Water UK

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Water UK's third party submission to the Competition and Markets Authority's redeterminations of PR24

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Executive summary

Introduction

This document is provided to the Competition and Markets Authority (CMA) in response to its invitation to third parties as part of its redetermination of Ofwat's PR24 final determination for the five disputing companies. It provides an overview of the industry-wide issues arising from Ofwat's PR24 final determinations, and our proposed recommendations, for consideration by the CMA.

The issues we set out below represent areas of significant concern for the entire sector. Having six companies reject Ofwat's final determinations (if Thames Water subsequently chooses to seek an appeal) is unprecedented since the privatisation of the sector over 30 years ago and reflects the scale of the sector's concern with the final determinations. Together, the six appealing companies serve more than half of all customers in England. Furthermore, the decision for many of the companies that chose not to seek a redetermination was an exceptionally difficult one that was finely balanced. This reflects the fact that a redetermination risks distracting staff, management and the supply chain away from delivery in the first, crucial year of a control period that will see a doubling of investment for most companies. It also reflects that a redetermination is costly.[1]

PR24 Context

Ofwat's PR24 final determinations represent a material change relative to the draft determinations across many components of the regulatory framework including cost allowances, the design of the outcomes package and the allowed return. We welcome these changes, which recognise that many components of the draft determinations (and, indeed, the PR19 final determinations) were incorrectly calibrated and represented an undeliverable package for the industry.

Nevertheless, the final determinations still contain major shortcomings that leave some companies underfunded for the activities they need to carry out. These determinations threaten their ability to raise the finance needed to deliver the major step-up in investment required in PR24 and the coming decades. Although the final determinations recognise some of these challenges, they do not go far enough to address the materially different context that companies are facing in this price control compared with PR19:

- External challenges, such as a growing population, climate change and increasing expectations from the public have been a feature for many years, but continue to intensify and add further upwards pressure to costs and expected performance levels. In particular, securing our water supply requires substantial investments.
- Companies are subject to extensive new and more stretching statutory requirements relative to PR19, which are driving up costs. For example, companies are faced with challenging targets for reducing storm overflows and removing phosphorous from discharges. This is even more challenging in the context of an ageing asset base that needs significant investment.

[1] We estimate that the cost of the PR24 redetermination process to water companies could be over £50m, based on the cost of previous redeterminations and the number of appealing companies.

At the same time, Ofwat's PR24 final determinations also fails to fully address the mistakes Ofwat made in the PR19 determinations which have led to substantial overspending by the sector against the allowed costs and significant performance penalties driven by the setting of unachievable service performance targets. Indeed, we are concerned that the mistakes of PR19 are being repeated through PR24, further damaging the investability of the sector at a crucial inflection point for investment and undermining the long-term success of the sector.

The issues in the final determinations span three main areas of Ofwat's decision-making: i) the approach to setting the cost of capital that determines the level of returns on investment that companies can recover from customers, ii) the allowed costs that companies can recover from customers, and iii) the performance framework that sets the outputs that companies must seek to deliver, as well as the associated targets, financial incentives and penalties for delivery. We provide a brief overview of each below, with more detailed coverage in the main body of this report.

Whilst we would expect the CMA to focus on these issues for the purposes of its redeterminations, it is worth noting that, at the request of the UK and Welsh Governments, Sir Jon Cunliffe is currently undertaking an independent commission that is looking at the water sector and its regulation.[2] He is expected to make recommendations in June 2025. Water UK is engaging closely with this commission.[3]

Issues with Ofwat's estimation of required investor returns

Given the scale of the investment programme that companies need to undertake, and the need to attract unprecedented quantities of equity and debt finance to the sector, it is critical that the regulatory framework provides appropriate long-term investment incentives aligned to the risks the sector faces. However, Ofwat's estimation of the cost of capital in the final determinations does not sufficiently reflect this, and sets the allowed return on both equity and debt at a level that is too low to attract the required capital to deliver for customers. This is an important reason why five companies have asked Ofwat to refer their PR24 price controls to the CMA for redetermination. We detail the drivers for this below.

First, Ofwat has not taken sufficient account of evidence from market-based cross-checks, which regulators use to consider evidence from the wider financial market about the sufficiency of their proposed allowances. Ofwat considers evidence on market-to-asset ratios (MARs), which involves making stylised assumptions to draw inferences on the cost of equity based on the ratio of market valuations of water company assets to their regulatory capital value (RCV). However, it does not consider other relevant cross-checks, which highlight the insufficiency of the return on equity allowance.

This is contrary to the CMA's PR19 redetermination approach, as well as the approach taken by other regulators (e.g. Ofgem), which consider alternative cross-checks, including debt-based cross-checks that measure the premium of equity returns over debt (e.g. the asset risk premium–debt risk premium (ARP–DRP analysis), and the hybrid debt cross-check). These cross-checks show that the PR24 final determinations provide an insufficient premium for equity over debt. Some cross-checks even suggest a negative spread between equity and debt thereby violating a fundamental principle of finance that equity is higher risk than debt and therefore requires a higher return. For example, the PR24 final determinations

[2] 'Governments launch largest review of sector since privatisation - GOV.UK', *GOV.UK,* (October 2024).
[3] See, for example, Water UK's response to the Commission's Call for Evidence. 'A Reset for Water: Water UK's response to the Independent Water Commission's Call for Evidence', *Water UK,* (April 2024).

set an unlevered cost of equity (which refers to the hypothetical cost of equity assuming an entirely debt-free capital structure) which is 32bps below the cost of new debt.

Second, Ofwat's approach to setting other elements of return using the capital asset pricing model (CAPM, which estimates the required return on investment taking into account the sector's risk) contains errors. This is illustrated in two ways:

- The situation in capital markets has changed markedly since PR19. There has been a sharp increase in interest rates and required returns for all asset classes, following a reset of global monetary policies to tackle high inflation. Despite this, Ofwat's estimate of total market return is only 2bps higher than the total market return under the CMA's PR19 redetermination.
- Investors are reassessing the risks associated with the water sector, in light of a significant programme of investment, challenging performance over the current asset management period (AMP7, the five year funding period from April 2020) and a high level of uncertainty and unpredictability around Ofwat's regulation. Despite the clear increase in sector risk, Ofwat's PR24 beta (i.e. the measure of the sector risk relative to the market as a whole) is lower than the beta in the CMA PR19 redetermination, on a like-for-like basis.

The inadequacy of the allowed return on equity is particularly problematic at a time when an unprecedented level of equity issuance is required to finance investment. When taken together with the issues raised above, Ofwat's final determinations present a significant investability challenge to the sector, risking under-delivery for customers and the environment.

Issues with Ofwat's performance framework

Although Ofwat has made material changes to the output delivery incentive framework (ODIs, which refers to financial payments or penalties companies face based on their performance against performance commitments) between draft and final determinations, major issues remain with the calibration of the framework. These include:

- the unreasonably high levels of stretch within performance commitment levels (PCLs);
- Ofwat's view that companies should bear the risk from extreme weather events that are outside of their control; and,
- Ofwat's decision that customer satisfaction should be benchmarked against businesses operating in completely different competitive contexts (e.g. in retail).

Collectively, these issues result in a negative skew within Ofwat's performance package. This is confirmed by analysis which finds that if companies deliver levels of performance forecast in their draft determinations responses, this would result in a net penalty across the sector of £281m over AMP8. This same analysis suggests Ofwat has miscalibrated a number of PCs, including:

- **Total Pollution Incidents**: which has a total gross penalty expected over AMP8 of £191.5m, which is the highest gross penalty across all PCs examined;

- **Water Supply Interruptions**: which has a forecast gross penalty of £87.2m, with almost half of companies forecast to underperform against the target PCLs; and

- **Storm Overflows**: where companies forecast a gross penalty of £94.2m over AMP8 across six companies, with 48% of this penalty attributable to only one company.

In theory, the newly introduced outturn adjustment mechanism (OAM) – which is designed to ensure the sector does not face excessive downside ODI risk as a whole – should help to mitigate against major sector-wide risks. However, the mechanism still leaves companies exposed to errors made in calibrating individual PCs which have not been addressed within Ofwat's ODI methodology.

We also note that Ofwat's own analysis shows a -0.2% operational return on regulatory equity (RoRE) impact for the median company. This is based on the mid-point between P90 and P10. However the P50 of the distribution in Ofwat's analysis is -0.42% of RoRE for the median company. This further highlights that a degree of negative skew is built into the ODI regime. Indeed, Ofwat is not even claiming to have eliminated the potential for a negative skew in its ODI payments, only to have reduced the potential for a negative skew by introducing various 'deadbands', which only become active if the median performance is equivalent to >-0.5% or >+0.5% of RoRE.[4]

In one of its more baffling statements, albeit with refreshing honesty, Ofwat rather simply declares that, "…we continue to expect companies to be responsible for managing the effects of factors outside their control."[5]

Furthermore, Ofwat has made extensive use of price control deliverables (PCDs) at PR24. While companies support the regulatory principle of protecting consumers against non-delivery, these PCDs create additional risks to companies which Ofwat has not properly accounted for within its final determinations. The PCDs unduly constrain companies to meet certain specific 'outputs' rather than enabling them to deliver 'outcomes', thus undermining the scope for innovation and efficiency. The additional risk include a one-sided disallowance risk associated with non-delivery PCDs, time delivery PCDs which are too heavily skewed towards penalties and the risk of under-funding driven by the introduction of base PCDs.

Issues with Ofwat's cost assessment

Ofwat reviews companies' business plans and associated proposals to set allowed revenues for each company. There are a number of issues with Ofwat's approach in this area.

First, Ofwat's approach to estimating funding needs for operating and capital maintenance activities (called 'base costs') is flawed. Ofwat heavily relies on backward-looking models of cost and performance, which are not always appropriate for forecasting future cost requirements.

Secondly, Ofwat has used information on past delivery to infer what companies should be able to deliver from their PR24 modelled base allowances, focusing on a narrow subset of company activities. In doing so, Ofwat has made conceptual and methodological errors resulting in a failure to adequately fund companies' activities, particularly asset maintenance.

[4] 'PR24 final determinations: delivering outcomes for customers and the environment', *Ofwat,* (December 2024), p. 42.
[5] 'PR24 final determinations: delivering outcomes for customers and the environment', *Ofwat,* (December 2024), p. 42.

Thirdly, Ofwat has applied retrospective penalties to companies for not delivering certain outputs during the previous price control – despite not setting any requirements on companies to do so in the first place, or ringfencing funding to deliver them. As expected under a totex-based regulatory regime, companies had discretion to allocate the funding to achieve the required outcomes in the most efficient and effective way – therefore, Ofwat's penalty is unreasonable and distortive. Retrospective regulation risks undermining trust in the regulatory framework and would drive up costs for customers in the long run.

In addition, as the water sector faces new and more stretching statutory requirements in an already challenging environment created by climate change and population growth, the proportion of enhancement expenditure[6] has increased from 17% of total allowed costs at PR19 to 42% at PR24. Yet Ofwat's cost assessment approach in this critical area of spend is not fit for purpose: it continues to rely on statistically weak, backward-looking models, and where it does make post-modelling adjustments, those often appear arbitrary. This leads to significant cost exposure risk across crucial delivery areas for the sector, including pollution reduction and environmental improvements.

Lastly, Ofwat's 1%-per-year frontier shift adds further pressure to companies' allowances. The level of the frontier shift challenge is too high; it exaggerates the productivity growth opportunities available to companies over the next five years and is not supported by economic evidence.

Conclusions

Considering the PR24 final determinations in the round, it is clear that Ofwat's approach poses a serious threat to companies' ability to meet customer and environmental needs. For several companies, the combination of cost, performance, and risk and return issues will mean that their final determinations create a serious risk to their ability to finance and/or deliver their plan in full. As such, we recommend that the CMA addresses the issues discussed above for appellant companies by considering:

- current market evidence to ensure that final allowances are adequate (e.g. reflecting cross-checks on the cost of capital and taking account of the activities funded by unit costs comparisons);
- the overall position that companies are left in as a result of methodological issues across all areas, particularly the risk and return balance; and
- the concerning precedent that is set by Ofwat's decision to apply retrospective regulation for future price controls and wider regulatory decisions.

As mentioned above, the water sector faces significant challenges in future price control periods. Demand for clean water and wastewater treatment will continue to rise due to economic and population growth, coupled with increasing urbanisation. At the same time, environmental standards are increasing, including ambitious targets to restore 75% of rivers close to their natural state and expand woodland in England. Societal pressures are also evolving, with growing pressures on water companies to address climate change impact and actively restore nature. Furthermore, working patterns have shifted and additional changes might be expected with new technologies. Climate change exacerbates all these challenges, posing increased risks to the water sector.

[6] Expenditure on activities which lead to permanent increases in the level of service or capacity.

Therefore, addressing the shortcomings of the PR24 final determinations is crucial in order to maintain and expand the fundamental infrastructure of the water sector, while ensuring that the sector is able to attract the necessary investment required in PR24 and beyond.

1. Context

The water sector in England and Wales was privatised 35 years ago, with the dual objectives of encouraging more efficient management and unlocking capital to invest in infrastructure. In the years that have followed, major benefits have been realised on behalf of customers and the environment:

- annual capital investment by the water industry in England and Wales has been significantly higher than at any point under the previous Regional Water Authorities;[7]
- companies have delivered large performance improvements—including the lowest ever levels of leakage, a 90% reduction in serious pollution incidents caused by the water industry and unplanned interruptions to water supplies that a fifth as likely than pre-privatisation;
- the performance and efficiency of water companies in England and Wales compares favourably to those in other major European countries including France, Italy, Spain and Germany.[8]

We recognise however that overall water sector performance is not where it should be. Companies in recent years have not delivered the performance improvements customers expected of them, and – by their own admission – have fallen short in some areas compared with the expectations set by Ofwat at PR19. We know there is much more to do, and companies are fully committed to improving performance.

Alongside these performance challenges, the need for water networks to adapt to climate change has been put into sharp focus by an increasing number of extreme weather events affecting the network. The rising risk of droughts, and the wider pressures created by climate change and population growth, increase the urgency with which we need to act to secure our future water supplies. Climate change will also increase the risk of surface water flooding and sewer flooding, putting pressure on wastewater networks.

Future investment requirements will be much higher than the past

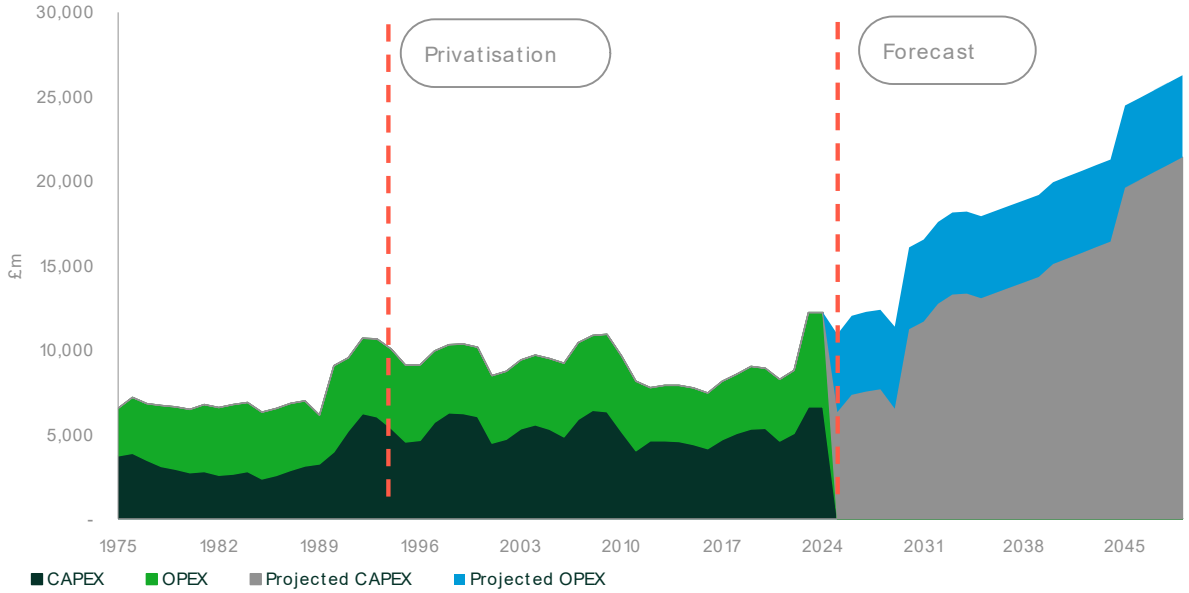
Recognising these challenges, in their PR24 business plans, companies proposed unprecedented levels of investment to support economic growth, secure our water supplies and address the issue of sewage entering our rivers and seas.

In their business plans, and at the time of the final determinations, companies' investment plans amounted to £112bn,[9] which included £49bn of enhancements.[10] This demonstrates the transformative scale of investment that the sector expects to deliver in the coming years.

The need for increased capital investment is forecast to continue into future asset management periods (AMPs), as highlighted in Figure 1, with a sustained increase in company expenditure through to 2050.

[7] 'Historic water dataset', *National Infrastructure Commission*, (2024).
[8] 'Water UK's submission to the NAO review of regulation in the water sector', *Water UK*, (2024), p. 5.
[9] Unless otherwise stated, all monetary values referenced in this report are in 2022/23 prices, for consistency with the price based used for the PR24 determinations.
[10] 'PR24 Final Determinations: Expenditure allowances', *Ofwat*, (December 2024), pp. 384-5. Alongside the PR24 final determinations, Ofwat has identified a further 30 major projects aimed at increasing water supply (which sit outside the PR24 funding envelope), with estimated whole life expenditure of £50bn (see 'PR24 final determinations: Major projects development and delivery', *Ofwat*, (2025), p. 8).

Figure 1: Water and sewerage companies' historical and projected spend (2020-real)



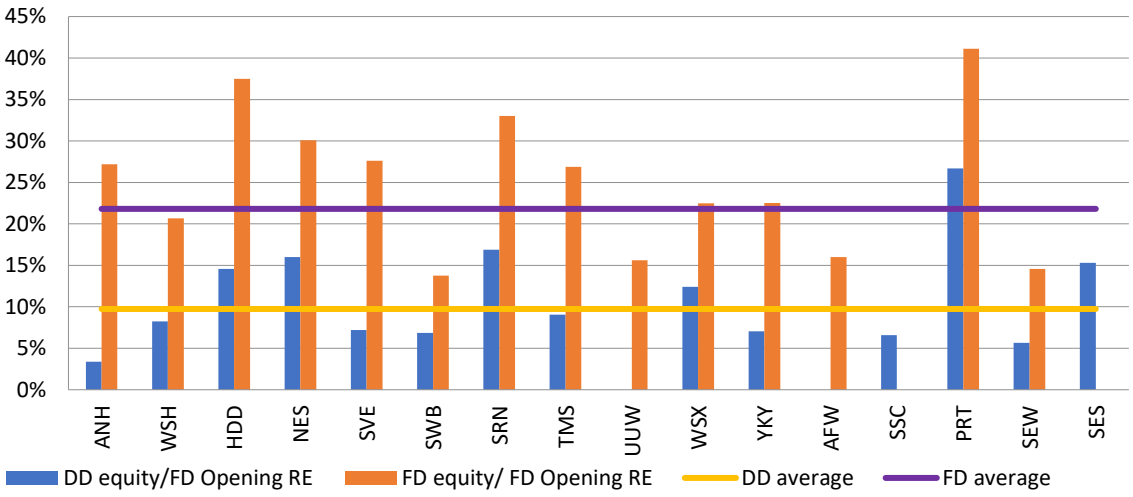
Source: Oxera, 2024 based on company long-term delivery strategies.

Financing this investment will require companies to access significant amounts of new equity and debt finance. Ofwat's financeability modelling indicates that companies would need to inject c.£12.6bn worth of new equity over AMP8.[11] See Figure 2 below.

To facilitate the raising of this equity and debt finance, the water sector needs to provide an attractive investment proposition. Potential investors have a range of options as to where and how to deploy their capital, and the water sector will need to compete with other investment opportunities across the infrastructure space (e.g. the energy transition). Maintaining investor confidence and ensuring the sector is seen as providing a rate of return commensurate with risk is, therefore, critical.

[11] This is based on a 'notional company' analysis, under which all companies are assumed to maintain a notional capital structure (with 55% debt, 45% equity) and perform in line with regulatory allowances.

Figure 2: Ofwat's modelled notional equity injections in AMP8 as a percentage of opening regulated equity



Source: Oxera analysis.

A sustainable regulatory framework is needed to support investment

It is the responsibility of companies to address underperformance and deliver required outcomes for customers and the environment. However, companies cannot turn around performance in a silo: making this happen necessitates regulatory arrangements which enable companies to finance their associated investment programmes.

Post privatisation, investment was forthcoming, enabled by a stable regulatory model that provided investors with the confidence needed to provide the funding to the sector. However, in more recent years, the framework has evolved in such a way that has worsened the sector's ability to raise finance.

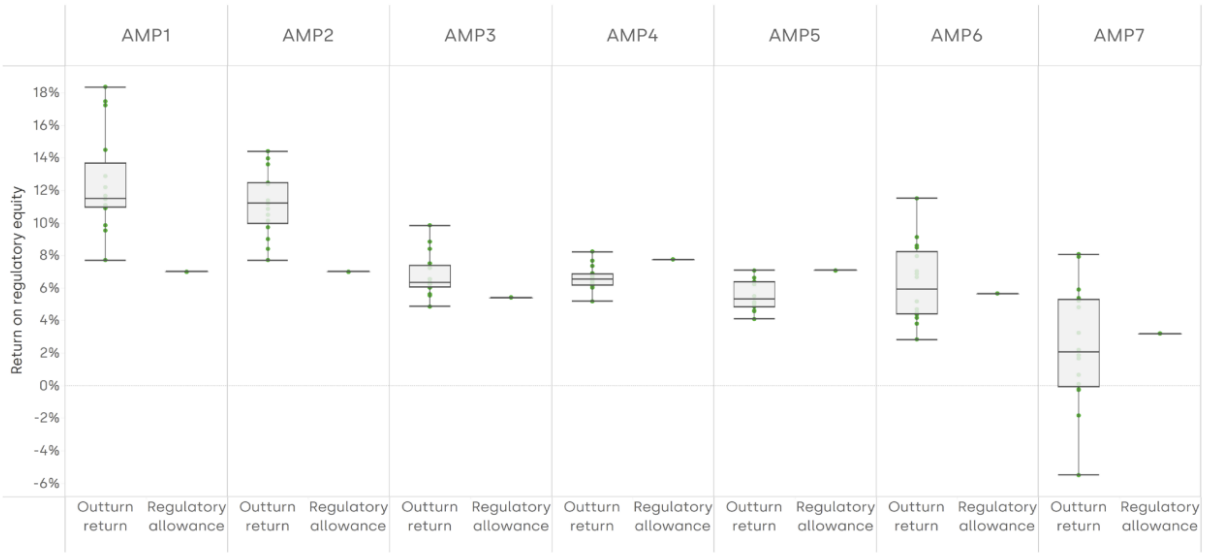
Indeed, as Ofwat itself acknowledges,[12] investor sentiment towards the sector is low and has been negatively influenced by events in AMP7, including:

- Over the first four years of the AMP, the majority of companies have received net penalties through Ofwat's performance framework, while also overspending their cost allowances[13];
- Returns to investors have fallen, as the consequences of a miscalibrated PR19 price control (i.e. insufficient cost allowances and overly stretching performance targets) have been borne by investors. This is shown in Figure 3 below, which also highlights the significant widening in the variance of returns, in particular since AMP5; and

[12] As Ofwat noted, "Investor sentiment towards the water sector is currently low. This was illustrated by investor engagement at our series of roundtables, and in representations to our draft determinations, for example in the response from the Global Infrastructure Investment Association, who represent the interest of private investors. In addition, Barclays' November survey continued to rate UK water as the riskiest European utility sector", 'PR24 Final Determinations: Aligning risk and return –allowed return appendix', *Ofwat*, (2024), p. 84.
[13] 'Investability at PR24', *Oxera*, (2024), pp. 24-5.

- Several companies have faced credit ratings downgrades, with rating agencies also making downwards adjustments in their assessments of the 'stability and predictability' of Ofwat's regulatory framework.[14]

Figure 3: Historical water sector outturn RoRE against regulatory allowances



Source: Oxera analysis.

We also note that Ofwat's decision to prioritise keeping bills low over consecutive price reviews (prior to PR24) has resulted in significant cuts to water bills in real terms. This is now having to be reversed, as bills rise (by an average of 36% in real terms) over the next five years to address historical underinvestment.[15]

It is important that services are provided to customers at an efficient level of cost, with companies incentivised to deliver investment and operations efficiently. Where companies fall short, they should be held to account.

However, as Ofwat has itself identified, a supportive and investable regulatory environment is critical to enable companies to deliver on their commitments to customers:

> *'It is important that our determinations are seen to support investment and investor confidence at a time when all companies (whether good or poor performers) are expected to continue to raise record levels of debt and equity finance, while competing*

[14] See, for example, 'Reduced predictability of regulatory environment pressures credit quality', *Moody's*, (18 November 2024), p. 2. This followed a previous downgrade of the water sector regulatory regime ahead of PR19. The regulatory regime for UK energy remains at a credit rating of 'Aaa' under the Moody's framework.

[15] This was identified by the House of Lords Industry and Regulators Committee: "Ofwat has failed to ensure companies invest sufficiently in water infrastructure, choosing to keep bills low at the expense of investment.", 'The affluent and the effluent: cleaning up failures in water and sewage regulation', *House of Lords Industry and Regulators Committee* (22 March 2023), p.4.

> *with other sectors and internationally for the allocation of that capital there is a clear need for a regulatory framework that provides companies with the funding that they require to meet statutory obligations and supports investment delivery.'*[16]

This means a regulatory framework that provides companies with:

1. a **financial package** that is attractive to both debt and equity investors, with sufficient incentives to finance the considerable amount of investment needed;
2. a **performance framework** that appropriately balances risk and return, thereby providing investors with a 'fair bet' (i.e. equal scope for out-performance and under-performance); and
3. **the expenditure allowances** they need to meet statutory obligations, support investment delivery and maintain asset health.

In this document, we provide an assessment of Ofwat's final determination against these criteria.

- Chapter 2 discusses Ofwat's price review process for PR24;
- Chapter 3 considers the financial package, with a focus on the allowed rate of return set by Ofwat;
- Chapter 4 considers the performance framework;
- Chapters 5 and 6 cover Ofwat's approach to assessing costs for base (Chapter 5) and enhancement (Chapter 6) activities; and
- Chapter 7 covers Ofwat's approach to setting the frontier shift efficiency challenge.

[16] 'PR24 Final Determinations: Aligning risk and return –allowed return appendix', *Ofwat*, (2024), p. 84.

2. Issues with Ofwat's process for PR24

Overview of issues

No price control process can be perfect. Compared with previous periodic review, PR24 has been subject to more external disruptions than previous controls, including through policy changes from Government and other regulators. Ofwat has run a transparent process for PR24 in spite of these challenges and generally sought to address them.

However, some of its decisions around the handling of that process, including the removal of the first feedback stage on companies' business plans, are likely to have contributed to the scale of company concerns and the number of appellants. At the same time, the lack of willingness to consider evidence in some contexts will have contributed to some companies feeling that they had little choice but to seek the independent perspective of the CMA.

Well-run price control processes can generally be characterised by the following principles:

- Meaningful **engagement** between the regulator and companies to ensure that regulatory tools are fit-for-purpose; and
- A **clear process**, with a methodology set well in advance of business plan submissions and no last-minute changes or surprises.

In some areas Ofwat's approach to PR24 reflected these principles. For example, Ofwat's engagement on base cost models gave companies a clear view of how Ofwat would approach this area and could raise issues and ideas. Similarly, Ofwat's approach to performance commitment definitions was clear and timely. However, there are a number of important areas where Ofwat's process and engagement fell short. We discuss these below.

While these issues cannot be addressed by the CMA, the CMA should consider the process Ofwat followed in *how* it came to its decisions alongside its review of *what* decisions Ofwat came to. In some cases, the process Ofwat followed is likely to have contributed to some of the issues with its approach.

Ofwat's level of engagement

Ofwat's engagement in some areas of PR24 has been transparent, with companies being well-sighted on Ofwat's approach and given the opportunity to provide input and challenge on Ofwat's methods. As mentioned above, this includes base cost models and performance commitment definitions. However, despite allowing £44bn of enhancement expenditure, Ofwat did not engage in meaningful dialogue with companies on how to assess and benchmark enhancement costs. For example, companies' first (and only) opportunity to review the enhancement models (which determine almost all enhancement costs; this is discussed further in Chapter 6) was at the draft determinations stage. Furthermore, Ofwat developed new modelling approaches in many areas of enhancement but did not engage on critical aspects of model design, such as selection of explanatory variables.

As a result, the models are under-developed in many areas. Given the size of the investment programme, there would have been benefit in more extensive engagement that enabled, for example, the collection

of more accurate and comprehensive datasets, development of more robust models and higher-quality decisions in the final determinations.

Specific issues with Ofwat's process

We have identified the following issues with Ofwat's process:

- **Absence of initial business plan assessment**: At PR19, companies had two opportunities to respond to Ofwat – first in response to the initial business plan assessment (published in January 2019) and second in response to the draft determinations (published in July 2019). In contrast, Ofwat's PR24 process, which is notably more significant in terms of the scale of the investment and more challenging in the context of the observed performance of the sector during AMP7, did not include an initial assessment of business plans. This means that companies only had one opportunity to respond to Ofwat's views on PR24. The absence of initial business plan assessment reduced the opportunities for companies to effectively engage with Ofwat's approach, limited their ability to provide further evidence and therefore reduced the effectiveness of the price review process. There were a number of new mechanisms, and significant departures from the final methodology, that could have been more effectively consulted on between business plan submission and draft determination without fettering Ofwat's discretion.

- **Limited time for companies to respond:** Companies had only six weeks to respond to the draft determinations (as a result of an earlier-than-anticipated the general election), which was insufficient given the breadth and scale of the issues under consideration, as well as the limited engagement on the business plan before this (as discussed above). In addition, in October 2024 – two months before final determinations – Ofwat introduced the OAM, a mechanism that has a significant impact on the risk and reward balance, but gave companies only three weeks to respond to the consultation.

- **Late introduction of important parts of the methodology, for example:**
  - The approach to **PCDs** was set out well after the publication of Ofwat's final methodology (May 2023 versus December 2022). In its final methodology, Ofwat set out high level principles for some areas without providing detail on its approach. Ofwat then published further details later, leaving companies little time to respond and reflect the details in their business plans (which needed to be submitted in October 2023).
  - The approach to **setting ODI rates** was substantially revised from a bottom-up approach informed by collaborative research to a top-down approach (August 2023). This was largely due to concerns over the robustness of elements of Ofwat's cross-sector customer research. However, this gave companies little time to consider and reflect on Ofwat's assumptions of customers' priorities and what it meant for their business plans (or how it compared with their own understanding of their customers' priorities). At the same time, the changes drove very significant variance in incentive rates and associated rewards or penalties companies could expect. For example, at the business plan stage (October 2023) companies were required by the methodology to use incentive rates that were broadly double those experienced in AMP7; at the draft determination, these rates

increased to c. four times those at AMP7; and, at the final determination stage, the rates fell back again to c.70% greater than AMP7. Companies cannot reasonably respond to incentives with such volatility in rates.

- Ofwat raised the possibility of introducing a **'severe supply interruptions' performance commitment** at draft determinations stage, before deciding it would not do so between draft and final determinations. This had implications for companies' business planning processes.
- As noted above, the **OAM** first consulted on in October 2024, two months before the final determinations. This gave companies little time to consider implications for their business plans. The OAM was then implemented in the final determination with a deadband in a form that was not consulted on.

Most likely reflecting the above, it is notable that Ofwat's own most recent investor surveys found that 100% of the private equity investors disagreed or strongly disagreed that 'Ofwat is listening to investors'[17].

[17] 'Investor survey results 2023', *Ofwat*, (2024).

3. Allowed rate of return and implications for investability

Overview of issues

PR24 is an inflection point for the water sector, with a large increase in investment expected over consecutive AMPs. It is critical that Ofwat regulates in a way that promotes long-term investment incentives and gives investors a fair balance of risk and return. The allowed rate of return plays an important role in promoting investment and ensuring that the sector is able to attract equity.

Most significant issues with Ofwat's approach in this area are:

a) Other market cross-checks not used by Ofwat provide strong evidence that the return on equity is too low, with too narrow a spread between returns to equity and debt investors.

b) There are issues with Ofwat's approach to estimating the CAPM parameters, including the beta of water companies.

(i) Ofwat has estimated a small increase in the total market return relative to PR19, despite a substantial increase in interest rates that has been observed in the intervening period. Indeed, Ofwat's PR24 total market return is only 2 basis points (bps) higher than the CMA PR19 redetermination, despite gilts trading around 400bps higher than at the time of the CMA redetermination.

(ii) Ofwat estimates the risk-free rate purely from index-linked gilts. There is evidence that index-linked gilts have special properties that mean their yields are below the true risk-free rate. This has led regulators, including the CMA at PR19, to include a convenience premium (typically placing some weight on yields on the highest-rated (AAA) corporate bonds). Ofwat has not taken sufficient account of this.

(iii) The beta measures the risk of the sector relative to the equity market as a whole. On a like-for-like basis, Ofwat's PR24 beta is lower than the beta in the CMA PR19 re-determination, despite the clear increase in sector risk. Ofwat's PR24 beta is also insufficiently representative of the water sector. For example, it excludes Pennon (the listed company that owns South West, Bristol and SES Water) from the comparator set, which artificially reduces the beta estimate.

The result is an allowed rate of return that does not adequately reflect current capital markets and the specific risk of the water sector.

Background: Ofwat's approach

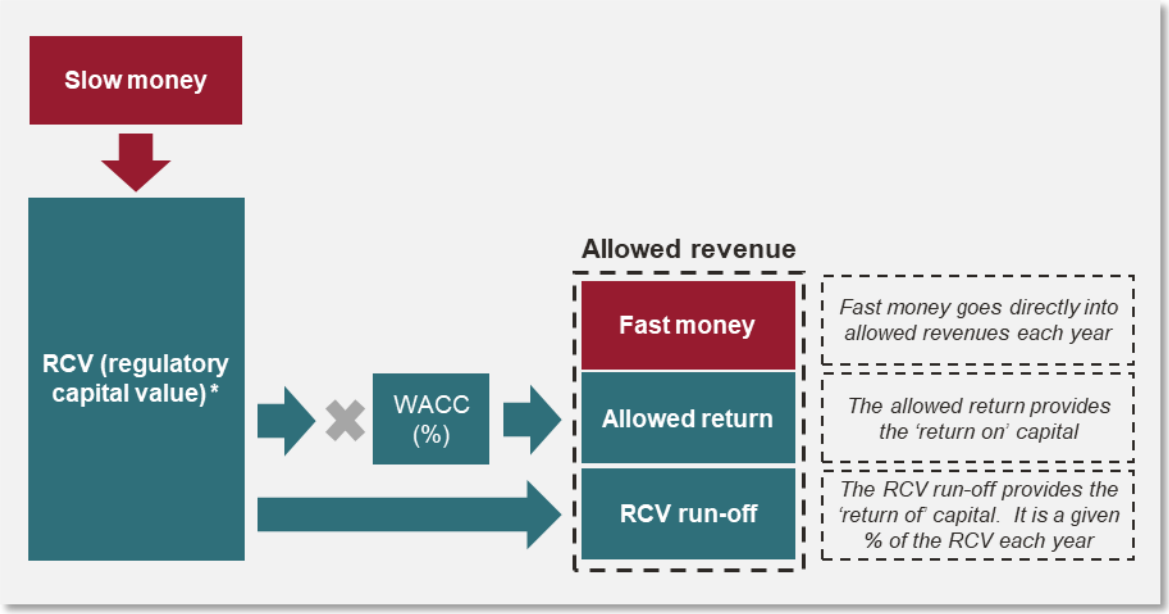
As part of Ofwat's approach to revenue controls, water companies are allowed to collect revenues based on the following building blocks:

- pay-as-you-go expenditure (or 'fast money'), which broadly covers operational expenditure (i.e. day-to-day spending on maintenance and operations);
- a rate of run-off of the RCV, which effectively smooths recovery of capital expenditure over time (also referred to as 'slow money'); and

- an allowed return, in the form of a return on both equity and debt capital.

This is illustrated in Figure 4 below.

Figure 4: Revenue building blocks under Ofwat's regulatory approach



Source: Frontier Economics.

The allowed return component reflects Ofwat's view of the financing costs of an efficient water network. At each price review, Ofwat estimates the weighted average cost of capital (WACC), which is an average of the cost of debt and the cost of equity. The weights that are placed on equity and debt in the calculation of the WACC are based on Ofwat's view of the capital structure (i.e. the balance of debt and equity) that would be adopted by a well-run company.

The WACC is multiplied by the value of the RCV to calculate the allowed return revenue component. This is the base return that the company can expect to earn if it performs in line with all regulatory allowances/targets (e.g. cost allowances and performance commitments). However, the actual return earned by the company will vary depending on whether it outperforms or underperforms relative to regulatory expectations.

Ofwat also conducts a financeability assessment to determine whether its price control package would allow a company with the notional capital structure and performing in line with the regulatory allowances/targets to maintain an investment-grade credit rating. While this assessment is focused on credit metrics (particularly in regard to the company's ability to cover its debt repayments), it requires assumptions about equity financing (e.g. dividend yields and equity injections).

Since the cost of capital estimate shapes the returns that investors can expect to earn, it plays a critical role in ensuring that there are appropriate investment incentives.[18] In its PR19 redetermination, the CMA recognised the link between the cost of capital and investment incentives, and noted the risk of an exit of capital from the sector over time if the WACC is set too low.[19]

This is particularly critical at PR24 given the levels of investment required in AMP8 (with total sector expenditure of c.£104 billion) and in future AMPs, as well as the large amounts of new equity financing that are required (with c. £12.5bn of new equity assumed in Ofwat's notional modelling).

The main features of Ofwat's approach at PR24 were as follows:

- Ofwat set a single, sector-wide allowed return on capital that applies to all companies.[20]
- In estimating the cost of equity, Ofwat applied the CAPM approach. This is a standard approach used by regulators, in which the cost of equity is estimated with reference to the total equity market return (which can be broken down into the return on a risk-free asset plus a premium for investing in equities) and the beta (a measure of how sensitive the stock of water companies is to movements in the market as a whole).
- In estimating the cost of debt, Ofwat distinguished between the cost of new debt (i.e. the cost of debt that will need to be raised over the forthcoming AMP) and the cost of embedded debt (i.e. the cost of debt raised in the past). Importantly, Ofwat calculated what it considered to be an efficient cost of debt, rather than providing pass-through of the actual debt costs on company balance sheets. The cost of new debt will be indexed to a benchmark so as to update for capital market conditions during the AMP.
- Ofwat assumed that a notional capital structure would involve a mix of 55% debt and 45% equity finance (i.e. a notional gearing rate of 55%). This was reduced from 60% at PR19.
- It set the cost of equity point estimate above the mid-point of its CAPM-implied cost of equity range. By rounding the upper-bound of the range, the effective 'aiming up' was equal to 27bps.

Ofwat's parameter estimates for setting the WACC allowance at PR24 final determinations is presented in Figure 5 below. Ofwat estimated a wholesale WACC of 3.97% in CPIH-real terms, an increase of 97bps relative to Ofwat's PR19 WACC allowance (once restating for notional gearing of 55%).

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[18] "*Given the expected scale of investment needed to address climate change, there can be expected to be a long-term benefit where the expected returns are sufficient to provide incentives to identify investments over time.*" 'Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited Price Determinations: Final report', *CMA*, (2021), para. 9.1280.

[19] "*We recognise that if the cost of capital is set too low, this may only have a limited effect on investment in the short term. However, the cost of capital today may have a knock-on impact on investment planning during AMP7 that will be actioned (or not) in subsequent price controls. As discussed in the next section, expectations of insufficient investment returns based on the current cost of capital may discourage companies from identifying and proposing otherwise desirable investment projects. If overall water asset health deteriorates as a result, this may lead to higher required investment (and so higher investor returns) in future periods. In this way, the current cost of capital can have a direct impact on the level of future investment and the future costs to customers*." 'Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited Price Determinations: Final report', *CMA,* (2021), paras. 9.1273.

[20] The only exceptions to this at PR24 are the application of a small company premium for some water only companies and a bespoke approach to setting the allowed return on debt for Havant Thicket.

Figure 5: Ofwat's PR24 draft and final determinations WACC parameters and estimates

Parameter	Draft determinations	Final determinations
Notional gearing	55%	55%
Risk-free rate	1.43%	1.52%
Total market return	6.29–6.87%	6.68–6.98%
Re-levered equity beta	0.57–0.63	0.59–0.65
Aim up	0.27%	0.27%
Allowed return on equity	4.19–4.88% (4.80% point)	4.58–5.08% (5.10% point)
Cost of embedded debt	2.46%	2.77%
Cost of new debt	3.36%	3.74%
Share of new debt	26%	24%
Issuance and liquidity costs	0.15%	0.15%
Allowed return on debt	2.84%	3.15%
Appointee WACC (CPIH-real)	3.72%	4.03%
Retail margin deduction	0.06%	0.06%
Wholesale WACC (CPIH-real)	3.66%	3.97%

Source: 'PR24 final determinations: allowed return appendix', Ofwat, (19 December 2024) and 'PR24 draft determinations, allowed return appendix', Ofwat, (11 July 2024).

In this Chapter, we detail the major issues with Ofwat's cost of capital estimate. The Chapter is structured as follows:

- We show that evidence from market cross-checks indicates the allowed return on equity is too low.
- We discuss the individual cost of capital parameters to identify the drivers of the under-estimate of the return on equity. This covers the risk-free rate, the TMR, the beta, and the choice of point estimate.
- In terms of the cost of debt, we discuss Ofwat's allowance for additional debt costs.
- We consider the implications of this on financeability and investability, with particular focus on Ofwat's assumptions around 'equity solutions'.

Issues with Ofwat's approach

1. Evidence from market-based cross-checks indicates that Ofwat's return on equity allowance is insufficient given current market conditions

Background

In recent years, it has become increasingly common for economic regulators to consider evidence from market cross-checks to assess the sufficiency of the proposed regulatory WACC allowance.[21] These cross-checks are a useful source of information, as the cost of equity is not directly observable and there is a risk that a CAPM-based assessment can lead to an over- or under-estimate relative to the 'true' market cost of equity.[22] In light of the uncertainty around WACC parameter estimation, these cross-checks can be used to check that the CAPM estimate is consistent with current market conditions.

One important category of cross-checks relates to those based on debt market data, where the CAPM-implied cost of equity can be compared against the yields on market-traded company debt to assess the premium on equity versus debt. As equity is subject to greater risk than debt, it follows that the return on equity must be higher than that on debt.

Ofwat's approach

In its PR24 final determinations, Ofwat has considered a small number of market cross-checks, which it concluded were supportive of its CAPM cost of equity estimate. They include:

- The implied risk premium of the cost of equity over selected debt benchmarks;.
- The inferred cost of equity from evidence on market-to-asset ratios (MARs)—i.e. the ratio of market valuations of water company assets to the regulatory capital value; and
- Selected equity analyst reports.

However, Ofwat chose not to place weight on several other market cross-checks that were proposed by companies in their PR24 submissions. These include:

- Oxera's asset risk premium–debt risk premium analysis (ARP-DRP, which, as noted above, refers to the premium of equity returns over debt);
- KPMG's multi-factor models, which seek to estimate the risk premium element of the cost of equity through analysis of multiple risk factors (as opposed to the CAPM approach which considers a single factor—i.e. the sensitivity of company returns to overall market returns);[23]
- KPMG's inference analysis, which infers the cost of equity from observable debt pricing and an elasticity capturing the relationship between debt and equity;[24] and
- Frontier Economics' hybrid debt cross-check, which involves comparing the allowed return on equity to the observable yields on hybrid bonds issued by utilities (i.e. bonds that have equity-like features).

[21] For example, in the PR19 re-determination, the CMA considered three cross-checks on the level of the WACC – the market prices for equity investments in water (MARs), broker estimates and financeability cross-checks.
[22] For example, Ofgem's RIIO-3 methodology states that: "To further address any concerns around a mismatch between the result driven by our CAPM-based assessment and the 'true' market cost of equity, we will follow a similar 'multi-step' approach to RIIO-2 that considers a wider range of evidence from cross-checks when setting allowance returns on equity". 'RIIO-3 Sector Specific Methodology Decision – Finance Annex', *Ofgem*, (2024), para 3.17.
[23] 'Estimating the cost of equity for PR24', *KPMG*, (2024), pp. 75-82.
[24] See, for example, 'Inference analysis as a cross-check on allowed returns at PR24', *KPMG*, (2023).

Issues

We consider the negative effects of Ofwat's decision not to consider these market cross-checks below.

Evidence from debt-based cross-checks

Debt and equity investors bear different levels of risk. Repayments to debt are fixed and known in advance (unless the company defaults), while returns to equity investors vary with company performance.[25] Consequently, it is a basic principle of finance that, against the same set of assets, equity financing is riskier and therefore more expensive to raise than debt.

A logical cross-check to test the sufficiency of the CAPM-implied cost of equity estimated in a regulatory determination is, therefore, to consider whether there is a positive (and reasonably-sized) premium in the returns for equity holders over the returns to lenders. Market-based cross-checks built on this test include the asset risk premium-debt risk premium analysis and hybrid debt cross-check.[26]

In performing its version of an equity premium cross-check, Ofwat analysed the spread (i.e. risk premia) between its CAPM-implied cost of equity midpoint and selected debt benchmarks.[27] Its results suggested that the implied premium of equity over debt was 1.63–2.38%. Ofwat acknowledged that this is a narrower premium than under previous determinations but stated that it was "not persuaded that such a premium was clearly too low".[28]

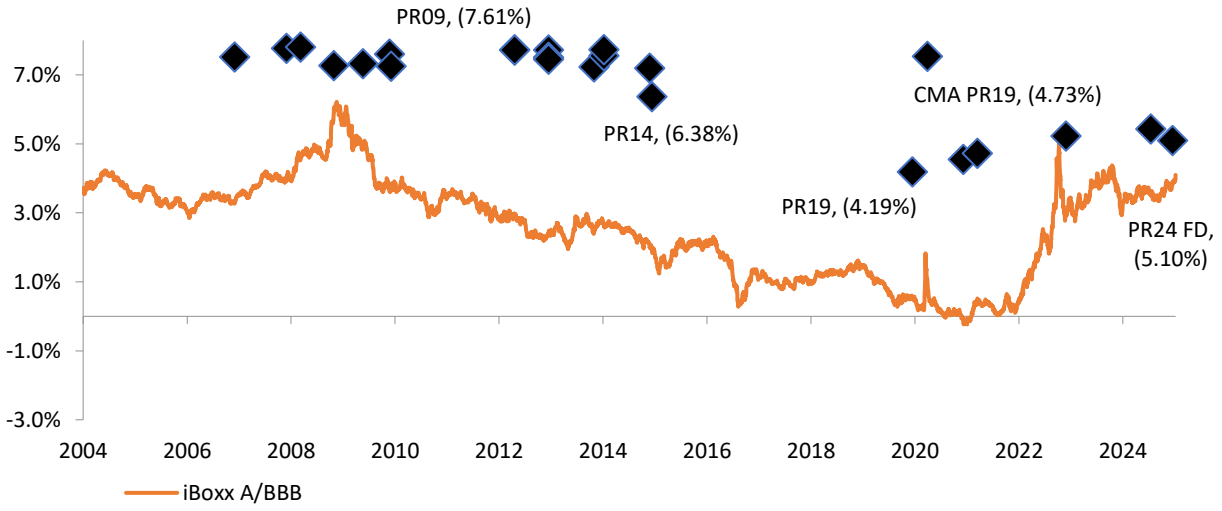
While Ofwat is correct to state that the narrowing premium is a function of it following a 'through the cycle' approach to estimating the equity market parameters, this does not mean that the resulting premium on equity over debt is appropriate.[29] The litmus test presented by market-based cross-checks is not merely to establish that the premium is positive. Rather, it is to consider also the sufficiency of the premium.

The narrowness of the equity premium within Ofwat's WACC allowance—and, hence, the effects of the 'through the cycle' approach—can be highlighted by comparison with previous regulatory decisions. Figure 6 compares historical cost of equity determinations (from across regulated sectors) against debt benchmarks. It shows that cost of equity determinations trended down with interest rates following the financial crisis. However, cost of equity determinations have not subsequently increased in line with the increase in underlying interest rates since 2022, resulting in the narrowing premium observed by Ofwat. This highlights a fundamental drawback with the 'through the cycle' approach: regardless of the sufficiency of compensation in the past, equity investors will now receive a very small premium over debt

[25] 'What does the cost of debt tell us about the cost of equity?', *Oxera*, (2023).
[26] 'Evaluation of the ARP-DRP framework', *Frontier Economics* (2024), 'Additional considerations for the PR24 allowed return on equity: A report prepared for Yorkshire Water', *Frontier Economics*, (April 2024), pp. 18-32.
[27] These benchmarks included the iBoxx A £ 10+ and iBoxx BBB £ 10+ non-financials indices, and recent debt issuances by two water companies (Severn Trent and South West Water).
[28] 'PR24 Final Determinations: Aligning risk and return –allowed return appendix', *Ofwat*, (2024), p. 64.
[29] The 'through the cycle' approach assumes investors' overall return requirements are reasonably stable over time, and hence that the total market return parameter will be relatively stable from one price review to the next (regardless of the prevailing interest rate at the time of the price review).

investors at a point in time in which the sector needs to attract an unprecedented amount of new equity capital.[30]

Figure 6: Historical cost of equity determinations against debt benchmarks



Note: Callouts shown only for water sector determinations. iBoxx yields deflated to CPIH-real terms, assuming 2% long-run inflation. Historical RPI-real determination have been converted to CPIH using the long-term wedge as stated the Office for Budget Responsibility (OBR). Changes in the long-term wedges have been reflected. For the years before the Bank of England started targeting CPI, we use a 2.5% RPI target.

Source: Oxera analysis.

While Ofwat's own analysis provides evidence that the premium on equity over debt has narrowed, there are additional cross-checks not used by Ofwat that provide an even clearer view of the inadequacy of the allowed return on equity. Figure 7 shows two such cross-checks:

- A comparison of the hypothetical cost of equity assuming an entirely debt-free capital structure (known as the 'unlevered cost of equity') with Ofwat's estimate of the cost of new debt. The unlevered cost of equity should always be greater than the cost of new debt as equity is higher risk than debt. However, under Ofwat's final determinations, the unlevered cost of equity is actually 32 basis points lower than the cost of new debt (i.e. a **negative spread of -32bps)**.
- A second cross-check is to compare the asset risk premium (ARP) to the debt risk premium. The asset risk premium reflects the excess return required by investors for providing capital to assets that bear some level of risk, and can be calculated as the product of the asset beta and the equity risk premium. The debt risk premium reflects the excess return required by debt holders relative to riskless assets, and can be calculated by disaggregating credit spreads, i.e. breaking down this premium into its components which may include default and liquidity risks. An important difference between the ARP–DRP analysis and the unlevered cost of equity versus cost of new

[30] This was highlighted as a possible outcome by the UK Regulators Network (UKRN). 'UKRN guidance for regulators on the methodology for setting the cost of capital', *UKRN*, (2023), p. 19.

debt is that through the disaggregation of credit spreads, the ARP–DRP analysis adjusts for the allowance for expected loss given default on debt.[31] In order to reflect the relative riskiness of equity and debt, the asset risk premium should be higher than the debt risk premium. However, under Ofwat's final determinations **the implied premium on assets as a whole is lower than the implied premium on debt (i.e. the ARP-DRP differential is negative)**.

Consequently, as shown in Figure 7 below, both of these cross-checks show negative spreads when basic principles of finance dictate that there should be positive differentials.

Figure 7: Cross-checks of the premium on equity over debt

Unlevered cost of equity cross-check implied by the FDs

Parameter	Value
Unlevered CoE	3.42%
Cost of New Debt	3.74%
Unlevered CoE v CoND	**-0.32%**

ARP–DRP cross-check implied by the FDs

Parameter	Value
ARP	1.90%
DRP	1.92%
ARP–DRP	**-0.02%**

Source: Oxera analysis.

The evidence set out above clearly supports the view that Ofwat's PR24 final determinations have set the allowed return on equity at a level where investors would not be sufficiently compensated for taking on equity, rather than debt risk.[32] Coupled with observations that this premium has narrowed over time, investors might reasonably conclude that there would be insufficient incentive to invest fresh equity capital, thus harming the sector's ability to raise financing to deliver on investment plans for customers.

Critique of Ofwat's MARs analysis to infer the cost of equity

Ofwat's final determinations cross-checks also include a stylised analysis of data on market-to-asset ratios (MARs) to infer a cost of equity range. A MAR is a ratio of the market value of a water network to its RCV. Such ratios can be calculated based on the share prices of listed companies (traded MARs) or on transaction multiples (transaction MARs). Some regulators, including Ofwat, have used MARs as a cross-check of their return on equity allowances. Underpinning this analysis is an assumption that MAR premia

[31] In doing so, this reduces the range of assumptions otherwise implicit within CAPM (and wider WACC) estimation. Oxera's ARP–DRP analysis draws on bond yields to maturity, deducting 30bps to reflect the expected loss, estimated from annualised default rates based on Feldhütter and Schaefer (2018) that are higher than those reported by Moody's. Using Moody's reported default rates would produce a lower expected loss assumption, i.e. a higher DRP estimate. See 'The myth of the credit spread puzzle', The Review of Financial Studies, 31:8, *Feldhütter, P. and Schaefer, S.M.* (2018), pp. 2897–2942; 'Annual default study: Corporate default rate will rise in 2023 and peak in early 2024', *Moody's* (13 March 2023), Exhibit 36.

[32] The lack of a premium could theoretically also result from the cost of debt being set too high. However, the cost of debt is observable and, hence, the uncertainty around parameter estimation should be lower for the cost of debt.

are an indication of expected outperformance against future regulatory settlements (including potential financing and/ or operational outperformance).

Ofwat's approach involves:

1. calculating the market-implied premium over RCV for the listed water companies using average share prices in September 2024; and
2. using this value to infer a cost of equity, by applying in-perpetuity assumptions over the rate of RCV growth and RoRE outperformance across a low and high scenario.

As illustrated in Figure 8, Ofwat finds that its allowed return on equity (4.58-5.07%) sits within the inferred cost of equity range from this MARs analysis (4.3–6.3%, across the average of the low and high scenarios). It concludes from this that the MARs provide support for its allowance.

Figure 8: Ofwat's final determinations inferred cost of equity from MARs analysis

Actual cost of equity (%)	United Utilities MAR: 1.08	Severn Trent MAR: 1.16	Pennon MAR: 0.97	Average
Low scenario	4.1%	3.6%	5.2%	4.3%
High scenario	6.1%	5.6%	7.2%	6.3%

Source: Ofwat (2024), PR24 final determinations: allowed return appendix, 19 December, p. 69.

However, this analysis (and the inferences that Ofwat has drawn from it) have a number of limitations:

- The listed companies for which this analysis is undertaken are not representative of the median or notional water company. The sample set comprises three WaSCs (United Utilities, Severn Trent and Pennon) that are noticeably above-average performers with a track record of historical RoRE outperformance, in addition to two of the three companies being the only two water companies awarded 'Outstanding' status as part of Ofwat's QAA assessment.
- The market valuation of listed companies is based on a wide range of divergent investor expectations at any given point in time and, consequently, encapsulates a wide range of factors (including external factors such as the wider macroeconomic environment). As such, it is not possible to link, exhaustively, a value premium to a particular source of outperformance (i.e. there is no direct relationship between MARs and the CAPM-estimated cost of equity). This means it is difficult to calculate robust estimates of the required return on equity directly from MARs analysis. While Ofwat's advisers (CEPA) acknowledge and seek to control for this, this is an inherently subjective exercise and different assumptions do lead to different estimates.[33]
- Ofwat's CAPM-implied cost of equity range is entirely within the lower half of the range implied by its own MARs analysis (with an upper bound that is below the midpoint of the MARs analysis).

[33] The key assumptions underpinning Ofwat's use of MARs analysis to infer the cost of equity are the in-perpetuity rate of RCV growth, and RoRE performance. Our analysis shows that assumptions around RoRE performance are especially salient and have a significant impact on the inferred cost of equity. 'PR24 cost of equity', CEPA, (2024), p. 53.

Therefore, even if Ofwat's MARs analysis is considered to be robust, it indicates that a higher return on equity allowance is warranted.

- Ofwat's MARs analysis is particularly sensitive to the assumption that is made around RoRE outperformance and relies on an RCV growth assumption in perpetuity that is difficult to reconcile with reasonable forecasts of future investment (Ofwat assumes a 2% RCV growth assumption which appears very low in comparison to future expected RCV growth).
- The results of Ofwat's MARs analysis are imprecise with a very wide range (of 3.6–7.2%) across all scenarios. While Ofwat's allowed return on equity sits within this range, the size of the range means that this should not be considered a reliable basis of support.

For these reasons, we do not consider Ofwat's inferred cost of equity range from the MARs analysis to be sufficiently robust to be used as a major cross-check in supporting its final determinations CAPM-estimated cost of equity. Instead, the concerns around this analysis warrants Ofwat placing weight on (either entirely, or in addition to) alternative evidence, especially debt-based cross-checks.

Evidence from listed infrastructure fund returns

An alternative market-based cross-check is analysis of returns required by listed infrastructure funds. An implied cost of equity can be calculated by referring to the discount rates of listed infrastructure funds, adjusted for the net asset value discount and fund gearing.

Such analysis performed on HICL Infrastructure plc (HICL) results in an implied re-levered cost of equity of 5.93% (CPIH-real), based on data up to Ofwat's final determinations cut-off of 30 September 2024.[34] While we acknowledge that this cross-check relates to a single infrastructure fund and there are potential comparability issues to the water sector, this analysis provides a useful data point, which consistent with the cross-check evidence we have highlighted above again illustrates that Ofwat's PR24 final determinations cost of equity may be set too low.

Recommendation

We recommend that the CMA makes more extensive use of market cross-checks when assessing the sufficiency of the CAPM-estimated return on equity and places greater weight on this evidence in reaching a WACC estimate.

2. Ofwat's assessment of the risk-free rate ignores evidence on the need for a convenience premium over index-linked gilts

Background

The risk-free rate is the return that an investor would expect when investing in an entirely riskless asset. In practice, no such investment exists. In economies with low sovereign default risk, regulators have estimated the risk-free rate with reference to yields on government bonds. Indeed, the UK Regulators

[34] Oxera's result here is based on assuming HICL's forecast CPIH inflation of 2.5%. If however the Bank of England long-term inflation forecast of 2% is applied, this would lead to an implied re-levered cost of equity of 6.36% (CPIH-real).

Network (UKRN) recommends that UK economic regulators estimate the risk-free rate with reference to inflation-linked gilts (ILGs).[35]

More recently, there has been debate around whether yields on ILGs provide an appropriate proxy for the risk-free rate.[36] Some regulators, including the CMA in the PR19 redeterminations (and the Civil Aviation Authority in subsequent decisions), have recognised that government bonds have special properties that can give rise to a price premium, thereby lowering their yields below the 'true' risk-free rate.[37] This effect—driven by excess demand for government bonds due to regulatory requirements and their use in hedging strategies—is known as the convenience premium.

There is empirical support for the existence of a convenience premium.[38] One way of observing the premium is to compare yields on government debt to yields on the highest-rated (i.e. AAA-rated) corporate bonds. The yield on AAA-rated corporate bonds is usually above the yield on government bonds of the same maturity, even though the risk of default should be comparably low.

Ofwat's approach

At PR24, Ofwat estimated the risk-free rate by reference to the one month average yield of the 20-year RPI index-linked gilt. Given that Ofwat sets a CPIH-linked cost of capital allowance, it adjusts the RPI-linked IGL for the estimated 'wedge' between RPI and CPIH inflation by equally weighting evidence from swap-derived deflators and official forecasts-derived deflators. Notably, despite the CMA's approach in the PR19 redeterminations, Ofwat has not allowed a convenience premium in PR24, citing its view that evidence for the application of such a premium was insufficient.

Issues

Ofwat's decision not to apply a convenience premium is a departure from the methodology used by the CMA in its PR19 redetermination, in which the CMA explicitly acknowledged the presence of a convenience premium and estimated the risk-free rate by reference to the average of the yields on ILGs and AAA-rated corporate bonds.[39]

In the PR24 final determinations, Ofwat considered the spread between ILGs and AAA-rated corporate bonds but concluded that this evidence was insufficient to support a convenience premium. This decision

[35] 'UKRN guidance for regulators on the methodology for setting the cost of capital', UKRN (2023), p.14.
[36] The UKRN guidance is inconclusive on whether a convenience premium should be applied: 'Given divergence in approaches across regulators, this guidance does not therefore propose alignment to a particular stance; however regulators should clearly set out their assessment of the evidence base in making their decisions. Regulators identify this as an area that may benefit from further work to consider the necessity of adjustments to index-linked gilt yields at the 10- 20 year horizon.' Ibid, p. 14.
[37] 'On balance, the CMA has accepted arguments and evidence that the ILG rate available to the government is unlikely to be a perfect proxy for the risk-free rate , and that the 'true' rate of the risk-free rate in the market is likely to be above this level.' 'Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited Price Determinations: Final report', *CMA*, (2021), para 9.158.
[38] For example, 'Decomposing swap spreads', *Journal of Financial Economics*, Feldhutter, P. and Lando, D. (2008), 88:2, pp. 375-405.
[39] 'Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited Price Determinations: Final report', *CMA* (2021), paras. 9.264, 9.265.

appears to partly stem from anomalous periods in the dataset in which the spreads between ILGs and AAA-rated bonds were slightly negative (including in the one-month average of September 2024).[40]

Longer-term evidence on yields provides clear support for a convenience premium. As shown in Figure 9, analysis of the duration-matched spread between zero-coupon ILGs and AAA-rated corporate bonds over the last five years shows the spread has averaged 45-55bps during this period. If the convenience premium were to be set equal to half of the observed spread (which is akin to the approach taken in the PR24 redeterminations), this would result in a convenience premium of c.25bps.[41]

Figure 9: Spread between zero-coupon ILGs and AAA-rated corporate bonds, duration-matched

	Modified duration	Five-year average yield (nominal)	Corresponding average gilt yield	Spread
£ iBoxx non-gilt AAA 10-15	9.5	2.88%	2.33%	0.55%
£ iBoxx non-gilt AAA 10+	14.00	3.05%	2.60%	0.45%

Note: As the average spread between ILG and AAA-rated corporate bonds is 0.5%, one half of this would result in an implied convenience premium of 25bps.
Source: Oxera analysis.

Ofwat's exclusion of the convenience premium has a material impact on the allowed return on equity and appointee WACC estimates. Including a 25bps convenience premium would increase the allowed return on equity by c.10bps, and WACC by c.4bps.[42]

Finally, Ofwat did not consider cross-checks pertaining to the inflation assumptions contained within its risk-free rate estimate. As highlighted above, the final determinations methodology is based on drawing from RPI-linked ILGs which are then adjusted for the RPI-CPIH wedge.[43] It may also be instructive to analyse nominal gilts (UK government bond issuances in nominal terms which do not reprice to inflation) deflated by CPIH inflation expectations, in what is effectively a reverse approach. This is pertinent because:

- Ofwat's reference points for inflation (and, in particular, the wedge) may be different to the breakeven inflation resulting from market evidence (e.g. market swaps on fixed and floating rate bonds);
- ILG yields may be affected by supply and demand dynamics arising from investors relying on ILGs as a hedge against inflation; and

[40] 'PR24 final determinations: allowed return appendix', *Ofwat*, 2024, pp. 18–19.
[41] The CMA's PR19 re-determination methodology assessed the risk-free rate as the midpoint between the ILG–AAA range, which is equivalent to taking the midpoint of the spread between ILG and AAA-rated corporate bonds as the convenience premium. Note that this analysis duration-matches the compared bonds, which was not performed by the CMA.
[42] This convenience premium is derived from the five-year average spread between ILGs and AAA-rated corporate bonds, up to a cut-off of 17 Jan 2025.
[43] Ofwat determines the wedge as the average between evidence from swap-derived delators and official forecast-derived deflators. 'PR24 final determinations: allowed return appendix', Ofwat, (2024), p.20.

- CPI swap rates used by Ofwat to inform its RPI-CPIH wedge may also be affected by their availability as impacted by the swap market structure, leading to biased estimates of the wedge.[44]

Recommendation

We recommend that the CMA considers the appropriate approach to estimating the risk-free rate, and specifically, the application of a convenience premium. This would be consistent with the CMA PR19 redetermination and reflect that the 'true' risk-free rate for an investor in the market is likely to be higher than the rate available to government due to the special characteristics of ILGs.

The CMA could also perform cross-checks of its risk-free rate estimate based on nominal gilts deflated by the long-term Bank of England CPIH target of 2% to provide additional evidence on the appropriate forward-looking risk-free rate estimate.

3. Ofwat's beta estimate fails to capture changes in sector risk since PR19

Background

Within the CAPM framework, the beta is a measure of the systematic riskiness of the asset relative to the market as a whole. To derive the beta, the CAPM regression is performed by drawing on actual market data as the independent variable. However, an underlying issue is that the CAPM beta estimation is reliant on parameter decisions (e.g. around averaging window, overlapping or non-overlapping estimates, etc), and has been documented for its poor empirical performance (we return to this below). This may result in a structural downward bias of the CAPM cost of equity estimate.

In practice, regulators typically estimate the beta by compiling a comparator set of publicly-listed companies that are considered to be good proxies for the entities subject to regulation. There are a number of choices facing the regulator when estimating betas:

- Estimation window i.e. the time horizon over which the beta is estimated (e.g. one-year, two-year, five-year or ten-year horizons);
- The sampling frequency e.g. daily, weekly or monthly data points;
- Use of spot values or rolling averages; and
- The comparators to include in the sample – typically regulators will try to find companies with similar operational characteristics and operating under similar regulatory frameworks. In the England and Wales water sector, only three companies are publicly listed in the United Kingdom, meaning there is a limited number of direct comparators.

We detail the items raised above in the following subsections.

Ofwat's approach

[44] As counterparties to the UK CPI swaps markets are primarily investment banks, and considering the capital requirements necessary to undertake 20-year swaps, market supply may be constrained, thus materially impacting pricing such that wedge estimates may be biased. 'Negative swap spreads', Federal Reserve Bank of New York Economic Policy Review, Boyarchenko, N., Gupta, P., Steele, N. and Yen, J. (2018).

In its PR24 final determinations, Ofwat estimated the beta by assessing spot estimates of five and ten-year asset betas for two companies (United Utilities and Severn Trent).

In doing so, it chose not to place weight on rolling averages as it correctly recognised that rolling averages place less weight on data at the start and end of the averaging period. [45]

Pennon was excluded as a beta comparator on the basis that parts of its historical time series are affected by its previous ownership of Viridor (a non-regulated waste management business), which it sold in 2020. For this reason, Ofwat considered that the Pennon beta would not be reflective of a 'pure play' water company. Ofwat cites a Q2 2021 cut-off date as a reasonable start date for including Pennon data, meaning that it is not possible to estimate a five-year or ten-year beta in the same way that it can for United Utilities and Severn Trent.[46]

Issues

The use of the CAPM framework to estimate the return on equity, including the beta, has been widespread in UK regulatory practice and Ofwat has followed longstanding practice by following this approach. However, it is important to note that there is extensive academic literature on the poor empirical performance of the CAPM market equity beta in predicting equity returns.[47] The relationship between returns and equity beta is much flatter in practice than the predictions of the CAPM. The implication is that the CAPM will tend to underestimate the cost of equity for assets, such as water networks, with lower systemic risk than the market as a whole (i.e. companies with an equity beta of less than one). The equity beta in the PR24 final determinations is 0.65 at the top of the range, which is materially lower than one and hence there is a high probability that using this value in the CAPM will underestimate the cost of equity. This is a potential explanation for why the cost of equity estimated by Ofwat using the CAPM approach appears to be insufficient based on the current market cross-checks outlined above.

Specific to Ofwat's PR24 final determinations methodology, however, we consider that there are two main issues which imply that its beta estimate is under-estimated. Both of these issues arise from Ofwat's decision to rely on five-year and ten-year betas, rather than considering shorter term estimation windows.

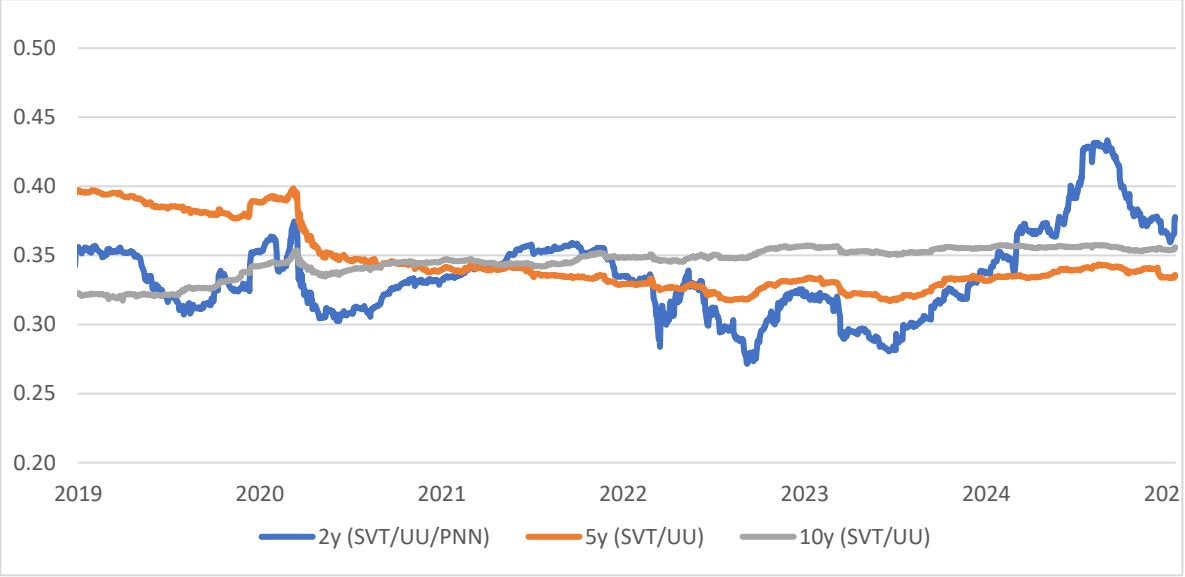
- **First, Ofwat's decision to focus on long-term betas means that Pennon is excluded from the comparator set, which artificially reduces the beta estimate** (as Pennon's beta (or risk measurement) has been evidenced to be higher than those of United Utilities and Severn Trent). The exclusion of Pennon reduces the robustness of the comparator set and, in particular, the extent to which it reflects the median company given that United Utilities and Severn Trent are both top performers.[48] Ofwat has acknowledged the relevance of Pennon as an additional comparator in a dataset that currently consists of only two companies. However, its reliance on

[45] 'PR24 final determinations: allowed return appendix', *Ofwat*, (2024), p. 57.
[46] The Q2 2021 date was suggested by Ofwat's consultants, FTI Consulting, as the point in time following the Viridor sale at which Pennon's net debt balance returned to a level consistent with its historic trend. 'Early view of water sector betas for PR24', *FTI Consulting*, (2022), p. 13.
[47] For example, 'Empirical tests of asset pricing models with individual assets: Resolving the errors-in-variables bias in risk premium estimation', Journal of Financial Economics, Jegadeesh, N., Noh, J., Pukthuanthong, K., Roll, R. and Wang, J. (2019), pp. 273–98.
[48] Ofwat states that Pennon's validity as a comparator is weakened due to the sale of Viridor in 2020, and ensuing high cash balances distorting estimates of its gearing. 'PR24 final determinations: allowed return appendix', *Ofwat*, (2024), pp. 52–53.

long-term betas means that Pennon is excluded from the sample, thereby unnecessarily restricting the size of the comparator set.[49] This is especially relevant if we consider that Ofwat's cut-off point for the inclusion of Pennon data is Q2 2021 – in other words, the five-year beta for Pennon would be valid from Q2 2026, just one year into the AMP8 period.[50] Yet Ofwat in its final determinations continued to decide against its inclusion.

- **Moreover, by placing weight solely on longer-run estimation windows (of five- and ten-year betas), Ofwat may not appropriately capture the changes in sector risk in more recent years**. Ofwat chooses to calculate betas using market data over five and ten year periods. It seeks to justify doing so on the basis that two year betas are more volatile. [51] While two-year betas may exhibit more volatility than the longer-term estimates, they better reflect current market pricing of risk of the industry. This is because if the most recent two years of any five or ten year period have exhibited greater systematic risk, that risk may be being artificially suppressed by relying exclusively on longer-term data. This is especially relevant for this price review given the increased risks that AMP8 presents to investors, which would not be captured in older market data. In this context, we note that Ofwat explicitly preferred two-year betas in the PR19 review, while the CMA considered a range of estimation windows (including two-years). Figure 10 shows asset betas over different time periods.

Figure 10: Two-, five-, and ten-year asset betas including recent market evidence



Note: Market data updated to cut-off of 17 Jan 2025.
Source: Oxera analysis.

The issues with Ofwat's beta estimate can be observed by comparing the re-levered PR24 notional equity beta estimate (of 0.69, at 60% notional gearing) to the CMA PR19 redetermination notional equity beta (of 0.71). On a like-for-like basis, Ofwat's PR24 beta is lower than the beta in the CMA PR19

[49] 'PR24 final determinations: allowed return appendix', *Ofwat*, (2024), p. 53.
[50] 'PR24 final determinations: allowed return appendix', *Ofwat*, (2024), p. 52.
[51] 'PR24 final determinations: allowed return appendix', *Ofwat*, 2024, p. 42.

redetermination, despite the clear increase in sector risk (which is captured in credit ratings agencies' assessments since PR19). This strongly indicates that Ofwat's PR24 beta estimate is not sufficiently reflective of the risks faced by the sector, and is set too low.[52]

Recommendations

We recommend that the CMA corrects the approach to beta estimation for AMP8, recognising the central requirement that the beta estimate should appropriately represent the median (and notional) water company, and capture recent, contemporaneous risks.

Specifically, given the balance of evidence and the narrowness of Ofwat's comparator set, the Pennon beta should be considered as part of the PR24 comparator set. We consider it provides valuable information on the current systematic risk exposure of the median water company. We note that in past reviews (e.g. in NATS RP3 where a close comparator, ENAV, had only recently been publicly listed), the CMA has considered two-year betas where longer-term data is not available.[53] There will be a full five years of 'clean' Pennon data by Q2 2026 (from Ofwat's suggested cut-off of Q2 2021) which (as noted above) is just one year into the AMP8 period. The Pennon beta can already be included in the sample with 'clean' data, if shorter beta windows are used, e.g. two-year or four-year betas.

Related to the point raised above, it would be appropriate to place weight on shorter window beta evidence in addition to longer-run estimates. Beyond presenting a more contemporaneous estimate of the beta in-line with recent market evidence, this approach is also beneficial as it allows for improved representativeness through the inclusion of Pennon into the comparator set. We note that the CMA considered a range of estimation windows in the PR19 redeterminations, including two-year betas,[54] and it also considered two-year betas in the NATS RP3 redetermination.[55]

4. Ofwat's total market return is only 2bp higher than CMA PR19 despite a fundamental change in underlying interest rates

Background

The total market return (TMR) represents the total returns that an investor would expect to receive by investing in the equity market, on average. It can be decomposed into two components: the risk-free rate and the equity risk premium (with TMR = risk-free rate + equity risk premium). Ofwat first calculates the TMR and then nets off the risk-free rate, in order to calculate the equity risk premium.

There are three main sources of evidence on the total market return.

[52] The credit ratings agencies have made a number of downgrades for England and Wales water in recent years, including the recent decision by Moody's to downgrade the stability and predictability of the regulatory framework. Moody's (2024), 'Reduced predictability of regulatory environment pressures credit quality', November.

[53] "The use of 2-year and 5-year periods for beta measurement is consistent with normal practice. We therefore took the same approach as the Parties, and also used both 2-year and 5-year betas, where data on both was available, or 2-year betas only, where longer-term data was not available." 'NATS (En Route) plc / CAA Regulatory Appeal', *CMA*, (2020), para. 13.85.

[54] 'Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited Price Determinations: Final report', *CMA* (2021), para 9.465.

[55] 'NATS (En Route) plc / CAA Regulatory Appeal', *CMA*, (2020), paras 13.56 to 13.64.

- Historical ex post returns, based on the average of observable historical returns, usually over a long period of time so as to take account of the fact that total market returns will vary significantly from one year to the next. For example, the Dimson-Marsh-Staunton (DMS) dataset commonly used by regulators considers returns since 1900;
- Historical ex ante returns, which adjust historical returns for one-off periods of good or bad luck in the past that investors might not expect to be repeated in the future; and
- Various forms of forward-looking evidence, including survey evidence on investors' perceptions and dividend discount models.

The UKRN recommends that regulators primarily rely on historical ex post and historical ex ante estimates.[56] While using these approaches, there are potential issues in relation to:

- The appropriate inflation series to use to deflate nominal historical returns data to real terms;
- The approach to averaging historical returns (e.g. whether to use the geometric or arithmetic mean);
- Linked to the averaging approach, the relevant holding period over which to consider returns[57]; and
- What weight, if any, should be applied to results from historical ex ante models, which are inherently subjective due to a reliance on retrospective adjustments.

Ofwat's approach

Ofwat relied on both the ex post and ex ante historical approaches, considering multiple averaging approaches (e.g. the arithmetic average of the overlapping estimator and 10–20 year holding periods, as well as converting the geometric average to the arithmetic equivalent adjusting for serial correlation). Between the draft and final determinations Ofwat changed its definition of the TMR range, such that the final range was defined by the low and high end of the 'blended' (ex post and ex ante) range. The net effect of this was to increase the lower bound of the range, ultimately resulting in a higher midpoint estimate TMR allowance.

Issues

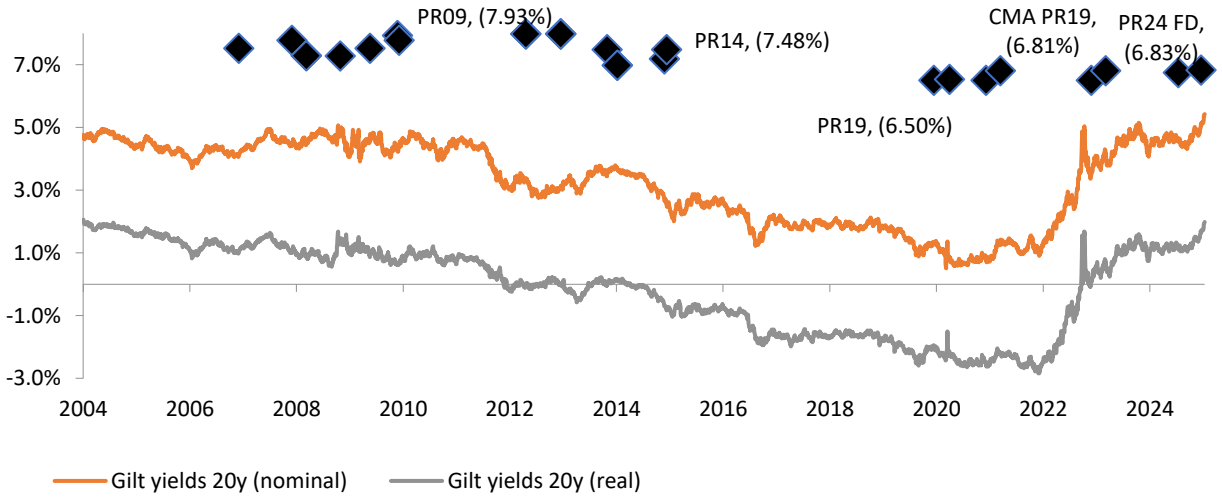
The central issue with Ofwat's TMR estimate is that it has applied a 'through the cycle' or 'stable TMR' approach (which assumes that the TMR is relatively more stable than the equity risk premium over time and so can be estimated directly from historical data on long-run average equity returns) in such a way that the TMR has not adapted to the changing interest rate environment. While the UKRN provides general support for a 'stable TMR' approach, there is an important caveat within its guidance – the greater stability of the TMR "does not imply that regulators should simply pick the same fixed value for the TMR in each decision for all time, but that the TMR would be relatively less variable than the underlying risk-free rate RfR [risk-free rate]", thus supporting greater stability in cost of equity allowances over time.[58] Ofwat's PR24 TMR is only 2bp higher than the CMA PR19 re-determination, despite gilts trading around 400bp higher than at the time of the CMA re-determination. The UKRN guidance recognises an important drawback to adopting a 'stable TMR' approach—specifically, that this can over- or under-state the returns

[56] 'UKRN guidance for regulators on the methodology for setting the cost of capital', *UKRN*, (2023), p. 4.
[57] The holding period is of relevance where an arithmetic average is used and in the presence of serial correlation.
[58] 'UKRN guidance for regulators on the methodology for setting the cost of capital', *UKRN*, (2023), p.19.

required by investors in a specific period, depending on underlying interest rates at the time. At a time when interest rates are relatively high/increasing (as they have been since PR19), this could lead to the CAPM-estimated return on equity being lower than the actual return required by equity investors to invest in the sector. Regulatory consistency over time is also important. It is of concern that the total market return was reduced in light of falling interest rates following the financial crisis, but has now only seen a small increase relative to its PR19 assessment (and, even then, only to bring it in line with what the CMA considered was a reasonable TMR in its PR19 re-determination).

Figure 11 below depicts historical TMR determinations by UK economic regulators against gilt yields. The figure shows a notable reduction to Ofwat's TMR estimate in-line with interest rates from PR09 through to PR19. However, as interest rates have risen over the last few years, TMR determinations (including those in water) have not kept in-line.

Figure 11: Historical TMR determinations



Note: Callouts shown only for water sector determinations. Historical RPI-real determination have been converted to CPIH using the long–term wedge as stated the Office for Budget Responsibility (OBR). We have reflected the changes in the long-term wedges. For the years before the Bank of England started targeting CPI, we use a 2.5% RPI target.
Source: Oxera analysis.

Recommendations

We recommend that the CMA uses the appropriate TMR assumption for AMP8, especially with reference to Ofwat's 'through the cycle' approach, which has effectively resulted in a 'fixed TMR' despite a material change in the interest rate environment. A clear cross-check is that current gilt yields are comparable to levels seen in PR09, where Ofwat allowed a TMR of 7.93% (CPIH-real), over 100bps higher than Ofwat's PR24 final determinations estimate—suggesting strongly that Ofwat's allowance is too low.

One possible way to reconcile the 'fixed TMR' view with an increase to the PR24 TMR estimate would be to reduce or remove the weight placed on the 'historical ex ante' evidence, which requires subjective assumptions around periods of 'good' or 'bad' luck and the extent to which these were captured in investors' past expectations.

We note also that non-CAPM cross-check evidence supports a higher TMR than Ofwat's PR24 final determinations – Figure 12 depicts evidence from surveyed investor expectations of long-term nominal equity return forecasts. Based on this analysis, the average forecast of 9.23% (nominal) can then be deflated by the long-term inflation expectation of 2% to derive the CPIH-real TMR. This places the cross-check evidence as 7.1%, around 30bps above Ofwat's PR24 final determinations estimate.

Figure 12: TMR cross-check from investment manager forecasts

Oxera survey—Investment manager forecasts

	Date	Scope	Horizon	Nominal	Uplift[1]	Nominal (+ Uplift)
Schroders	Jun-24	UK	10	9.80%	1.65%	11.45%
Blackrock	Nov-24	UK	10	6.34%	1.65%	7.99%
Quilter	Dec-24	UK	LT	8.82%	1.65%	10.47%
Aon Hewitt	Aug-24	UK	10	6.00%	1.65%	7.65%
JP Morgan	Oct-24	UK	10 to 15	7.82%	1.65%	9.47%
Vanguard	Dec-24	UK	10	6.70%	1.65%	8.35%
Average						9.23%

Note: [1]Uplift applied for conversion from geometric to arithmetic averaging based on the DMS data

Source: Oxera analysis

5. The increased investment requirements, risk and uncertainty support a higher aiming up on the return on equity

Background

In the context of fixed price settlements for critical infrastructure, there is a long history of regulators selecting a point estimate within the WACC range that is higher than the mid-point. There have been several justifications for this, including:

- supporting financeability;
- addressing uncertainty in the estimation of WACC parameters;
- addressing wider asymmetry in the price control package; and
- the costs to consumers of setting the WACC too low could significantly outweigh the costs of setting the WACC too high, if it leads to underinvestment or an exit of capital from the sector.[59]

The CMA chose to aim up from the mid-point in its PR19 re-determination, and Ofwat chose a point estimate above the mid-point in its PR24 cost of equity estimate.

Ofwat's approach

Ofwat's point estimate on the cost of equity effectively 'aims up' by 27bps above the mid-point of its CAPM-implied range. Ofwat reasoned that this aiming up was driven by two factors, specifically (i) to

[59] 'Optimal WACC in tariff regulation under uncertainty', Journal of Regulatory Economics, 61, *Romeijnders, W. and Mulder M.,* (2022) pp. 89–107.

reflect low investor sentiment towards the water sector, and (ii) to support companies in securing the capital needed to deliver on the PR24 investment programme.

Issues

While we welcome Ofwat's recognition of the case for aiming up, it is not clear that the degree of aiming up is sufficient. At PR19 re-determinations, the CMA aimed up by 25bp based on the need to:

- promote investment in the water sector;
- address the risk of the cost of capital being set too low;
- reflect parameter uncertainty in the CAPM estimation (especially as equity returns had declined sharply since PR14); and
- support financeability.[60]

Looking ahead to AMP8, all of the reasons the CMA aimed up at PR19 continue to apply and are now even stronger in the context of declining equity returns over AMP7, a considerable increase in forecast enhancement spend and the reduced investor sentiment towards the sector identified by Ofwat. This increases the risk that companies are unable to attract equity and also means that there are now even larger consequences for consumers if companies are unable to attract equity. There are strong grounds for the quantum of aim-up to be greater than at PR19.

Recommendation

In light of the considerations raised above, we consider that the degree of aiming up should be increased, or the greater uncertainty facing the water sector in AMP8 and future price controls should be directly reflected in the CAPM parameter estimates.

6. Additional issuance and liquidity costs on debt are required given the financing requirements for a larger investment programme

Background

In estimating the cost of debt, Ofwat estimates i) a cost of embedded debt, based on analysis of companies' balance sheets; and ii) a cost of new debt, based on a benchmark index plus a premium for the spread between water company bonds and the benchmark. It adds an additional allowance for additional costs associated with issuing debt (e.g. rating agency fees), maintaining adequate levels of liquidity and the cost of carry arising from issuing debt ahead of time (e.g. pre-financing maturing debt, working capital requirements).

Ofwat's approach

[60] 'Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited Price Determinations, Summary of Final Determinations', *CMA* (2021), para. 86. In addition to this in addressing CAPM parameter uncertainty, we note also that the empirical performance of the CAPM beta, when compared against actual market data, has been researched to be poor, due among other factors to an attenuation bias in the CAPM regression, which biases the regression coefficient (i.e. the equity beta) towards zero, even betas are estimated with long-run daily data. See 'Empirical tests of asset pricing models with individual assets: Resolving the errors-in-variables bias in risk premium estimation', Journal of Financial Economics, *Jegadeesh, N., Noh, J., Pukthuanthong, K., Roll, R. and Wang, J.* (2019), pp. 273–98.

In the PR24 final determinations, Ofwat set out its view that:

- Data on issuance costs from company Annual Performance Reports supports a 5bps issuance cost allowance;
- An allowance of 10bps is sufficient to remunerate companies for the need to maintain adequate levels of liquidity (through cash and short-term deposits, or liquidity facilities); and
- While companies will face basis risk due to the indexation of RCV to CPIH (while most inflation-linked debt is linked to RPI), companies do not need a specific allowance to compensate for this risk.

Ofwat's PR24 final determinations therefore provided a combined allowance of 15bps for additional debt costs.

Issues

Ofwat's allowance for additional debt costs does not fully capture the cost borne by companies. There is a strong case for an increase to this allowance in PR24, supported by the following factors:

- Ofwat's PR24 allowance is 10bp lower than precedent set by Ofgem in RIIO-2, as well as the indicative position set out in the energy regulator's ongoing RIIO-3 SSMD consultation. Figure 13 below shows the breakdown of Ofgem's allowance in the current control period. The differences relate both to the size of the issuance and liquidity cost allowances and the inclusion of a separate allowance to compensate for basis risk.[61]

Figure 13: Comparison of Ofwat and Ofgem allowances on additional debt issuance costs

bps	Ofgem (RIIO-2)	Ofwat PR24 FD
Issuance and transaction costs	6	5
Liquidity/ revolver costs	4	10
Cost of carry	10	
Basis risk	5	–
Total (bps)	**25**	**15**

Source: Oxera analysis.

- Given the scale and pace of investment in AMP8 onwards and progressively increasing refinancing needs, Ofwat's assumption of a 6-month pre-financing period is unrealistic. In practice, companies need to issue 12-18 months ahead to support going concern and rating agency requirements on liquidity.[62] The pre-financing timelines are extended at PR24 given the impact of not having funds

[61] Ofwat provided a model (PR24 RR06 - Analysis of liquidity requirements) alongside the final determination setting out its calculation of liquidity costs. We are not aware of a breakdown of the calculation of the 5bp issuance and transaction costs.
[62] KPMG, 2024, 'Estimating the Cost of New Debt and Additional Borrowing Costs for PR24', p. 5.

available in time to deliver investments to meet deadlines for Price Control Deliverables and the large debt requirements across the sector as a whole.

- Companies have historically financed themselves with RPI-linked debt but receive revenue streams and RCV indexed to CPIH. Companies need to manage the risk that RPI differs from CPIH and thus that there is a mismatch between their debt costs and their revenues. This is known as 'basis risk' management. The scale of 'basis risk' has increased at PR24 as i) RCV indexation is fully transitioning to CPIH; and ii) the RPI-CPIH 'wedge' has been highly volatile in recent years. While Ofgem has recognised this risk and provided compensation for it in RIIO-2, Ofwat has made no such allowance.

The allowance for additional debt costs is a significant component which leads to Ofwat's PR24 final determinations WACC estimate being under-stated, in addition to the under-estimation of the cost of equity addressed above. Specifically, increasing this allowance by 10bps to align to Ofgem's allowance would lead to a significant increase in the WACC of c.7bps.

Recommendation

We recommend that the CMA reassesses additional debt costs, taking account of the much larger investment requirements in AMP8 and the increasing costs of basis risk management.

4. Performance mechanisms

Overview of issues

There are two major issues with Ofwat's proposed performance package for PR24:

a) Ofwat's ODI framework is asymmetric by design. Despite the steps Ofwat has taken to provide a more balanced performance package (compared with its draft determinations), we still have concerns about risks companies will bear. This is driven by high levels of risk exposure on specific performance commitments, as well as other design issues.

b) Price Control Deliverables (PCDs) expose companies to additional risks. We support the principle that customers should be protected from non-delivery. However, Ofwat has not properly accounted for the risk driven by PCDs within its final determinations.

We recommend that the CMA reconsiders the risk companies will bear through the PR24 performance package, and addresses this by either intervening 'at source', or via a higher cost of capital allowance to compensate investors for bearing these additional risks.

Background: Ofwat's approach

Ofwat's regulatory framework makes use of 'ex ante' revenue controls. This limits the amount of money companies can recover from their customers for specific activities, which in turn is intended to provide companies with incentives to become more efficient over time.

Without appropriate safeguards, ex ante revenue controls have the potential to:

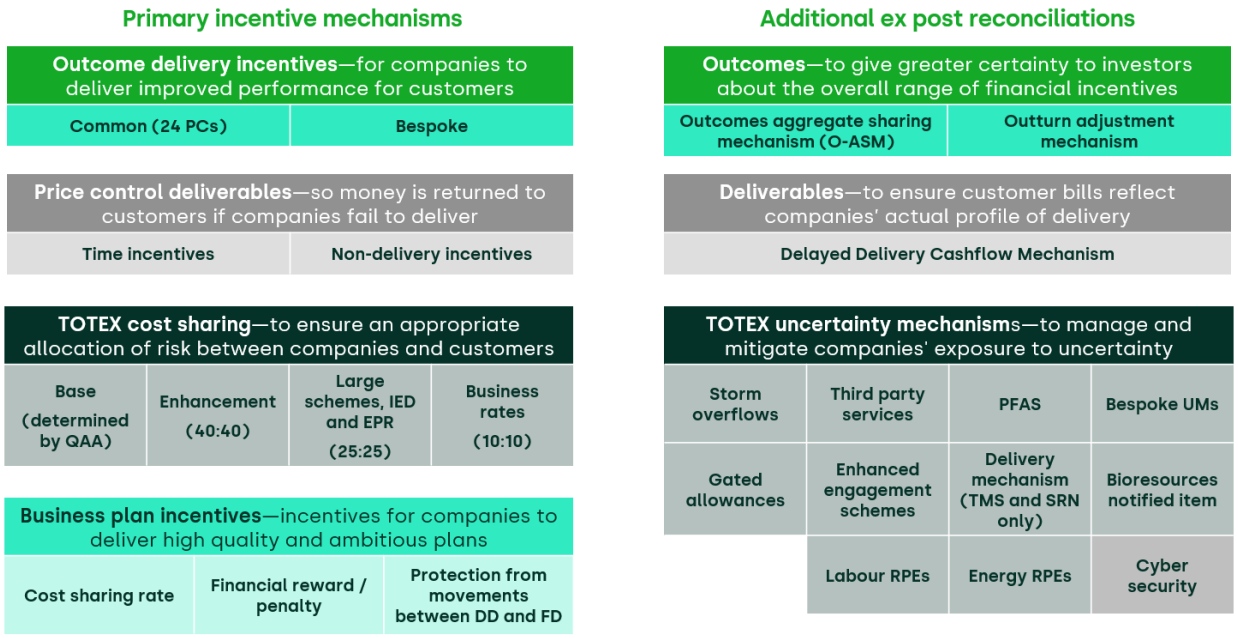
- create perverse incentives for companies to reduce service levels or under-deliver in order to cut costs; and
- expose companies and their investors to risks relating to forecasting uncertainty, unforeseen circumstances or regulatory errors, which in turn may result in customers paying more.[63]

To manage these risks, Ofwat has built a range of regulatory mechanisms which aim to incentivise service performance and efficiently distribute risk between companies and customers. Figure 14 summarises the main performance mechanisms Ofwat has set out in its PR24 final determinations.[64]

[63] This could occur if investors perceive a higher level of exposure to risk under the regulatory regime, which in turn leads into a higher cost of capital for companies.

[64] The figure is not exhaustive and a number of other reconciliations will also be applied (e.g. revenue forecasting incentive, water trading incentive, land sales, retail reconciliation, bioresources reconciliation, tax reconciliation, cost of debt indexation).

Figure 14: Summary of PR24 performance mechanisms[65]



Source: Oxera

Ofwat has made multiple changes at PR24 compared with its toolkit used in previous price reviews. Notable changes include: more extensive use of price control deliverables; use of multiple sharing rates for cost out/under-performance; and the introduction of mechanisms to constrain risks facing companies at an aggregate level such as the OAM, which – as discussed above – limits the financial incentives or penalties companies face based on their relative performance in any one year.

These changes have increased the overall complexity of the regulatory framework due to the higher number of mechanisms in place, differences in how each mechanism is applied (e.g. annual vs end of period adjustments, or RCV vs revenue adjustments), and the interactions between the different mechanisms.

This Chapter sets out areas of concern with the performance framework that Ofwat has landed on in PR24. In particular, we highlight:

- the asymmetric calibration of the ODI regime (which, as noted above, refers to the financial incentives and penalties associated with delivery of the performance commitments); and,
- the one-sided disallowance risk associated with Price Control Deliverables (PCDs).

Issues with Ofwat's approach

1. Ofwat's ODI framework is asymmetric by design

Ofwat's approach

[65] Notes: IED stands for 'Industrial Emissions Directive'; EPR stands for 'Environmental Permitting Regulations'; and PFAS stands for 'Polyfluoroalkyl Substances' (more commonly referred to as "forever chemicals").

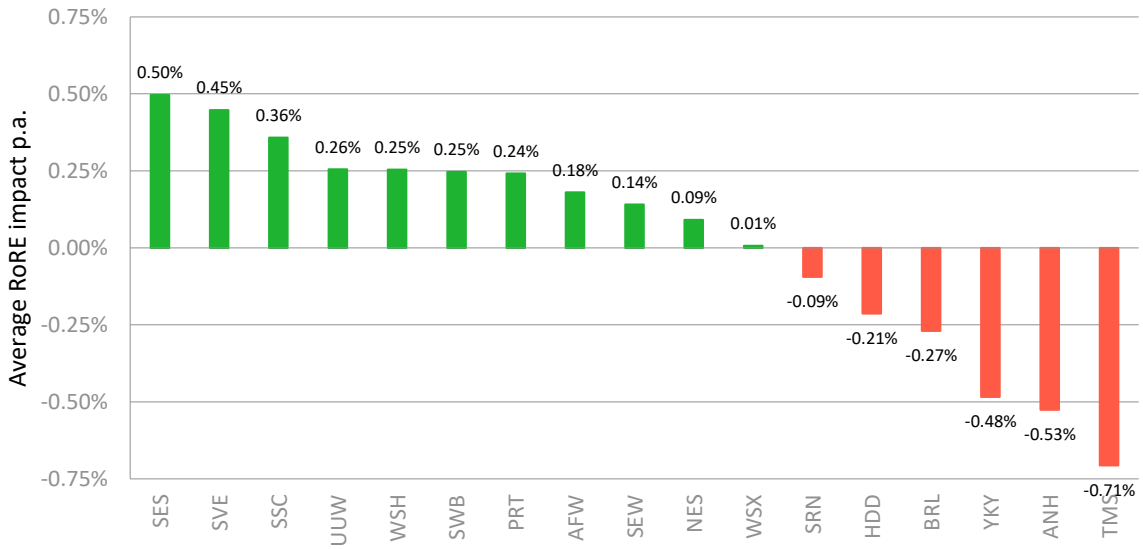
In its PR24 final determinations, Ofwat confirmed a set of 24 common performance commitments (PCs), consisting of 23 with financial incentives and one that is reputational only. While Ofwat made wide-ranging changes to the ODI regime between draft and final determinations, the ODI package remains highly stretching relative to AMP7 performance levels, with more scope for penalties than rewards.

Before outlining its approach in detail, we note that Ofwat's decision to set ODI rates using a 'top-down' approach (specifically, through an average RoRE allocation per performance commitment of 0.5%[66]), has not been taken based on a wider view of the appropriate level of overall risk exposure. Given that utilities are generally seen by investors as low risk – and the need to ensure the water sector is seen as investable – we consider Ofwat should have made an effort to assess whether the overall level of ODI risk implied by its preferred approach was commensurate with the level of risk utility sector investors generally expect.

Both company and Ofwat forecasts indicate downside skew in the ODI package

Companies' performance forecasts suggest there is downside skew within Ofwat's ODI package. This can be seen when calculating the net rewards or penalties companies can expect under Ofwat's final determinations, if their outturn performance is in line with forecasts provided in their draft determinations responses. As shown in Figure 15, under this scenario the sector would be in a net penalty position of £281m over AMP8, indicating a slightly negatively-skewed impact on the return on regulated equity (RoRE) at the sector level.

Figure 15: Average RoRE impact per annum given performance levels forecast in draft determinations responses and Ofwat's final determinations PCLs



Source: Oxera analysis.

It should be noted however that in practice, the downside risk within the ODI package may be greater than outlined above. This is because the performance forecasts outlined in companies' draft

[66] '[PR24-final-determinations-Delivering-outcomes-for-customers-and-the-environment.pdf]', *Ofwat*, (2024), p. 33.

determinations responses were predicated on higher total expenditure (totex) allowances (there is a £3.6bn shortfall between what companies said they needed in their responses to the draft determinations and what Ofwat allowed). This implies that companies' latest performance levels are likely to be even more stretching, thus implying a higher potential net penalty position.[67] Moreover, companies were required by Ofwat under the Quality and Ambition (QAA) incentive to set very stretching performance targets or face penalties.

Finally, Ofwat's own analysis shows a -0.2% operational RoRE impact for the median company. This further highlights that a degree of negative skew is built into the ODI regime.[68]

This downside skew is driven by excessively stretching PCLs

The sector fully supports Ofwat's aim of setting stretching and achievable targets. These targets should be set at realistic levels, which avoid creating excessive levels of downside risk that make it difficult for companies to demonstrate progress.

However, the primary driver of the forecast losses discussed above is the excessively stretching level of PCLs that Ofwat has set across performance areas. As shown in Figure 16, based on the performance levels forecast in their draft determinations responses, companies can expect to be in net penalty across 11 of the 19 common PCs analysed[69] by the end of AMP8.

Figure 16: ODI penalties by PC (shown for PCs where the sector is expected to be in net penalty by the end of AMP8, based on company draft determinations responses)

PC	AMP8 forecast gross penalty (£m)	AMP8 forecast net penalty (£m)	Number of companies penalised
Water supply interruptions	87.2	80.0	8/17
Compliance risk index (CRI)	45.5	45.5	6/17
Mains repairs	52.7	52.7	5/17
GHG emissions (wastewater)	41.3	26.6	4/11
Water quality contacts	11.5	7.9	8/17
Total pollution incidents	191.5	11.4	6/11
Internal sewer flooding	119.3	56.9	5/11
External sewer flooding	178.1	38.1	4/11
Sewer collapses	6.0	3.9	4/11
Storm overflows	94.2	82.0	6/11
Serious pollution incidents	116.8	116.8	1/17

[67] After adjusting for base and enhancement sharing rates.
[68] 'PR24-final-determinations-Aligning-risk-and-return-appendix.pdf', *Ofwat*, (2024), p. 10, Table 1.
[69] This analysis excludes the measure of experience PCs (i.e. the 'MeXs'), since it is not possible to forecast sector wide penalties and rewards based on companies' draft determination responses.

Note: 'AMP8 forecast gross penalty' shows penalties accruing to all companies that expect to lose money on that PC over AMP8. In contrast, 'AMP8 forecast net penalty' adds in the rewards expected by companies that are forecast to make money on that PC over AMP8. 'Number of companies penalised' includes all companies that are forecast to have a total penalty position over AMP8 greater than 0.01% of RoRE.
Source: Oxera analysis.

We note that despite industry-wide concerns regarding the level of stretch in the PR24 draft determinations, Ofwat has set more stretching targets in 36 cases in the PR24 final determinations, when considering the end-point performance (i.e. 2029/30) for company-specific targets.

Whilst we note that these are illustrative forecasts and so may not reveal the true distribution of financial rewards and penalties, the analysis does reveal a number of PCs that could be higher risk for the industry. This is observed from the table above in two main ways:

- **High forecast gross penalty** – which shows that one or more companies are forecast to severely underperform their PCLs. One example is **Total Pollution Incidents,** which has the highest total gross penalty of £191.5m. Six out of eleven companies expect to be in a total penalty position over AMP8. The final determinations PCLs appear to be unachievable for these companies, given that their draft determinations responses forecast performance levels imply such large penalties.

- **High forecast gross penalty and slightly lower net penalty** – which may demonstrate a mis-calibration of the PCL, where underperformers are disproportionately punished relative to the overperformers that are insufficiently rewarded. For example, **Water Supply Interruptions** has a forecast gross penalty of £87.2m, with almost half of companies forecast to underperform against the target PCLs. The forecast net penalty of £80.0m indicates that those overperforming the PCLs would earn a reward of only £7.2m, an order of magnitude smaller than the penalty for underperformers. Similarly, for **Storm Overflows** companies forecast a gross penalty of £94.2m over AMP8 across six companies, with 48% of this penalty attributable to only one company. The net penalty of £82.0m indicates that there is a forecast £12.2m of rewards: this is split between just three companies, which suggests that this PC is disproportionately punitive relative to the rewards achievable for the industry-leaders.

Ofwat's PC definitions mean companies also bear risks outside of management control

In its final determinations, Ofwat has maintained its view that PC definitions should not provide protection from extreme weather events and other factors outside management control. Specifically, Ofwat says:

"*As we stated in our PR24 methodology and draft determinations, our general PR24 outcomes policy is that we do not consider that it is appropriate to have exclusions for factors that are outside a company's control, such as weather events*."[70]

[70] 'PR24-final-determinations-Delivering-outcomes-for-customers-and-the-environment.pdf', Ofwat (2024), pp. 86-87.

It should be noted that regulatory mechanisms which mitigate the risk to companies of extreme weather are common across other regulated infrastructure sectors, and – as such – Ofwat's approach at PR24 sits in contrast to that adopted by the likes of Ofgem.[71]

The implication of this approach is that uncontrollable environmental conditions can result in financial penalties for companies, while rewarding others which may have experienced favourable conditions solely due to external factors, such as the geography of their region.[72] This undermines the incentive structure and distorts the fairness of the regime, as outcomes are unduly influenced by external circumstances outside of management control.

Extreme weather events can make preventing supply interruptions, floods and overflows very challenging, and – in some situations – impossible. Because of this, Ofwat's decision to not account for extreme weather events when measuring performance means companies' AMP8 performance against PCs including storm overflows, internal sewer flooding and external sewer flooding may end up being influenced by factors outside of their control. It should be noted that extreme weather events, such as droughts, flooding and freeze-thaw cycles, have already resulted in companies incurring significant penalties over AMP7.

While we recognise that other aspects of the PR24 outcomes package may help mitigate against the risk of extreme weather events (such as caps, collars and deadbands), companies will continue to bear reputational risks associated with factors outside of their control, which would not be appropriate.

Ofwat's customer satisfaction incentive (C-MeX) benchmarks performance against non-representative sectors

The ODI reward and penalty forecasts outlined earlier do not capture the customer, developer services and business customer measures of experience (C-MeX, D-MeX and BR-MeX, respectively)[73], collectively referred to as the 'MeXs'.

To begin with, it should be noted that though the C-MeX incentive relates to companies' retail activities, Ofwat has calibrated it based on the overall appointee regulated equity. This gives it greater weight than other incentives – which are typically set either on water or wastewater regulated equity – meaning that a comparatively much larger proportion of companies' retail revenue is at risk on this single performance metric for no apparent reason.

Secondly and more importantly, Ofwat has chosen to calculate C-MeX performance with reference to the UK Customer Satisfaction Index (UKCSI) all-sector average, reduced by five points for 2025-2028 and four

[71] See for example 'Extreme_weather_event_risk_report.pdf', *Frontier Economics*, (2022), Table 1, p. 4

[72] We note that related legal issues were explored in proceedings at the High Court in 2023 (see: *R (on the application of Northumbrian Water Ltd) v Water Services Regulation Authority, 2023*). The High Court found in favour of Ofwat in that case, confirming that the wording of the reporting guidance gave the regulator discretion to impose financial penalties on the company following supply interruptions caused by a civil emergency. However, it is important to recognise that the case did not consider whether companies should in fact be exposed to penalties in circumstances such as extreme weather events as a matter of principle (but rather, whether penalties were justified in this case based on the application of the existing rules).

[73] C-MeX stands for "Customer Measure of Experience", D-MeX stands for "Developer Services Measure of Experience", and BR-MeX stands for "Business Retail Customer Measure of Experience.

points for 2028-30. The UKCSI all sector average includes customer service performance of organisations operating in highly competitive sectors such as leisure, banking and retail – customer engagement in these sectors is fundamentally different to the context in which water companies operate, since (in these other sectors):

- greater resources are allocated to compete on levels of customer service than in regulated utilities; and
- there is more frequent direct contact with customers which contributes to the ability to shape customer views.

Historical evidence shows that the median score for water companies has been below the UKCSI all-sector average over AMP7 (since the C-Mex was introduced) and that, in 2023/24, no water company achieved a score above the UKCSI average.[74]

This raises questions as to whether use of the UKCSI all-sector average for benchmarking customer satisfaction in the water sector is appropriate, or whether a more targeted index – such as the UKCSI Utilities index – is more appropriate.

Issues

As discussed above, over the first four years of AMP7 companies have faced a significant downside skew to returns, with the vast majority of companies facing penalties on ODIs (and simultaneously overspending their totex allowances). These penalties reflect a combination of overly-stretching regulatory targets at PR19, an unprecedented number of extreme weather events and – in some circumstances – areas where companies have (by their own admission) fallen short of expectations.

In its final determinations, Ofwat has taken steps to address concerns raised by companies at draft determinations stage regarding the risk of 'downside skew' in AMP8 (that is, the risk of significant sector-wide underperformance driven by the ODI package proposed by Ofwat in its draft determinations). This has included both:

- changes made to individual PCs (e.g. via adjustments to caps and collars, and greater use of deadbands); and
- changes to risk allocation at an aggregate level, through the introduction of the OAM (summarised in the box below).

The Outturn Adjustment Mechanism (OAM)

When responding to Ofwat's draft determinations, companies expressed concerns that there would be significant sector-wide underperformance over the AMP8 PCL ODI regime. The concern was also raised independently by the rating agencies, including Moody's in a sector research note which sought to quantify the scale of the downside skew in the ODI regime and estimated a c.£2bn net penalty across the sector[75].
In response, in October 2024 Ofwat issued a short consultation regarding its proposed OAM. Ofwat stated that the aim of this mechanism was to set "incentives so that the impact of outcomes on the

[74] 'AFW144 KPMG RoRE risk', *Affinity Water* (2024), p. 14.
[75] 'PR24-final-determinations-Delivering-outcomes-for-customers-and-the-environment.pdf', *Ofwat*, (2025), pp.51-52

base allowed return earned at the median is zero".[76] Ofwat outlined its decision to introduce the OAM in its final determinations, albeit with some changes from the mechanism outlined in its October consultation.

OAM adjustments are calculated as follows:

1. Ofwat first calculates the total ODI impact on each company's RoRE, while applying the aggregate sharing mechanism (ASM) if the thresholds of 3% or 5% RoRE impact are met.

2. Ofwat then calculates the OAM median benchmark by averaging the performance of the median three companies within the dataset (or the median four if the dataset contains an even number of companies).

3. If the OAM median benchmark falls within a 'trigger threshold' range of +/- 0.5%, no adjustment is applied. However, if the benchmark falls outside of this range, an adjustment is made to all companies as the difference between the median company and the trigger threshold.[77]

The OAM adjustment is applied across all companies in water and waste separately, effectively shifting the sector's overall performance accordingly. OAM adjustments can be made at the end of each year during the AMP8 period. In theory, the mechanism should provide an additional layer of protection for companies in the event of sector-wide underperformance against PCLs, and for customers in the event of sector-wide overperformance against PCLs.

We recognise these efforts to produce a more balanced ODI package. Nevertheless, as our analysis indicates, we still have concerns regarding the risks companies will bear under the package proposed by Ofwat. Specifically:

- **We continue to have concerns regarding ODI risk**. Estimates of AMP8 ODI penalties based on performance forecasts in companies' draft determinations responses indicate that companies still face a substantial degree of risk on specific PCs. While we consider that introducing the OAM at final determinations was a positive step, this does not fully address the sector's concerns regarding the balance of risk and reward in the ODI package, particularly where the OAM has a deadband of 50bps applied. This can be seen by considering an extreme example, in which the sectors' performance was in line with AMP7: this would see a sector wide penalty of £1.15bn over AMP8, despite both the ASM and OAM being triggered.

- **Concerns remain regarding the approach to benchmarking customer satisfaction for C-MeX**. We welcome that Ofwat has stated in its final determinations that it will apply a downwards adjustment to the UKCSI all-sector average before calculating rewards and penalties, to address concerns raised by stakeholders regarding this index being higher than the UKCSI utilities average historically. However, it is unclear whether this adjustment will adequately address the concern that water customer satisfaction will ultimately still be benchmarked against other sectors of the

[76] 'PR24-Consultation-on-outturn-adjustment-mechanism.pdf', *Ofwat,* (2024), p. 2.
[77] 'PR24-final-determinations-Aligning-risk-and-return-1.pdf', *Ofwat*, (2024), pp. 15–18.

economy which are simply not comparable. We also note Ofwat's decision to reduce the size of the adjustment in the later years of AMP8 to "encourage continuous improvement".[78]

Recommendations

As noted earlier, Ofwat has taken steps to address concerns raised by companies regarding the risk of 'downside skew' in AMP8. We welcome these changes. However, we still have concerns regarding the risks companies will face under the package proposed by Ofwat.

We recommend that the CMA examines the ODI package put forward by Ofwat and seeks – in the first instance – to correct the issues 'at source' (rather than through adjustments to mechanisms designed to mitigate risk at an aggregate level, such as the ASM and OAM). This includes changes such as:

- **Amending PC definitions**: so that companies are not exposed to external risks, such as extreme weather events, which lie outside of their control; and
- **Changing the calibration of MeX incentives**: such that C-MeX performance is calculated with reference to the UKCSI Utilities index, which is more representative of the context water companies operate in.

2. Price Control Deliverables (PCDs) expose companies to additional risks, which have not been adequately considered by Ofwat

Ofwat's approach

A significant change to the performance framework at PR24 is Ofwat's extensive use of PCDs, which are linked to specific outputs. Broadly speaking, the PCD framework makes use of two types of incentives:

- **Non-delivery PCDs**, whereby funding is 'clawed back' from companies in the event of non-delivery (i.e. these are one-sided, penalty only incentives). This applies to around one third of PR24 totex allowances across both base and enhancement.[79]

- **Time based PCDs,** whereby payments are made based on the percentage of outputs that are delivered 'on time'. The incentive is two-sided, since companies can earn rewards (in the event of on time delivery) as well as penalties (in the event of delayed delivery). Time based PCDs apply to around half of the sector's enhancement allowances.

In its final determinations, Ofwat updated its position on the ratio of late delivery incentives to on time delivery incentives from 4:1 to 3:1 – that is, instead of late delivery penalties being four times as large as on time delivery rewards (as was the case at draft determinations), in its final determinations Ofwat set late delivery penalties at three times the size of on time rewards. The new 3:1 ratio was based on the

[78] 'PR24-final-determinations-Delivering-outcomes-for-customers-and-the-environment.pdf', *Ofwat*, (2024), p. 238.

[79] It should be noted that base PCDs, which cover specific water assets, were a new introduction at PR24. We outline our concerns with regards to base PCDs in Chapter 3 below.

proportion of enhancement projects under the Water Industry National Environment Programme (or WINEP)[80] which were completed on time over AMP7.[81]

Issues

As discussed in Chapter 2, the water sector is expected to deliver a step change in investment over AMP8, with a corresponding impact on customer bills. In light of this, we fully support Ofwat's desire to protect customers from non-delivery, and accept the principle that adequate protections should be in place to achieve this aim.

Nevertheless, it is important to recognise that the PR24 PCD package exposes companies to considerable additional risk over AMP8, which Ofwat has not properly accounted for within its final determinations. In particular, we note the following:

- **Non-delivery PCDs create one-sided disallowance risk not captured in Ofwat's RoRE risk modelling**. Ofwat explicitly states that non-delivery incentives have no RoRE impact, on the assumption that no costs would be incurred in the event of non-delivery. However, in practice, the stringent conditions attached to some PCDs – and the fact that the PCDs have been designed to clawback funding if delivery is delayed into the next AMP by more than a few months[82] – mean there is a risk that companies could incur costs, but then the funding for the associated outputs is removed.[83] This creates a one-sided disallowance risk for companies that is not captured in Ofwat's analysis, nor compensated for in its final determinations. This approach is also illogical, since it wrongly conflates the failure to deliver on time with a failure to deliver anything.

- **Base PCDs cover outputs that are unfunded**, thereby distorting incentives and leading to an erosion of base allowances. For these PCDs, Ofwat has made assumptions about the level of activity that can be funded from base expenditure. As discussed in further detail in Chapter 5 below, Ofwat's view regarding what has been funded from base differs from companies' views, and is not supported by robust evidence, opening companies up to non-delivery and time-incentive PCD penalties if companies deliver less than this. Consequently, companies will either need to divert funding from other areas of their base funding allowances to cover these outputs, overspend to avoid these penalties, or have further spend disallowed.

[80] The WINEP is the programme of actions water companies need to take to meet statutory environmental obligations, non-statutory environmental requirements or delivery against a water company's statutory functions.
[81] Specifically, Ofwat found that companies delivered approximately 76% of WINEP schemes on time over AMP7, i.e. a ratio of time delivery to late delivery of roughly three to one. See 'PR24 Final Determinations: Expenditure allowances', *Ofwat*, (2024), p. 311.
[82] It should be noted that the possibility of funding being clawed back if delivery is delayed into the next AMP by more than a few months creates a risk of seriously perverse incentives. This is because if a company considers there is a risk of delay which can only be mitigated by spending a large sum of money (much greater than would be needed to deliver the output only slightly later), then it would face strong incentives to incur these additional costs to avoid losing the allowance, part of which would be passed on to customers via TOTEX sharing.
[83] This could occur if, for example, a company had delivered roughly 90% of the investment needed to deliver a scheme in AMP8 but – due to delays driven by (for example) planning – the scheme was delayed into AMP9, potentially resulting in all funding for the scheme being clawed back.

- **Time incentive PCDs are too heavily weighted towards penalties.** Ofwat's proposed 3:1 ratio of late delivery incentives to on time delivery incentives (i.e. whereby late delivery penalties are three times the size of on time rewards) is based on AMP7 data, comparing the proportion of WINEP enhancements which were delivered on time compared to those schemes which were delivered late. Underlying this proposed penalty/reward ratio therefore is an assumption that enhancement project delivery over AMP8 will be similar to AMP7, despite – as Ofwat itself acknowledges – the considerably more ambitious investment programme in AMP8. Additionally, while late payments can compound for each year a project is delivered late, companies do not receive correspondingly larger rewards for delivering projects early.

Not only do PCDs create additional downside skew in the overall package, but **they also provide constraints on companies to deliver certain outputs (e.g. a particular scheme) rather than the outcomes that customers or the environment require (e.g. an improved environmental outcome)**. Whilst a PCD should ensure that a company does deliver against a particular commitment (or that funding is returned to customers if a company does not deliver), it is also in the interests of customers to provide companies with a degree of flexibility to innovate and find alternative ways to achieve the outcome more efficiently or by delivering additional wider benefits to customers or the environment – it is not unusual for superior alternative approaches to emerge as projects go through development cycles, for example. However, the current design of the PCDs do not reflect this.

Recommendations

While we fully support the principle that customers should not pay for non-delivery of outcomes that have been funded, the PCD framework put forward by Ofwat exposes companies to considerable additional risks and provides constraints that encourage companies in certain instances to focus on delivering very specific outputs rather than outcomes. This is likely to drive worse outcomes for customers and the environment.

We recommend that the CMA considers the additional risks companies will bear through PCDs and considers amendments to the PCD definitions to provide greater flexibility. Specifically, as part of its assessment, the CMA should consider:

- **Which additional risks should be addressed 'at source'** – in particular, the CMA should consider i) extending the grace period on enhancement PCDs where the enhancement carries over in to AMP9 and ii) addressing the base PCDs, which are currently underfunded; **Whether some risks cannot, or should not, be addressed at source** – and should be compensated for via a higher cost of capital allowance (e.g. one-sided disallowance risks); and
- **Changes to PCDs that would provide greater flexibility for companies to focus on the agreed outcomes.**

5. Assessment of base cost allowances

Overview of issues

The following five areas of Ofwat's base cost methodology warrant a different approach by the CMA:

a) Ofwat has underestimated base cost allowances by erroneously assuming that historical costs are a good predictor of future costs. As a result, Ofwat's allowances are not sufficient for some companies to address the challenges of AMP8.
b) Ofwat has set the burden of proof for company cost adjustment claims unreasonably high and has rejected most of companies' claims; we are concerned that well-founded claims may have been unduly rejected.
c) Ofwat's retrospective under-delivery adjustments are unreasonable, damaging to company efficiency incentives and set a harmful regulatory precedent.
d) Ofwat has underfunded cost adjustment claims by overestimating the implicit allowance from the base cost econometric models.
e) Ofwat has underfunded some asset health categories and not established a clear process for companies to access more funding in-period when needed.

Overall, Ofwat's cost assessment decisions have resulted in base funding below the efficient level of cost for many companies.

Background: Ofwat's approach

Ofwat largely relies on econometric modelling when setting efficient allowances for base costs.[84] The modelling is complemented with company-specific and/or sector-wide cost adjustments and ad hoc models.[85] The exact approach used varies across the individual price controls for wholesale water, wholesale wastewater, bioresources and residential retail activities. Figure 17 below illustrates the different components of Ofwat's base cost allowance.

Figure 17: Components of Ofwat's base cost allowance

[84] Companies operating and capital maintenance activities
[85] Ad-hoc models are used to assess 'unmodelled' base costs. These are costs Ofwat considers to be largely outside company's control, or costs driven by company-specific characteristics.

Econometric models

Econometric models estimate a relationship between cost drivers and base costs using historical data, considering some of the structural factors that may drive differences in costs (these are known as 'cost drivers' and can include for example population density or complexity of company activities). The estimated relationships are then applied to forecast cost drivers submitted by the companies to determine an efficient level of base costs for a particular activity. Variation in company costs from this 'efficient' level is interpreted as the company's managerial efficiency/inefficiency.

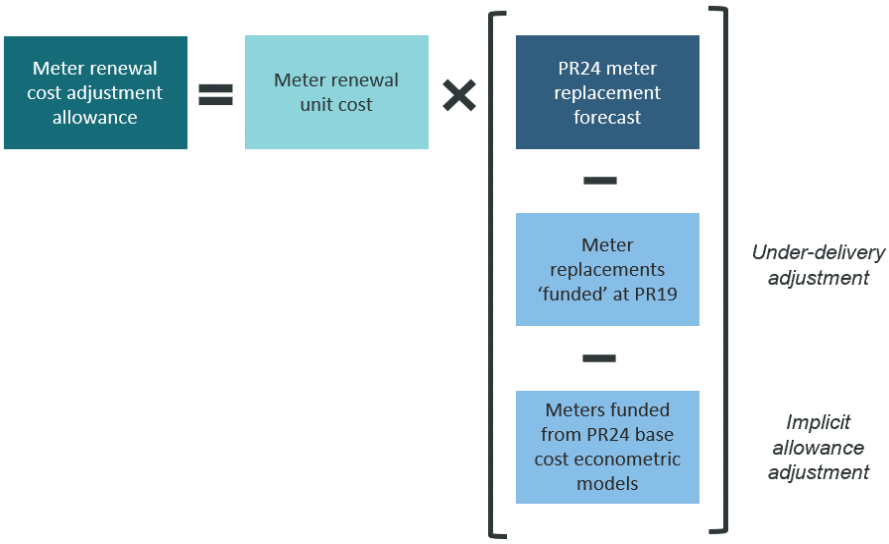
Cost adjustments

Ofwat recognises that its econometric models do not capture all of the structural reasons for variation in company costs. To address this, Ofwat makes two types of 'post-modelling' cost adjustments (middle box):

- **'Sector-wide cost adjustments'** provide additional allowances for incremental change common across all companies (e.g. delivering a step-change in meter replacement); and
- **'Company-specific cost adjustments'** reflect the unique circumstances of individual companies (e.g. SES Water has a statutory obligation to soften water for over 80% of its customers, leading to additional operational and capital expenditures. It submitted a CAC to cover these unique costs, emphasising that such obligations are not considered in the standard cost models).

The process for setting sector-wide cost adjustments is illustrated in Figure 18.

Figure 18: Example of Ofwat's cost allowance setting process



In short, this considers three areas:

1. *Benchmarking costs:* Ofwat multiplies companies' forecasted outputs (e.g. meter replacements) by a benchmark unit cost derived from company business plans.

2. *Avoiding double counting:* Ofwat applies downward adjustments to prevent funding duplication from two potential sources of overlap:

    - PR24 Base Cost Model Overlap – funding already allocated by the PR24 base cost models, i.e. the implicit allowance; and
    - PR19 Funding – funding provided in PR19 that may still contribute to outputs in AMP8 where Ofwat's delivery expectations set out in PR24 exceed what the company delivered during AMP7.

3. *Downward adjustments*:

    - Under-delivery adjustment – reduces funding if Ofwat determines that a company did not fully utilise its PR19 funding to carry out this activity; and
    - Implicit allowance adjustment – reflects Ofwat's view on the contributions from PR24 modelled base allowances to the relevant activity.

Unmodelled base costs

Unmodelled costs (last box) are not included in the econometric models. Unmodelled costs include pension deficit recovery, business rates, and abstraction charges.

Issues with Ofwat's approach

We have identified five areas where Ofwat's cost assessment decisions have resulted in base funding allowances below the efficient level of cost for some companies.

1. Ofwat has underestimated base cost allowances by erroneously assuming that historical costs are a good predictor of future costs

Ofwat's approach

Ofwat's base cost econometric models use historical data over 2011-2024 to estimate how companies' costs will evolve in future years. To incentivise less efficient companies to improve their performance, Ofwat then applies a 'catch-up efficiency challenge' to company allowances, by setting allowances at a level based on the costs of the most efficient companies. Ofwat sets the catch up efficiency challenge at the upper quartile company. This means that companies that are deemed to be less efficient than the upper quartile company receive an allowance that is representative of the upper quartile level of efficiency.

Issues

As discussed in Chapter 1, in recent years there have been significant changes in the external context in which companies operate, due to factors including climate change, increasing engagement and expectations from the public, and new and more stretching statutory requirements relative to PR19. However, Ofwat's models do not include cost drivers for changes in these circumstances and this means that its backwards-looking models are increasingly less representative of the forward-looking cost pressures facing companies and underfunds efficient costs.

Ofwat itself has recognised the limitations of this approach and requested companies to submit cost adjustment claims (CACs) where historical cost relationships might not accurately reflect future costs.[86] However, it is unclear whether the PR24 cost adjustments are sufficient to correct for this limitation. While Ofwat has made sector-wide adjustments, it has disallowed close to half (28) of the cost adjustment claims submitted by companies. Ofwat has also disallowed costs related to increases in employers' national insurance (NI) contributions, which are outside companies' control.[87]

This means that the base cost econometric models together with cost adjustments made by Ofwat are likely to provide insufficient funding as they do not sufficiently account for external pressures that companies will face at AMP8.

Recommendations

The CMA should set base cost allowances at a level that reflects the increase in costs driven by a changing operating environment. This could be achieved by:

- Developing improved base cost models which better capture the impact of changing circumstances by, for example, identifying and including more appropriate cost drivers and re-assessing the weight given to historical and forecast years in the estimation sample.
- Using a less stringent efficiency benchmark to mitigate the impact of the base cost models not reflecting the changing external context, and the wide degree of uncertainty associated with the models.
- Allowing a larger number of cost adjustment claims to address the known limitations with the current set of base cost models (including use of sector-wide adjustments).
- Allowing an adjustment for the increase in employers' national insurance (NI) contributions.

For future price controls, Ofwat should develop a better base cost assessment process that better reflects how external circumstances impact the relationship between costs and cost drivers.

2. Ofwat has set the burden of proof for company cost adjustment claims unreasonably high and has rejected the majority of companies' claims as a result

Ofwat's approach

Ofwat encouraged companies to submit cost adjustment claims where they face unique circumstances not captured by the econometric models. This could include specific legal requirements or atypical

[86] Specifically, Ofwat notes: "*We recognise that our statistical models cannot account for all relevant factors that affect costs. There may be instances where an adjustment is required to account for these factors*." ('PR24 final determinations: expenditure allowances', *Ofwat,* (2024), p. 27).

[87] At Final Determinations, Ofwat rejected an ex-ante allowance with potentially an end of period reconciliation process on the basis that: 1) there is uncertainty around the impact of the increase in NI contributions; 2) cost sharing is sufficient to address this uncertainty; 3) other unexpected events can lead to lower costs cancelling out the impact of the increase in NI contributions. We consider that Ofwat did not provide sufficient evidence to support its decision. Specifically, on 1), while there is uncertainty around the impact, we estimated that the impact is material at £382m for the industry; on 2), by definition the cost sharing mechanism will only cover 50% of the incremental costs; and on 3), Ofwat has not provided evidence that there will be other factors outside of companies' control that might cancel out the impact of the increase in NI contributions.

expenditures which might increase efficient costs relative to peers, or instances where historical costs are a poor predictor for future costs.

Ofwat assessed these claims against three criteria:

- **Materiality:** the value of the claim must meet the minimum threshold of 1-6% of the overall five-year Business Plan totex (exact threshold varies across the controls on the specific price control)[88];
- **Need for adjustment:** an explanation for why the base costs would not be sufficient; and
- **Cost efficiency:** companies must provide compelling evidence that their cost estimates are efficient.

Companies submitted 64 cost adjustment claims with a total value of £5.4bn. At final determinations, Ofwat rejected about half of these claims and allowed £3.9bn in cost adjustment allowances. Ofwat grouped some claims together and applied six sector-wide adjustments.[89]

We have listed in Figure 19 below the cost adjustment claims proposed by water companies in response to the draft determinations, and those allowed by Ofwat.[90]

Figure 19: Comparison of cost adjustment claims requested by companies at draft determination and allowed by Ofwat

Requested in response to the DDs	Allowed by Ofwat?
Energy	Yes, sector-wide
Mains renewals	Yes, sector-wide
Meter renewals	Yes, sector-wide
Network reinforcement	Yes, sector-wide
Net Zero	Yes, sector-wide
Phosphorus removal opex	Yes, sector-wide
Wastewater growth	No
Average Pumping Head (regional topography)	No
Leakage	No
Lack of large sewage works	No
Regional wages	No
Transience	No
Canal & River Trust	Yes, company-specific
Managing interruptions performance	Yes, company-specific
Reservoir maintenance	Yes, company-specific
Non-infrastructure capital maintenance	No
Exogenous factors increasing drainage costs	No
Advanced anaerobic digestion (Industrial Emissions Directive)	Reallocated to enhancement
Water softening	Yes, company-specific
Costs associated with retail scale	No

[88] The claims are allocated to specific price controls, and the materiality threshold is calculated based on the overall totex of the price control for each company. The materiality and need for adjustment criteria are necessary criteria, i.e. if the claim fails either of these criteria, it is rejected.
[89] At draft determinations, Ofwat rejected 28 of the claims and reallocated eight claims to enhancement, accepting or partially accepting 28 claims.
[90] Source: analysis of draft determinations and final determinations cost adjustment claim models.

Economies of scale at water treatment work	Yes, company-specific
Coastal population	No
Liming and bioresources	No
AMP7 nature based and catchment management solutions	Yes, company-specific
Cost impact of combined sewers in the network	No

Issues with Ofwat's approach

The high rate of cost adjustment claims rejections suggests that Ofwat's criteria (particularly, 'need for adjustment' and 'cost efficiency') have been applied too harshly, leading to well-founded claims being rejected. This has disadvantaged companies most affected by unique circumstances not captured in Ofwat's base cost models.

Left uncorrected, this approach sets a harmful precedent which will weaken incentives for companies to submit cost adjustment claims in future, as the costs of developing these claims will outweigh the low chance of receiving any allowances. Further, it may lead companies to only submit claims they believe most likely to succeed, based on Ofwat's previous decisions. This introduces a potential bias to the business planning process (e.g. capex/opex bias if companies anticipate more capex solutions to be accepted by Ofwat, as per PR24 precedent).

Recommendations

The CMA should consider revisiting Ofwat's cost adjustment claim decisions to evaluate whether the assessment criteria have been applied in a reasonable, proportionate manner and consistent manner.

3. Ofwat's retrospective under-delivery adjustments are unreasonable, damaging to company efficiency incentives, and set a harmful regulatory precedent

Ofwat's approach

A strong theme in Ofwat's final determinations is that customers must not 'pay twice' for activities companies were funded for at PR19 but did not deliver.[91] To this end, Ofwat has applied under-delivery adjustments to its estimates of sector-wide cost adjustments for 1) water meter renewals, 2) mains renewals and 3) network reinforcement. This is summarised in Figure 20. A similar adjustment was also applied to growth at Sewage Treatment Works.

To calculate the under-delivery adjustments, Ofwat compared the outputs companies delivered in these areas over AMP7 with their respective PR19 business plan forecasts. Where a company delivered less than it forecast in its original PR19 business plan, Ofwat has made a respective adjustment to its PR24 funding.

[91] 'PR24 final determinations: Expenditure allowances', *Ofwat*, (February 2025).

Figure 20: Summary of Ofwat's approach to estimating under-delivery adjustments

Cost adjustment area	Ofwat's approach
Meter renewals	Calculated as the difference between PR19 outturn and forecast meter renewals, multiplied by Ofwat's estimate of a benchmark unit cost per renewal[92]
Mains renewals	Implemented through a more stretching assumption for the rate of mains renewals compared to Ofwat's target rate of 0.3%
Network reinforcement	Calculated as the difference between PR19 outturn expenditure and a derived 'implicit allowance', multiplied by companies' outperformance cost sharing rates.[93]

Figure 21 below shows the allowances for each area before the under-delivery adjustment (A), the value of the adjustments (B and C) and the percentage reduction due to B and C. Overall, Ofwat has removed 10% of efficient base costs via these adjustments (ranging from 2% for network reinforcement to 23% for mains renewals).

Figure 21: The impact of Ofwat's under-delivery adjustment on sector-wide cost adjustment allowances

		Meter renewals	Mains renewals	Network reinforcement*	Total
Ofwat's PR24 allowance (before adjustments) (£m)	A	964	2,288	1,340	4,592
Under-delivery adjustment (£m)	B	74	105	16	195
Implicit allowance adjustment (£m)	C	162	1,727	496	2,385
Ofwat's PR24 allowance (£m)	D=A-B-C	729	456	734	1,919
Impact of under-delivery adjustment on allowance (%)	E = B/D	10%	23%	2%	10%

*Source: analysis of Ofwat models 'CA95 Mains renewal cost adjustment model', 'CA99 Meter renewals cost adjustment model', and 'CA148 Network reinforcement cost adjustment model'. *Network reinforcement adjustments also include cost challenge. Note: All figures in the table are in 2022/23 £m prices.*

Ofwat has calculated the under-delivery adjustments in different ways. This is summarised in Figure 22 below.

[92] Estimated from unit costs submitted in company business plans.

[93] In calculating the network reinforcement under-delivery adjustment, Ofwat adopt two separate calculation approaches for the implicit network reinforcement allowances and averages across them both. Each approach multiplies a different derived scaling factor with a different measure of cost to approximate a network reinforcement allowance

Figure 22: Summary of Ofwat's approach to estimating under-delivery adjustments

Cost adjustment area	Ofwat's approach
Meter renewals	Calculated as the difference between PR19 outturn and forecast meter renewals, multiplied by Ofwat's estimate of a benchmark unit cost per renewal.[94]
Mains renewals	Implemented through a more stretching assumption for the rate of mains renewals compared to Ofwat's target rate of 0.3%.
Network reinforcement	Calculated as the difference between PR19 outturn expenditure and a derived 'implicit allowance', multiplied by companies' outperformance cost sharing rates.[95]

Issues

We consider that Ofwat's under-delivery adjustment represents a retrospective adjustment to the PR19 price review settlement. This adjustment is conceptually flawed and sets a harmful regulatory precedent.

At PR19, Ofwat did not set delivery targets for any of the three areas based on company forecasts. Neither did the companies receive the full funding they asked for in their business plans to deliver these forecasts. Instead, in these areas, Ofwat's policy was to hold companies to account for meeting their wider statutory duties and their licence conditions and delivering the package of performance outcomes agreed at the final determinations (with associated rewards and penalties to those for out or under performance). As expected under a totex-based regulatory regime, companies had discretion to allocate the funding to achieve the required outcomes in the most efficient and effective way.[96] Customers have been protected from company under-delivery by the outcome delivery incentives (ODIs).

By departing from its PR19 policy position, Ofwat is effectively applying a retrospective assessment of what it expected companies to deliver, and penalising companies for legitimate management decisions *ex post*. In doing so, it also goes against best asset management practice where companies should optimise risks across asset classes, which may mean delivering different volumes of activity to those included in business plans. This will disincentivise innovation and increase investor perceptions of forward-looking regulatory risk – all of which will increase costs for customers.

In addition, retrospective regulation creates a moral hazard problem[97] for the regulator as it may be less concerned about making suboptimal decisions on the expectation that it can revisit these decisions *ex post*.

In addition to these in-principle concerns, we have also identified an errors in Ofwat's implementation of the adjustments. Specifically, with respect to network reinforcement, Ofwat approach penalises

[94] Estimated from unit costs submitted in company business plans.
[95] In calculating the network reinforcement under-delivery adjustment, Ofwat adopt two separate calculation approaches for the implicit network reinforcement allowances and averages across them both. Each approach multiplies a different derived scaling factor with a different measure of cost to approximate a network reinforcement allowance
[96] There are several options for a company to deliver a set outcome; for example, the outcome of demand reduction can be achieved by a more effective means than mains renewals in some areas (e.g. metering).
[97] A moral hazard problem occurs when a party takes more risks because they do not bear the full consequences of their actions.

companies who achieved delivery at a lower cost than forecast in PR19 plans. Ofwat calculates the under-delivery adjustment using the amount of totex spent as a proxy of output delivered. This means that *any* underspend is considered under-delivery *irrespective* of whether it was driven by the volume of work delivered or cost savings on the work delivered. In other words, if a company delivered exactly its forecast business plan network reinforcement volumes, but for a lower unit cost than assumed at PR19 final determinations, it will be penalised for this efficiency at PR24. This represents a perverse incentive to discourage companies from achieving cost savings. Combined with the increased uncertainty around further potential retrospective adjustments, this has concerning implications for other areas of company spend.

Recommendations

The CMA should remove Ofwat's unjustified and unreasonable under-delivery adjustments to safeguard company incentives to be efficient, and to prevent a harmful regulatory precedent.

For future price controls, the CMA should ask Ofwat to:

- Refrain from introducing retrospective changes to agreed price control settlements. If, in the future, Ofwat judges it appropriate to alter the balance between setting outcomes on an *ex ante* basis and assessing outputs on an *ex post* basis, then it should signal this at the methodology stage of a price control and not after the fact.
- Maintain commitment to the targets and expectations it sets for companies at the beginning of price control periods; where this includes discretion over how obligations are delivered, Ofwat should take care not to penalise companies *ex post* for acting on the incentives it has set.

4. Ofwat has underfunded cost adjustments by overestimating the implicit allowance from the base cost econometric models

Ofwat's approach

In some areas where Ofwat has accepted the need for a sector-wide cost adjustment, Ofwat considers that its PR24 base cost econometric models already fund some of the outputs associated with the cost adjustment.[98] However, since the allowances from base cost econometric models are not tied to specific outputs, Ofwat estimates the contribution that its modelled allowances have on companies' individual output forecasts. This contribution is known as the 'implicit allowance' adjustment and is deducted from companies' cost adjustment allowances.

[98] In other words, in a counterfactual without cost adjustment allowances companies would still be funded for some level of activity and therefore this should be removed from the adjustment allowance.

In practice, Ofwat uses historical data on the average level of output the sector has delivered against the available base allowance to approximate companies' implicit allowance adjustments. Figure 23 details Ofwat's approach for each area.

Figure 23: Summary of Ofwat's approach to estimating implicit allowance adjustments

CAC	Ofwat's approach
Meter renewals	Calculated using historical sector (unweighted arithmetic) average renewal rates.
Mains renewals	
Network reinforcement	Calculated using the average historical proportion of base allowances allocated to outturn network reinforcement expenditure.[99]

Issues

We recognise the rationale for changing the cost adjustments to account for funding through base allowances – companies provide estimates of implicit allowances when submitting their claims.

However, we consider that Ofwat has made conceptual and implementation errors when estimating implicit allowances.

Mains renewals

Ofwat has incorrectly assumed that *historical* outturn delivery and expenditure can accurately predict what will happen in AMP8. However, as discussed above, companies were not funded to deliver specific outputs from base allowances, nor was historical expenditure ringfenced. Instead, companies were given flexibility in how to spend their allowances. Hence, historical data reflects individual company decision-making within the parameters imposed by the PR19 determination, not Ofwat's econometric exercise used in the process.

Meter renewals and mains renewals

Ofwat has cherry-picked the years included in its calculation of historical averages when determining implicit allowances. In particular, to calculate the rate of mains replacement achievable from the implicit allowance, Ofwat has excluded the year 2023-24 from the historical average. This has resulted in a higher mains replacement rate (of 0.30%) than would have otherwise been the case (0.29%). Incorporating 2023-24 data into the calculations would increase the mains renewals cost adjustment allowance for the industry by £92m. Ofwat's justification for this methodology decision is simply that it is *"not […] reflective of what base allowances deliver"*. It is also inconsistent with Ofwat's wider price control approach. When assessing base costs Ofwat uses the last five years to set the efficient cost allowances based on the upper-

[99] Ofwat take the average of the two approaches. The first approach multiplies (a) company annual average outturn network reinforcement expenditure over PR19, by (b) the company ratio of modelled 'efficient' wholesale allowances and outturn spend at PR19. The second approach multiplies (a) PR19 wholesale allowances by (b) the sector average ratio network reinforcement expenditure to total wholesale expenditure in PR19.

quartile benchmark company and it is this period that should therefore be used to set the implicit assumption about 'what base buys'. Indeed, if the benchmark company were used then the implicit amount of renewals that can be funded from base would be much lower still.

Recommendations

The CMA should correct Ofwat's estimation of implicit allowances. We recognise this is a complex exercise, requiring estimation of an unobserved counterfactual (i.e. what would companies deliver only with base funding). If historical data is used to estimate the implicit allowance, the CMA should bear in mind that PR19 was an outcomes-based price control. This means that what companies delivered in AMP7 cannot be used to reliably estimate what the base cost models implicitly funded at PR19 and therefore what they might fund at PR24. However, all the data should be included and an allowance should focus on the efficient modelled period rather than a longer period.

Given these challenges, and the inherent limitations of any modelling approach, we recommend the CMA reviews Ofwat's estimates by giving greater consideration to companies' engineering and asset management evidence.

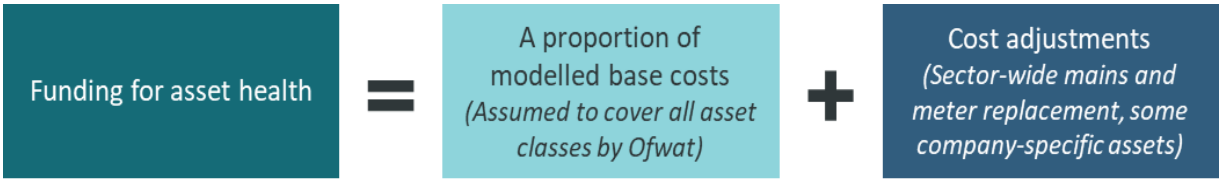
For future price reviews, Ofwat should develop a robust, comprehensive and consistent approach to determining what implicit base allowances fund.

5. Ofwat has underfunded some asset health categories and failed to set out a clear process for accessing additional funding in-period

Ofwat's approach

For most asset categories, Ofwat has assumed that the allowances from the base cost models sufficiently fund maintenance of those assets. This is because the costs included in the models include capital maintenance, and over PR19 asset conditions have remained steady or improved for most asset classes (e.g. gravity sewers, rising mains, and bioresources assets). Figure 24 illustrates how Ofwat funded asset health at PR24.[100]

Figure 24: Ofwat's funding of asset health at PR24



Issues

[100] The exception to this is funding for replacing water mains and water meters (as explained in the previous Chapter) and funding for some company-specific assets. For these exceptions, Ofwat allowed additional funding using company-specific cost adjustment allowances for specific assets. This included the water softening scheme for SES Water, and reservoir maintenance and Wrexham ring main for Hafren Dyfrdwy. For Thames Water, the Beckton Sludge Powered Generator replacement was included in the large scheme gated process. The gated allowance for asset maintenance was a unique approach for Thames Water only.

We have identified three areas of concern with Ofwat's approach:

First, limiting the sector-wide cost adjustment to just three asset classes (mains and meter renewals, network reinforcement) is unreasonable, and creates perverse incentives.

Ofwat stated that it decided not to consider cost adjustment claims for asset classes in steady or improving condition (although it did include additional allowances for more water mains replacement that demonstrated this under Ofwat's definitions).[101] This lacks rationale. A likely explanation for steady or improving condition is that companies have focused their AMP7 capital maintenance programme on those assets – it is unclear why Ofwat would now signal these areas are 'fixed' and instead direct companies to switch activity elsewhere (as determined by PCDs (see Chapter 4) and narrow focus of cost adjustment claims). At the same time, we note that Ofwat has not been able to assess many asset classes and, for those that it has been able to assess, the definitions often conflate 'condition' with 'performance'. For example, the condition assessments for water mains rely heavily on the number of burst mains experienced, a reduction in mains bursts in this context will lead to an improvement in 'condition' in the assessment. For sewers the same is true for 'collapsed sewers'. In practice, companies have found ways to reduce the number of these events, for example through more pressure management on water mains but, in reality and as can be seen from the replacement data where it is available, companies are replacing less and less of these assets so the actual condition of the asset is unlikely to be improving.

Ofwat's approach risks distorting companies' strategies for which assets they choose to renew away from the optimal long-term approach, likely to the detriment of customers. This is because, for example, companies will be forced, under the final determination, to spend around 40% of their water base capex allowances on mains, meters and network reinforcement or they will see funds clawed back at PR29. This will necessarily mean spending less on other assets which are likely to be more critical to service delivery.

Second, Ofwat's cost assessment of asset health lacks forward focus and generates insufficient allowances to meet the needs of AMP8.

As explained above, Ofwat's econometric models are largely backward-looking. These models fail to appropriately capture cost drivers expected to grow in importance in the near future. For example, climate change, with increased magnitude and frequency of extreme weather events like droughts and floods is likely to have a greater impact than it did in the past.[102] Other examples include:

- Changes in customer expectations, e.g. increased focus on water company environmental performance;[103]
- Increased demand due to population growth;[104]
- Increasingly uncertain macroeconomic environment leading to higher input prices.

[101] Ofwat has listed gravity sewers, rising sewer mains and bioresources assets as some areas where asset condition has largely been maintained or improved (see 'PR24 final determinations: Expenditure allowances', *Ofwat*, (February 2025), p. 3).
[102] 'Water 2050: A White Paper', Water UK, June 2022.
[103] 'Customer trust and satisfaction in water companies falling in latest Ofwat and CCW research', Ofwat, April 2024.
[104] ONS data

The impact of these factors on asset health will continue to evolve – but we are not convinced that Ofwat's current approach to asset health is sufficiently effective and future-proof to support the requirements of the sector in this area.

During the PR19 redeterminations, the CMA expressed a similar concern. The CMA agreed with the arguments raised by Anglian Water and Northumbrian Water that Ofwat's approach didn't sufficiently recognise the need to anticipate change. The CMA stated that: "*[t]his is a complex issue, which, going forward, may become more important. We therefore suggest that Ofwat considers developing indicators to track this issue and to enable it to enhance its analysis with a forward-looking element that will assist in triangulating results from its econometric modelling of historic costs*."[105]

Ofwat has not taken forward this recommendation and has not developed any forward-looking indicators for AMP8. Ofwat has outlined plans to better understand the condition of all asset classes during AMP8.[106] It will then assess whether there are any asset condition issues across the sector that need to be addressed ahead of PR29. Ofwat briefly noted some potential options for additional base expenditure allowances in-period or at the PR24 end-of-period reconciliation, and/or allowing companies to accelerate 2030-35 capital maintenance spend into the last two to three years of the PR24 period.

We are concerned that Ofwat has made similar statements in the past which did not materialise in further funding.

Recommendations

The CMA should revisit Ofwat's approach to setting allowances for asset health. We recommend that this includes:

- A review of whether the base cost models provide sufficient funding for all asset classes.
- Explicit consideration of the long-term impact of asset health underfunding in light of changes to external conditions, e.g. higher costs due to climate change. This could involve including an explicitly forward-looking element into the assessment of efficient allowances (e.g. an appropriate cost driver, assessing appropriate weight to be given to historical *and* forecast data).[107]
- Direct Ofwat to provide clarity and procedural certainty on the processes for securing additional funding for other asset classes over the course of AMP8 to maintain and improve asset health.

In future, Ofwat needs to improve its approach to asset health to ensure that all asset categories are sufficiently funded.

[105] 'Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations', *CMA,* (2021), para 4.293.
[106] 'PR24 final determinations: Expenditure allowances', *Ofwat*, (February 2025), pp. 91-92.
[107] This is also discussed as an issue in the Water UK/Reckon work undertaken to respond to Ofwat's approach to assessing asset health at PR24.

6. Assessment of enhancement cost allowances

Overview of issues

There are five major aspects of Ofwat's method for assessing enhancement costs where we consider the CMA should take a different approach:

a) The econometric models are not robust. Many of the econometric models employed by Ofwat are not statistically robust and are not based on sound economic or engineering rationale. As a result, the differences between modelled allowances and the costs submitted by companies are likely to capture data quality and modelling issues, rather than purely differences in managerial efficiency. Given these modelling issues, Ofwat places too much weight on the econometric models when setting allowances.
b) Ofwat places too much weight on flawed unit cost models when setting allowances. Many of Ofwat's unit cost models assume that companies are undertaking comparable activities, and attribute differences in costs to efficiency, when some of these differences reflect the varied activities that companies need to undertake due to the specific conditions they operate in.
c) Ofwat's allowance decisions following 'deep dives' are subjective, arbitrary and lack transparency. Ofwat has not sufficiently considered company engineering and operational evidence in its decision making.
d) Ofwat's approach to making corrective adjustments for (what it considers) an overlap between the base and enhancement funding ('base overlap') is poorly justified and lacks transparency.
e) Ofwat's retrospective PR19 under-delivery adjustments for are not justified. Ofwat has reduced some companies' PR24 allowances on the basis that the proposed activity has been funded and should have been undertaken in PR19. These adjustments are unreasonable and set a harmful precedent for the regulatory framework.

We are concerned that as a result, some companies have received arbitrary and unreasonable cuts to their proposed enhancement expenditure, leaving them with insufficient funding to deliver improvements in line with their business plans.

Background: Ofwat's approach

Expenditure is categorised as 'enhancement' if it is to be incurred on activities which lead to permanent increases in the level of service or capacity or a reduction in risk. For example, this can be for environmental improvements to meet new statutory obligations, improving service quality or new solutions to improve water supply resilience.

At PR24, the value of enhancement costs and the proportion of enhancement costs relative to total costs has increased significantly compared to PR19, from 17% (c.£10bn) to 42% (c.£44bn). This has been driven by new and more stringent statutory requirements and increasing external pressures from climate change and population growth.

Ofwat's methodology for enhancement cost assessment is comprised of two important components:

1. **Benchmarking:** Ofwat compares historical and forecast costs for each company and each category to estimate the level of efficient cost. This benchmarking takes two forms:

    i) Econometric benchmarking is a quantitative analysis method that uses statistical and econometric models to compare the efficiency of companies in the sector. It involves estimating cost or performance relationships based on historical data to assess how efficiently companies operate relative to their peers. Ofwat evaluates water companies' costs by applying regression models that account for various cost drivers, such as network size, customer numbers, and environmental factors.
    ii) Unit cost modelling, where Ofwat seeks to identify an efficient unit cost for outputs (or benefits) delivered, using company cost and output data. It uses this benchmark unit costs to set allowances.

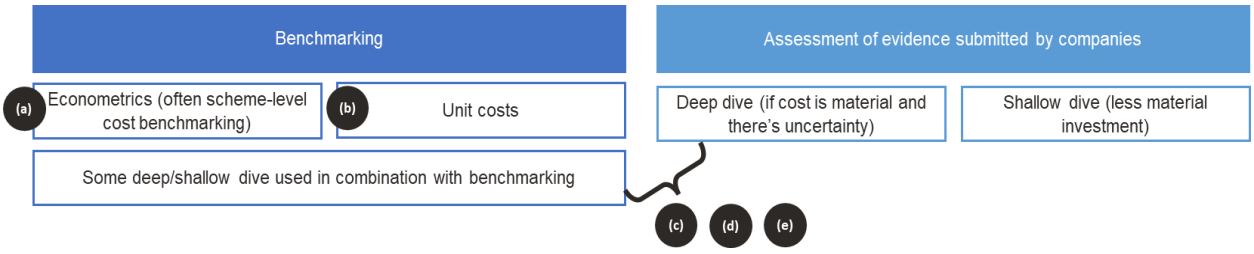
Ofwat requires companies to allocate their proposed enhancement spend within specified categories ('enhancement lines') as much as possible, to enable comparative analysis to be undertaken (although 'freeform' requests can also be made). There are approximately 60 different 'enhancement lines' covering areas such as resilience, leakage, pollution reduction, and raw water deterioration.

2. **Assessment of company evidence**: Ofwat uses its 'deep dive' and 'shallow dive' assessment frameworks to assess costs.

    i) A 'shallow dive' assessment is a light-touch review of an enhancement case, typically where expenditure is less than 0.5% of the water or wastewater wholesale totex, or less than £10m).
    ii) In a 'deep dive' assessment Ofwat conducts an in-depth, rigorous review of evidence provided by the companies for each enhancement case. It considers the strength of evidence on the need for the investment, the efficiency of the proposed costs and whether the investment represents the best option for customers. The 'deep dives' generally apply to more material enhancement cases (where the expenditure is more than 0.5% of the water or wastewater wholesale totex, or more than £10m).

For each enhancement line, Ofwat employs either one of these methods, or often a combination of these methods. Ofwat's enhancement assessment is covered across c.60 different spreadsheets, one for each enhancement line, often employing several assessment methods. Figure 25 below summarises Ofwat's approach. In this diagram we also indicate where we have identified areas of concern.

Figure 25: Overview of Ofwat's approach to assessing enhancement costs



Source: Frontier Economics

Issues with Ofwat's approach

1. The econometric models are not robust

Ofwat's approach

Ofwat uses econometric modelling for storm overflows, phosphorus removal, growth at STWs, bioresources IED, supply interconnectors, sanitary parameters, septic tanks, first time sewerage, metering, and lead.[108]

In its econometric models, Ofwat uses various combinations of:

- Scheme level data (i.e. for specific projects/sites proposed by each company) and company level data (i.e. aggregate data at the company level); and
- Historical and forecast data.

Ofwat does not set a uniform 'catch-up efficiency' challenge, instead it considers the quality of the models when determining the appropriate efficiency challenge. Where models identify potential outliers[109], Ofwat considers these individually, assessing the costs through targeted deep dives. Ofwat makes adjustments to the allowed costs in these cases, dependent on the extent to which Ofwat finds the justification provided by companies 'compelling'.

Issues

Ofwat's econometric models for enhancement costs fail to adequately explain company costs. This is largely due to the lack of statistical robustness of the models, and the inherent limitation of the modelling approach to capture the full economic and engineering rational through a small set of common cost drivers.

Statistical robustness of econometric models is often assessed on the Adjusted R^2 ('R-squared') measure. While models should not be evaluated solely on R^2, the measure is widely accepted and recognised and provides a useful indication for how well the model fits the data.

The R^2 falls between 0 and 1; where '1' means the model works perfectly (i.e. 100% of the variation in the dependent variable is explained by the explanatory variables). The closer the model's R^2 is to 1, the more robust the model.

Many of Ofwat's scheme-level econometric models do not perform well in terms of Adjusted R^2. For example, four of the ten Storm Overflows models have an Adjusted R^2 below 0.5, as do two of the four Phosphorus Removal models. Although comparisons of R^2 across different models are not always meaningful, the R^2s of Ofwat's enhancement models are lower than typically seen in other regulatory contexts. For example, the majority of Ofwat's econometric models for base costs have an Adjusted R^2 of

[108] Several of Ofwat's models, such as metering and storm overflows, only include one cost driver, and are effectively unit cost models. We cover the issues with Ofwat's unit cost modelling approach later in this Chapter.
[109] Ofwat's main method for identifying potential outliers was the Cook's distance statistic.

over 0.8,[110] and Ofgem's econometric models for RIIO-ED2 final determinations all had an Adjusted R^2 between 0.77 and 0.93.

Ofwat's phosphorus reduction enhancement model is one of the cases illustrating these limitations

- To assess companies' submitted costs for Phosphorus Removal, Ofwat combines four different scheme-level econometric models. Two of the models are based on historical data and two are based on forecast data. Each of the four models have Adjusted R2s which are relatively low, but the models using forecast data explain greater variation in costs (R2 of c.0.5 vs R2 of c.0.3). The forecast models also give substantially higher sector allowances. However, all models are assigned equal weight.
- Before Ofwat adjusts for outliers, the spread of modelled cost outcomes for companies is very wide. For example, Hafren Dyfrdwy's triangulated modelled allowance is 119% greater than its request, and Anglian Water's allowance is 41% greater. In contrast, Thames, Wessex, United Utilities and Severn Trent all have modelled allowances which represent a cut of over 30% to their request. These differences in modelled costs are far larger than would reasonably be expected to be driven by efficiency differences alone, and likely to reflect issues in the model quality and underlying data.
- Ofwat then makes several adjustments to these allowances, including adjusting for outliers, bringing the spread of outcomes ranging from 13% above request for Hafren Dyfrdwy, to 31% below request for Wessex. Though this is a more reasonable outcome, it still reflects a wide range of efficiency judgments, and it does not change the fact that the underlying models generated a significant spread of outcomes, calling into question their statistical robustness.

The relatively poor statistical performance of econometric models creates uncertainty around the degree of confidence that can be ascribed to their results. There is a significant risk that the differences between modelled allowances and the costs submitted by companies reflect data quality and modelling issues, rather than purely differences in managerial efficiency. These differences are large: for AMP8, companies requested £5.8bn of costs (compared with £3.3bn for PR19) but Ofwat allowed only £3.8bn.

Ofwat's econometric models fail to adequately explain company costs. This is largely due to the lack of statistical robustness of the models, and the inherent limitation of the modelling approach to capture the full economic and engineering rational through a small set of common cost drivers.

Recommendations

The CMA should limit the reliance on flawed econometric models in enhancement cost assessment and give greater weight to bottom-up evidence on why companies' costs are efficient, with due focus on the circumstances each company is facing. The CMA's assessment should focus on the models that cover the largest areas of expenditure, including Phosphorus Removal and Growth at Sewage Treatment Works, and/or where Ofwat's assessment has led to large differences between company cost submissions and allowances. In these cases, the CMA should assess whether the underlying models are robust.

[110] 'PR24-final-determinations-Expenditure-allowances-Base-cost-modelling-decision-appendix.pdf', *Ofwat,* (December 2024).

2. The methodology underpinning the unit cost models is flawed

Ofwat's approach

Ofwat assesses some enhancement lines using 'unit cost' modelling to identify an efficient unit cost for outputs (or benefits) delivered. In general, allowances for PR24 are then set based on the identified unit cost 'benchmark' (such as the median unit cost) multiplied by the expected number of units for each company. Ofwat seeks to identify an efficient unit cost allowance for the following enhancement lines:

- Supply;
- Continuous Water Quality Monitors;
- Leakage ("other leakage activities");
- Smart meters (new installations and upgrades);
- Raw water deterioration; and
- Water quality improvements - Improvements to taste, odour and colour.

Issues

There are two main issues with Ofwat's approach to unit cost modelling at PR24.

1. Ofwat has given insufficient consideration to when unit cost modelling is appropriate, and
2. Ofwat's application of unit cost models is not robust

Because unit cost models estimate a single unit cost for a unit of work, in order to deliver meaningful results they should only be used where workloads are uniform and repeatable. Attempting to apply this modelling approach across different types of activities will result in a unit cost estimate that is not reflective of any one activity type, which would penalise and reward companies in an arbitrary manner.

Ofwat has applied unit cost modelling in areas where companies may be proposing different activities because they are:

- performing at a different level from other companies and therefore require different solutions to make marginal improvements or adjustments;
- proposing different solutions for other reasons, such as due to the characteristics of their assets and geography; and/or
- are required to implement different solutions. For example, in some cases, specific solutions are required by the Environment Agency or Natural Resources Wales. The models do not always take account the costs associated with these solutions.

When estimating efficient unit costs, Ofwat made the following errors:

- Ofwat's choice of time period for the model (i.e. whether it uses historical or forecast data) varies on a case-by-case basis and the reasons for a particular choice of time period are not well justified. This can be seen, for example, in Ofwat's unit cost model for 'Other leakage activity[111]':
    - Ofwat split the companies into two groups – a set of 'high performers' who received one benchmark unit rate, and the remainder of the sector who received a different (lower) benchmark unit rate. An important methodological difference in Ofwat's approach to the two groups is the selection of the time period.
    - When calculating the unit rate for the high performing companies, Ofwat uses *forecast* data submitted by the companies; for the other group, *historical* data is used. Ofwat does not explain this methodological difference.
    - Further, the underlying historical data exhibits substantial volatility over time, calling into question the credibility of the data comparability for use in a unit cost benchmarking exercise.
- Some outputs used in the unit cost analysis are difficult to measure or rely on companies' own assumptions. In cases where different assumptions have been used to forecast certain outputs, it is more difficult to undertake a like-for-like comparison. Ofwat's model for supply schemes is an example of this:
    - The "unit" that is used to derive the unit cost is the Ml/d of water supply increase to be delivered by each scheme.
    - However, it is not practicable to verify whether the Ml/d increase proposed by all companies is accurate. It is also not clear to what extent Ofwat has scrutinised or verified the consistency of assumptions made on the expected Ml/d increase across schemes.
    - This means that, for companies who appear 'less efficient' than the benchmark, it is not feasible for them to assess whether their (alleged) inefficiency is simply a result of different assumptions being made by other companies on the Ml/d 'benefit' for each scheme.

In many cases, Ofwat recognises that the variation in unit costs around the unit cost benchmark is too wide. To mitigate this, Ofwat carries out additional analysis and implements adjustments. This includes deep dives for outliers, such as in Ofwat's assessment of storm overflow costs, or the use of a different benchmark for a particular sub-group (e.g. leakage unit costs for high performers). Ofwat should instead recognise that this is a symptom of a flawed unit cost approach and develop a better understanding of cost drivers and differences between company activities.

Recommendations

As Ofwat's unit cost models are not robust, the CMA should review the allowances by considering more closely company-specific evidence on cost efficiency. This needs to include detailed consideration of the nature of the activities and companies' unique circumstances. This could either be captured in an improved modelling approach, or alternatives to unit cost modelling.

In future price controls, Ofwat should:

[111] This enhancement line covers costs associated with leakage reductions through activities outside of mains renewal and customer supply pipe leakage, such as leakage control and pressure management.

- Give greater consideration to when unit cost models are the most appropriate choice of cost assessment methodology.
- Plan ahead to ensure that it is able to collect all the necessary cost and cost driver data to undertake robust unit cost modelling.
- Carry out a more thorough consultation process on the specification of its unit cost models.
- Utilise unit cost models which have strong engineering and economic rationale, and
- Generate a set of estimated unit costs for the sector that are backed by engineering rationale, to reduce the need for complex and convoluted adjustments.

3. The deep dives are subjective and arbitrary

Ofwat's approach

Ofwat's deep dive assessment of company costs is carried out against three criteria: the "need" for the investment, whether the investment represents the best option for customers, and cost efficiency. It also considers whether customer protection is required in the form of a PCD. Based on Ofwat's assessment of whether the criteria have been met, or whether "minor concerns", "some concerns" or "significant concerns" remain, Ofwat makes cuts at pre-determined rates to cost submissions (see Figure 26 below).

Ofwat applies its deep dive approach in cases where:

- Ofwat considers that the investment area does not lend itself to statistical modelling; or
- costs are material (greater than 0.5% of the water or wastewater wholesale totex or greater than £10 million) or are flagged as potential outliers in Ofwat's regression on unit cost models.

Figure 26: Ofwat deep dive criteria

Enhancement criteria grouping	Category	Cost adjustment	Justification
Need	Pass	0%	The need for enhancement is clear with sufficient and convincing evidence for enhancement need.
	Partial pass	10%-80%	Need for enhancement is partly demonstrated but concerns remain due to lack of supporting evidence. Apply bespoke adjustment based on sufficiency of evidence and degree of investment overlap.
	Fail	100%	Possible investment need, but investment is covered under base activities or previously funded. enhancements or no clear evidence for enhancement need.
Best option for customers	Pass	0%	Sufficient and convincing optioneering evidence provided to support selection of best option.
	Minor concerns	10%	Limited options considered but with evidence or range of options considered with limited supporting evidence.
	Some concerns	20%	Limited options considered with limited/no supporting evidence.
	Significant concerns	30%	No clear evidence of options considered.
Cost efficiency[63]	Pass	0%	Sufficient and convincing evidence that costs are efficient.
	Minor concerns	10%	Some cost efficiency criteria met with some supporting evidence.
	Some concerns	20%	Several cost efficiency criteria not met with limited/no supporting evidence.
	Significant concerns	30%	No clear evidence of cost efficiency.
Customer Protection	Pass	N/A	Customer protection proposed covering all costs and benefits.
	Some concerns	N/A	Some customer protection provided but does not cover all the benefits/proposed investment.
	Significant Concerns	N/A	No customer protection proposed.

Source: Ofwat, 2024, PR24 draft determinations: expenditure allowances, p. 62

Issues

Ofwat's approach to deep dives is problematic for three reasons.

1. Ofwat's application of the categories of 'concern' is highly subjective. In most cases, Ofwat is not transparent about how it has reached its conclusion and provides only a brief explanation. For example:

- Northumbrian, Essex and Suffolk (NES) had £68m of treatment works resilience expenditure assessed through a deep dive. Ofwat applied a 10% cut to this due to "uncertainties around base maintenance overlap."
- Southern Water requested £1.4m of expenditure for Heat Stress. Ofwat applied a 30% cut to this based on the fact that it had 'significant concerns' that the scheme was the best outcome for customers as Southern did not provide quantifiable cost benefit analysis.

2. Cost adjustments are based on overly simplistic pre-determined assumptions (i.e. the percentage adjustments of 10%/20%/30% seen in the table above for each category of 'concern') with limited read-across to the evidence provided by the companies. While Ofwat may be dissatisfied with the evidence provided by companies, the cuts, at times, appear disproportionate to the degree of criticisms set out in the assessment decision. Ofwat provides no justification for why it has selected reductions of 10%, 20% and 30% for each category of concern, suggesting that these figures have been set arbitrarily.

Furthermore, in the category "best value for customers", Ofwat does not recognise that the best option for customers may require higher costs. Its assessment decisions imply that a better option for customers is always cheaper.

3. Ofwat adds the cost adjustments associated with each of its 'concern' assessments together to calculate the overall cost disallowance (e.g. it applies cuts for cost inefficiency on top of cuts for insufficient justification of need). This can lead to excessive penalties.

For example, following its assessment of Severn Trent's 'PFAS Laboratory' enhancement case, Ofwat applies a 10% efficiency adjustment based on 'minor concerns' regarding the company's evidence of need. It then applies another 10% cut due to 'minor concerns' on cost efficiency. These adjustments are added together, resulting in a 20% efficiency adjustment. It is logical to assume that the first adjustment would have removed some (or all) costs inefficiency. Therefore, the second adjustment should be smaller, or not needed at all. Ofwat's cumulative approach of applying adjustments means that in some cases the penalties may be excessive.

Recommendations

The CMA should revisit Ofwat's 'deep dive' assessments which resulted in significant cost adjustments. It should assess the supporting evidence provided by companies in a more transparent way to determine an efficient allowance.

In the future, Ofwat's 'deep dive' approach should give greater consideration to the case-specific company evidence. Its assessment should be transparent and sufficiently informed by engineering evidence, rather than determined through simplistic application of arbitrary pre-set efficiency adjustments.

4. Ofwat's approach to making corrective adjustments for (what it considers) an overlap between the base and enhancement funding ('base overlap') is poorly justified and lacks transparency

Ofwat's approach

As discussed above, company costs are categorised as 'base costs' and 'enhancement costs'. When Ofwat assesses enhancement cases, it considers whether a proportion of the proposed cost (or its entirety) should be categorised as base costs.

When Ofwat deems there to be an overlap between enhancement and base costs it can:

1. Re-allocate some (or all) of the proposed costs to base before assessing the remainder as enhancement. The re-allocated costs are assessed as part of base expenditure.
2. Remove some of the cost (or all) on the grounds that the activity is already funded by base expenditure. Ofwat refers to this enhancement expenditure cut as a 'base overlap adjustment'. These adjustments result in a range of reductions between 10-100%[112].

In this document **we focus only on the second action above**, that is, cases where Ofwat removes costs where it deems them to have been covered in base costs already. We do not discuss reallocations between base and enhancement.

Ofwat's base overlap adjustments are focused in the areas of resilience and Net Zero. For resilience, Ofwat excludes:

- funding to manage existing risk from all hazards; and
- funding to address the failure of assets managed through maintenance, as it considers these should be managed through base costs.

For Net Zero[113], Ofwat applies a 3-stage test that is different to the deep dive approach for other areas. Stage 1 assesses whether the scheme is related to a core business activity and whether reduction of GHG emissions is a primary driver. Almost all company requests for expenditure fail this test leading to an 80% reduction in cost allowances overall. Ofwat's argument for this reduction is that transitions for low-carbon heating and low-carbon transport are already covered by base expenditure allowances.[114]

Issues

While it is important for Ofwat to ensure customers do not pay twice for the same activity, its approach in this area risks underfunding companies and limiting future improvements to service resilience. This is because Ofwat's decisions lack transparency and evidential rigour.

1. Ofwat failed to provide timely, transparent guidance to companies on what evidence it was seeking to support the enhancement cases. In its methodology documentation, Ofwat defines enhancement expenditure as a permanent increase, or a step change, in the current level of service to a new 'base' level

[112] To be clear, Ofwat applies 'base overlap adjustments' as part of a case-by-case deep-dive assessment; this is not a sector-wide adjustment.
[113] We note that Ofwat also separately applies a sector-wide Net Zero base cost adjustment; the value of the cross-sector adjustments is less than what companies proposed in the Net Zero enhancement cases.
[114] 'Water – Net zero; enhancement expenditure model', *Ofwat, (*February 2025).

and/or the provision to new customers of the current service.[115] However, Ofwat failed to set out clear expectations for how companies should evidence their cases. This lack of guidance has, in some cases, undermined the companies' ability to secure the necessary funding for resilience investment, increasing the risk of customer detriment over time.

Another consequence of the lack of initial guidance is the inconsistency in Ofwat's own decision making, and inability to robustly justify its decisions. For instance, Ofwat disallowed several companies' Net Zero claims for EV schemes on the grounds that "Transport historically funded under base allowance."

Ofwat's decision documents sometimes describe the evidence that the company has provided and then its decision (e.g., *"the company has failed to provide sufficient and compelling evidence*") but it is not possible to determine how the former relates to the latter and where precisely the company's evidence has fallen short. This adds a further layer of opaqueness to Ofwat's assessments, making it difficult for companies to understand the evidential requirements even for lessons learned.

2. Ofwat's treatment of resilience risk is overly simplistic. For enhancement spending on resilience, where Ofwat has excluded funding to manage existing risks, it can be challenging for companies to evidence that a risk is new. For example, Ofwat has disallowed 'heat stress' costs for Southern Water because it "does not provide sufficient and convincing evidence that there is an increasing risk from hazards outside of its control. If required, the company should therefore be undertaking the investment within base expenditure allowances." However, such risks around resilience are rarely binary (and therefore not new or old) but change in their likelihood and consequence over time and are continuously being reassessed. It follows that the appropriate mitigation responses also vary depending on the most recent understanding of the potential consequences, how the quantum of risk is forecast to change over time, and any changing customer acceptability of those consequences. This can mean a risk that can be accepted and monitored in the short-run or mitigated with small operational changes may also legitimately require a large investment in the longer term. By failing to engage with this complexity when setting out the evidential requirements within this context, Ofwat's approach risks underfunding these kinds of investments.

3. Ofwat fails to account for hindsight bias in its decision making. Beyond the complexities of risk management and potential valid arguments for deferring investments, there remains uncertainty in any assessment of resilience risk. Ofwat's base overlap processes are highly likely to be affected by hindsight bias[116] resulting in inefficiently low allowances. The impact of this bias could be mitigated by setting out, in a transparent and timely manner, the evidential requirements for the business plan process.

Recommendations

The CMA should consider detailed company evidence on the scope of the schemes to re-assess the base overlap.

[115] 'Appendix 9 – Setting expenditure allowances', Ofwat, (2023).

[116] Hindsight bias is recognised by behavioural science as an inherent cognitive bias resulting in a tendency to think better decisions could have been made in the past (for instance here on maintenance investment to retain resilience in the face of uncertain exogenous risks), even where it is understood that the evidence available at that time would not have supported that better decision.

The CMA should use a clear, transparent methodology that is based on Ofwat's definitions of base and enhancement expenditure to re-assess potential base overlap in the deep dive assessments.

In future price controls, Ofwat needs to be more transparent in how it has made its decisions around the overlap with base funding – both in terms of its assessment and how this has influenced the reduction in costs it has made. There should aways be a clear line of sight between the evidence Ofwat has reviewed, where it considers that evidence to be lacking, and how this has resulted in the final value of any cost reduction.

Ofwat should set out, in a timely manner, the evidential requirements it expects companies to meet to demonstrate that expenditure does not overlap with base. This additional layer of transparency is needed to manage the inherent complexities of risk management and the presence of hindsight bias. If not addressed, there is a risk that companies would be permanently underfunded for service resilience improvements.

5. Ofwat has reduced some companies' PR24 allowances on the basis that the proposed activity has been funded and should have been undertaken in PR19; these adjustments are unreasonable and set a harmful precedent for the regulatory framework

Ofwat's approach

Ofwat has reduced some companies' PR24 allowances on the basis that the proposed activity has been funded and should have been undertaken in PR19. Examples of expenditure areas affected include water resources management plans, Water Industry National Environment Plan/National Environmental Plan (WINEP/NEP) and growth at sewage treatment works.

Issues

We find these adjustments unreasonable.

1. Companies have overspent against their PR19 allowances. It is therefore counter-intuitive for Ofwat to argue that companies have retained their PR19 allowances as profit which can now be 'clawed back'. For example, Ofwat has made retrospective under-delivery adjustments to the Growth at STW enhancement allowances based on the capacity improvements companies *proposed* in their PR19 business plans - despite never setting any targets in the first place, or ringfencing the funding. As expected under a totex-based regulatory regime, companies had discretion to allocate the funding to achieve the required outcomes in the most efficient and effective way – therefore, Ofwat's penalty is unreasonable, and undermines the efficiency of company decision making.

2. We also disagree with Ofwat's assertion that without the under-delivery adjustment customers would be at risk for paying twice for the same activity. Should under-delivery occur, customers are protected under the outcome delivery incentives (ODIs) mechanism; the penalty associated with under-delivery would be returned to customers.

3. Ofwat's approach is detrimental to the effectiveness and stability of the regulatory framework:
    - The retrospective adjustment creates a perverse incentive to discourage companies from adopting more efficient strategies to achieve required objectives. If Ofwat's approach implies that

any deviation from business plans could lead to retrospective penalties, even when the outcome required has been delivered, companies would be disincentivised to respond to new information which could improve outcomes for customers.

- Revisiting the PR19 settlement ex-post creates regulatory uncertainty. This is likely to worsen investors' perceptions of risk[117] and can increase the cost of capital, which would drive up costs for customers in the long run.
- Retrospective regulation creates a moral hazard problem[118] for the sector, as the regulator is less concerned about making suboptimal decisions on the expectation that it can revisit these decisions ex-post. Ultimately, customers would pay the increased cost as investors seek higher risk premiums to compensate for the increased uncertainty in the regulatory regime.

Recommendations

The CMA should remove the under-delivery adjustments applied to enhancement schemes on the grounds of overlap with PR19 allowances. These include adjustments made to specific schemes within the 'deep dives', and the past under-delivery adjustment which applies to Growth at Sewage Treatment Works. The CMA should consider whether the schemes proposed are necessary and efficient, but it should not make any adjustments based on Ofwat's flawed 'under-delivery' concept.

For future price controls, the CMA should ask Ofwat to:

- Refrain from introducing retrospective changes to agreed price control settlements. If, in the future, Ofwat judges it appropriate to alter the balance between setting outcomes on an *ex ante* basis and assessing outputs on an *ex post* basis, then it should signal this at the methodology stage of a price control and not after the fact.
- Maintain commitment to the targets and expectations it sets for companies at the beginning of price control periods; where this includes discretion over how obligations are delivered, Ofwat should take care not to penalise companies *ex post* for acting on the incentives it has set.

[117] Indeed, the sector has faced an overall downgrade by the credit rating agencies. For example, Moody's noted in November 2024 that, "*Taking account of the above we have changed our assessment of stability and predictability of the regulatory environment for the UK water sector under our rating methodology to A from Aa"* ('Moody's ratings Action', *Moody's,* 2024).

[118] A moral hazard problem occurs when a party takes more risk because they do not bear the full consequences of their actions.

7. Frontier shift

Overview of issues

The frontier shift challenge of 1% per year is too high, and exaggerates the productivity growth opportunities available to companies over the next five years. The CMA should address the errors in Ofwat's approach which have led to an over-estimation of the frontier shift challenge:

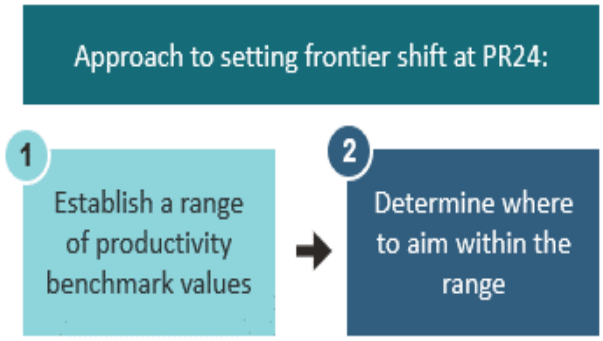
a) Ignoring the structural break in productivity following the 2007-08 global financial crisis;
b) The flawed choice of comparator sectors for the benchmark;
c) Application of regulatory precedent that fails to reflect final regulatory decisions;
d) Double-counting of evidence;
e) Underestimating the significance of the overlap between the frontier shift and outcomes stretch; and
f) The unevidenced assumptions around the impact of monetary tightening and Artificial Intelligence on productivity growth.

Background: Ofwat's approach

It has been standard regulatory practice to apply a 'frontier shift' adjustment to cost allowances as a means of introducing a further efficiency challenge that reflects potential productivity growth opportunities observed in the wider economy. Ofwat applies frontier shift to all wholesale and retail base and enhancement expenditure allowances (except for the costs Ofwat deems 'mostly outside of company control').[119]

Ofwat estimates the frontier shift by following a two-step approach, as illustrated in Figure 27:[120]

Figure 27: Ofwat's two-step approach to setting frontier shift



[119] 'PR24 final determinations: Expenditure allowances', *Ofwat*, (December 2024).
[120] This approach was developed for Ofwat by CEPA, see 'Frontier Shift, Real Price Effects and the energy crisis cost adjustment mechanism', *CEPA,* (2024). For the purposes of this document, we reference this as 'Ofwat's approach' throughout.

Step 1 involves triangulating across a sample of historical productivity growth estimates to set a lower and upper bound for the benchmark productivity range.[121] This sample includes productivity estimates derived from a dataset published by the European Commission ('EU KLEMS') for a selected set of comparator industries and time periods. It also considers regulatory precedent on frontier shift. Step 2 involves weighing up broader evidence of the expected future productivity opportunities to determine which point estimate to select within the range.

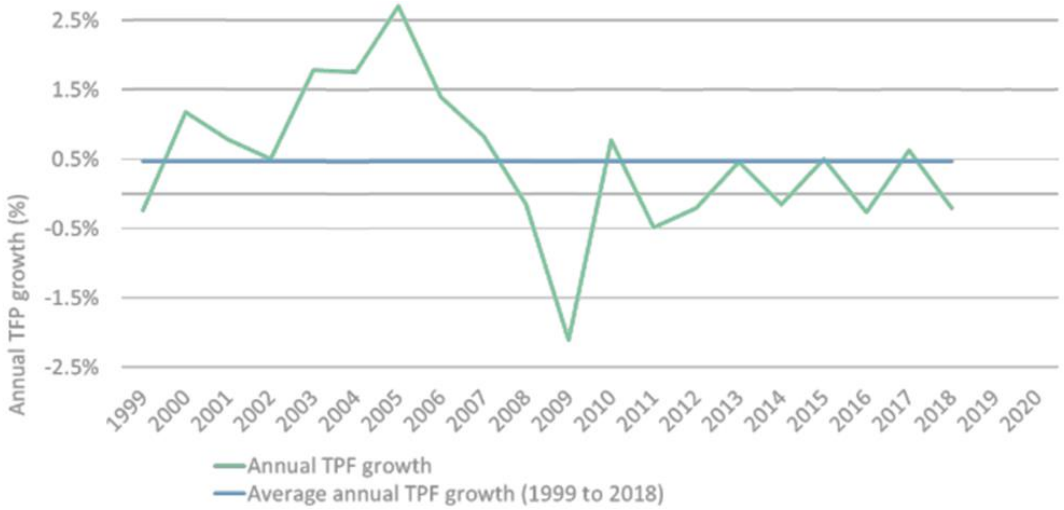
Issues with Ofwat's approach

We have identified six errors in Ofwat's approach which have led to an overestimation of the frontier shift challenge.

1. Ofwat ignores the structural productivity break following the 2007-08 global financial crisis

The PR24 productivity benchmark is set over 1996-2019. Figure 28 below illustrates a clear structural break in productivity post-2009, following the global financial crisis (GFC).[122]

Figure 28: UK total factor productivity growth, before and after the GFC



Source: Adapted from an analysis of EU KLEMs presented in 'Response to Ofwat draft methodology' (Economic Insight)

Ofwat's approach to estimating the productivity benchmark places equal weight on all the data points in the 1996-2019 series. This is incorrect, and more weight should be given to the more recent post-GFC period, given its significant impact on productivity trends across all comparator sectors.

Figure 29 below summarises Ofwat's arguments for maintaining its position at final determinations, and our view on each. Overall, we find that Ofwat's benchmarking approach is unrepresentative of the productivity opportunities in AMP8 and inconsistent with broader trends in productivity in the UK economy.

[121] In this context, triangulation means combining different estimates of the same unobserved parameter value (i.e., the productivity opportunities for water companies in AMP8) in order to reduce the statistical noise within any one estimate from biasing the inferences.

[122] Adapted from an analysis of EU KLEMs presented in 'Response to Ofwat draft methodology' (Economic Insight '[Frontier shift at PR24 - Response to Ofwat draft methodology]').

Figure 29: Ofwat arguments for not placing greater weight on post-GFC period and our views

Ofwat's position	Our view
"It is established good practice to analyse productivity growth over full business cycles"[123] and the most objectively identifiable recent business cycle is 1996-2019.	This is not consistent with HMT's own analysis which noted that, "The previous economic cycle began in the first half of 1997 and ended in the second half of 2006".[124] Furthermore, the significance of the structural break to future productivity trends (as per the evidence above) is a more relevant consideration than a theoretical concept of a business cycle. In any case, the CMA has previously noted that the "analysis of business cycles is not exact science".[125]
"Our approach places a broadly equal emphasis on the periods before and after the Global Financial Crisis, which is appropriate because the UK productivity slowdown should not fully impact on potential productivity growth in the regulated water sector"[126]	This is internally inconsistent: if the water sector is in some way insulated from the wider productivity of the economy, then the pre-GFC period is equally as unrepresentative as the post-GFC period. In any case, the premise itself is flawed since the drivers for productivity growth in the wider economy also apply the water sector.
Recent shocks to economy-wide productivity such as Brexit, the Covid-19 pandemic and energy price crisis have not directly affected the water sector.	This fails to recognise the systemic nature of these shocks and economy-wide impacts. The water industry draws from the common pool of the UK economy's factors of production and is therefore equally affected by the economy-wide trends. Ofwat has elsewhere recognised the link between productivity drivers in the wider economy and the water sector: 'The water sector benefits from R&D carried out by other sectors when it purchases inputs (through embodied technical shift), and hence it is not just the R&D carried out by water companies that is relevant when setting frontier shift'.[127]

2. The selection of comparator industries to establish the benchmark is flawed

Small changes in the selection of sectors for the 'comparator sets' can have a significant impacts on the benchmark. This is because productivity varies considerably across sectors. At PR19, Ofwat used a broad set of comparators to prevent any single data point disproportionately affecting the average.

At PR24, Ofwat used two comparator sets to estimate a productivity range:

[123] 'PR24 Final Determinations – Frontier Shift Final Report', *CEPA*, (2024), p.20.
[124] 'Autumn performance report 2008', *HMT*, (2008), p. 13.
[125] 'Energy License Modification Appeal Final Determinations Vol 2B', *CMA*, (2021), para 7.104.
[126] 'PR24 Final Determinations – Frontier Shift Final Report', *CEPA*, (2024), p.8.
[127] 'PR24 final determinations: Expenditure allowances', *Ofwat*, (2025), p.266.

- Set 1: same as at PR19, with an average productivity estimate of 0.6%; and
- Set 2: '4 highest performing industries', with an average productivity estimate of 1.7%.

The second set increases the upper bound of the productivity range significantly. However, the choice of the second comparator set is flawed. In particular, it is too narrow to be considered representative of wider productivity trends. It is also skewed by a single sector, 'chemicals and chemical products', which has an average productivity value of 2.5% (compared with 1% for the other 3 industries in this group).

Ofwat argues that the additional comparator set is needed to determine the upper bound. This is a misunderstanding of the purposes of triangulation[128], which is to reduce the 'noise' in the data. It is this noise which drives the distribution of values and therefore the upper bound. Amending the data collection process (e.g., by changing the comparator group) to derive a different upper bound is not a valid statistical approach.

3. The application of regulatory precedent should final regulatory decisions

Ofwat has included previous frontier shift decisions from regulatory precedent in the sample of values it uses to derive its range. Whilst we do not agree that weight should be placed on decisions from different contexts (i.e. different sectors and time periods, which risk under or over funding water companies), we note that if this is to be done it should at least be based on final regulatory decisions. We note that the upper bound of 1.2% taken from RIIO-2 includes a 0.2% 'innovation uplift' which was subsequently removed by the CMA in company appeals (but ignored by Ofwat).

4. Double-counting of evidence

In determining where to aim within the benchmark range of productivity estimates, Ofwat has sought to 'correct' for the factors which it considered were not captured in the range itself, but which would affect productivity opportunities for water companies. These are: (a) the presence of an innovation fund in the water sector; and (b) 'learning-by-doing' opportunities from enhancement investment.

This correction is unnecessary, as both effects are already captured within the comparator sets:

- At the RIIO-2 appeals, the CMA determined that the impacts of innovation funding in the energy sector should already be reflected in the comparator groups. This argument applies equally to the water sector; and
- Learning-by-doing is a core driver of overall productivity growth, which is captured in the total factor productivity estimates. There is no reason to expect water companies to benefit from this driver over and above other sectors.

5. The significance of the overlap between the frontier shift and outcomes stretch is under-estimated or id

Ofwat concluded that "*While there could be a theoretical overlap between outcomes stretch and frontier shift in the water sector, this overlap is likely minimal."*[129] We disagree. Figure 30 below provides Ofwat's reasoning and our view.

[128] Model triangulation is the process of using multiple models, methods, or data sources to analyze the same problem. This helps improve accuracy, reduce bias, and increase confidence in the results by comparing different perspectives.

[129] '[PR24 final determinations: Expenditure allowances]', *Ofwat*, (December 2024), p.280.

Figure 30: Interaction between frontier shift and outcomes stretch: Ofwat's position and our views

Ofwat's position	Our view
Only a subset of water companies' total performance commitments relate to 'factory gate specification of a product' and those are to do with 'the specification of the service delivered to end-customers'.	Outcome stretch across any performance commitment (including environmental and asset health performance commitments) represents an increase in the intrinsic quality of the service. These improvements can take place at the point of supply (e.g. drinking water quality) or as better environmental outcomes (e.g. pollution incidents) and asset health outcomes (e.g. rates of leakage). The latter category are not 'standards achieved in the production process', but are nevertheless valued by customers, as evidenced by Ofwat's own research when selecting performance commitment definitions for PR24.
Productivity estimates from EU KLEMS underestimate quality improvement over time: the data reflects quality adjustments for a 'limited number of item-specification changes month-to-month […] these changes tend to happen more often in certain industries, such as computing'. Therefore, the data doesn't support the concept of an overlap between outcomes stretch and frontier shift.	We are unable to verify Europe Economics' claims about the EU KLEMS data as they appear to have been revealed from undisclosed discussions with the ONS, rather than substantiated with reference to any available evidence. We note, however, that the comparator set at PR24 includes industries for which quality change over time is likely to be important for overall growth accounting (as it is for computing).

The fundamental point is that both instruments – frontier shift and outcomes stretch – have the effect of putting downward pressure on quality-adjusted unit costs. The implications of this for calibrating the package are presented compellingly by Ofwat's own advisors: *"frontier shift is just one part of the complete price control package, so we continue to recommend that Ofwat considers the level of ambition on cost efficiency and service quality that is implied by the Final Determinations 'in the round' to ensure that frontier shift challenge is part of a stretching but achievable package'"*.[130]

[130] 'PR24 Final Determinations', *CEPA*, (December 2024), p.34.

6. The assumptions around the impact of broader trends on productivity are unevidenced

Ofwat assumes that economy-wide productivity growth will accelerate over AMP8[131]: this is contrary to the evidence of a post-GFC productivity slowdown presented by its own advisors.[132]

Ofwat bases its assumption on the following:

- monetary tightening forcing the exit of the most inefficient firms and freeing up inputs for more productive use; and
- wider use of artificial intelligence.

While the theory behind Ofwat's assumptions is reasonable, Ofwat presents no evidence to support the quantitative impact these two factors may have on productivity growth, or even the likelihood of it materialising in AMP8.

Monetary tightening

Ofwat cites a body of literature supporting a correlation between long-run interest rates and national productivity. It then concludes that interest rate rises over 2022 and 2023 will force the exit of unproductive firms in the near term and that this will increase the productivity of remaining firms (and water companies) over AMP8.

This inference is flawed. Drawing conclusions about short-run economic outcomes from a long-run equilibrium framework is misleading. For high and non-transitory interest rates to deliver wider productivity benefits, a sequence of events must first occur which are highly unlikely to happen in AMP8. See Figure 31 below. It is highly unlikely that the long-run effects of this process will materialise in the next five years, even if the conditions were in place today.

Artificial Intelligence (AI)

Ofwat expects AI *"to increase productivity growth in the water sector as well, with various AI applications already being explored by water companies"*.

This is unacceptably speculative for setting frontier shift for the next five years. The industry's view is that *"the technological readiness level of AI applications to the water and wastewater sectors is not yet at the point of scalable systems proven in the operational environment"*.[133]

Figure 31: Sequence of necessary events for monetary tightening to increase productivity in AMP8

Stage	Sequence of necessary events:	Reasons why this is highly unlikely in AMP8:
1.	High interest rates need to push unproductive firms' debt interest costs	Interest rates have begun to decline again since they were raised in 2022/23 and their long-run

[131] Ofwat's position relies on arguments developed by Europe Economics. See 'Frontier Shift and Outcome Stretch at PR24', *Europe Economics,* (2023). For the purposes of this document, we refer to this as 'Ofwat's approach'.
[132] CEPA's own productivity analysis of EU KLEMS shows that average productivity of the PR24 comparator set is 2.5% pre-GFC and 1.5% post-GFC (based on TFP VA) and 1.7% pre-GFC and 0.5% post-GFC. See 'Frontier Shift, Real Price Effects and the energy crisis cost adjustment mechanism', *CEPA,* (2024).
[133] 'SVE4.38 Frontier Shift: Draft Determination representations', *Severn Trent*, (2024).

Stage	Sequence of necessary events:	Reasons why this is highly unlikely in AMP8:
	above their profits for long enough (in expectation) for those firms to decide to exit market rather than deploy reserves or undertake capital restructuring.	average (which is relevant for firm's expectations) is far from clear and, therefore, so is any decision to exit.
2.	The resources employed by these exiting firms (e.g. capital, labour) must find their way to more productive firms.	The ability for productive firms to acquire newly released resources will also be slowed down because the cost of their embedded and new borrowing will also be higher.
3.	The firms in receipt of these additional resources must re-optimise the levels of each of their factors of production to accommodate a change in one or more of these levels at Stage 2 (Stage 3).	Whilst firms recalibrate their factors of production (e.g. increase/reshape workforce to accommodate new capital assets) they may actually become less productive as the value of their asset stock increases relative to their output.

Recommendations

We do not seek to specify a frontier shift value, however, we do find that corrections to Ofwat's methodology lead to a frontier shift strictly below 1%. The CMA should re-estimate the frontier shift with the following considerations in mind:

- Appropriate weighting of the post-GFC period;
- The PR19 comparator group should be retained (i.e. without the '4 highest performing industries' group); and
- Accurate application of regulatory precedent.

In determining where to 'aim' within the benchmark range, the CMA should:

- Remove double counting of innovation fund and learning-by-doing evidence;
- Recognise, and account for, the overlap between frontier shift and outcomes stretch;
- Discount unsubstantiated hypotheses about future impacts of AI or monetary policy; and
- Cross-check the estimates with broader trends in productivity in the UK economy.

For future price controls, the CMA should recommend that Ofwat refines its approach to estimating frontier shift in line with the points raised above.