size	£1bn - size of a hypothetical project
WACC (as set in the CMA's PF)	3.50%
Cost sharing rate (as set in the CMA's PF)	55% - Cost to company for overspend 45% - Benefit to company from underspend

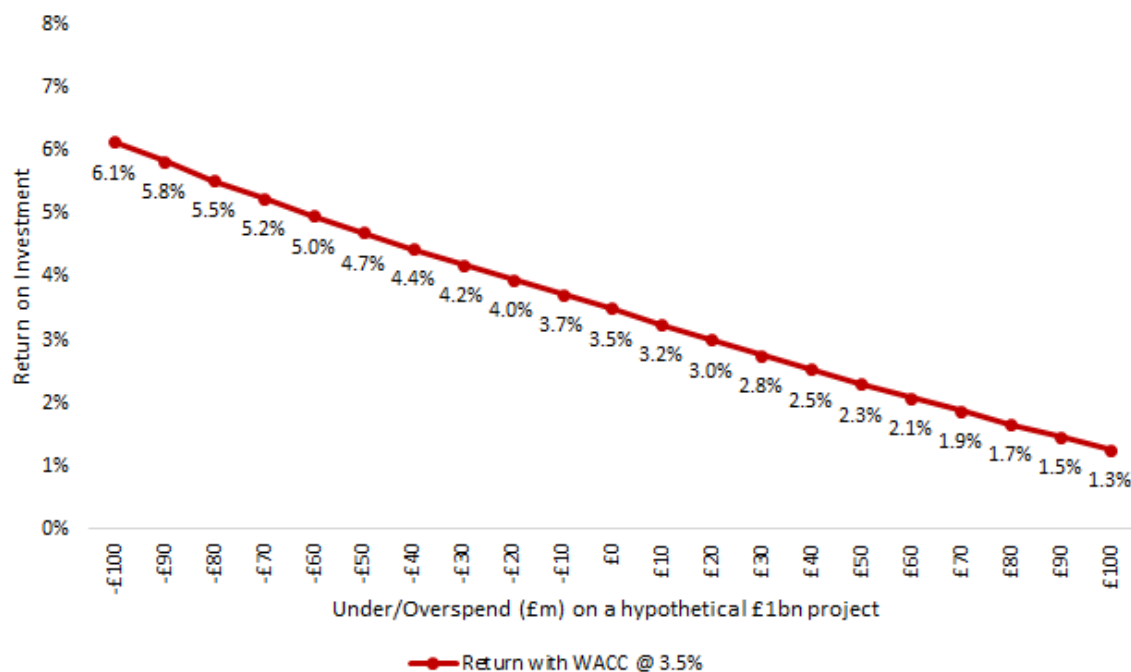
Source: CMA, PwC analysis

Using the assumptions in Table 1.A on cost sharing rates and WACC, we then estimate the profile of returns on a £1 billion hypothetical project. In Figure A.1, we show the impact of under/overspending by plus and minus 10% of the initial project cost. The returns are calculated assuming that this project is equally spread over five years (i.e. over one price control period).

²⁸ CMA (2020), PR19 Provisional Findings (pp.661-662)

²⁹ Ofwat (2020), Monitoring financial resilience Ofwat, p.10

Figure A.1: Stylised example of the relationship between cost sharing incentives and the return to the investor of a hypothetical project



Source: CMA, PwC Analysis

In this hypothetical example, underspending by £100m (i.e.10% of project cost) can increase the return by 264bps from 3.50% to 6.14%. As the level of underspend increases, the higher the rate of return. Overspending by 10% of project cost would lead to a reduced return of 1.26%.

Our first conclusion we draw from this stylised example, is that the marginal benefits from underspending outweigh the marginal costs from overspending given the higher rates of return companies could achieve from underspending compared to an equivalent amount of overspending. Therefore companies have an incentive to underspend.

Our second conclusion is that the impact of under- or over-spending on returns is far greater than any aiming up wedge on the WACC. Totex and outcomes incentive mechanisms are therefore better placed to address the issues of potential underinvestment or underperformance.

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