April 2025

HISTORICAL UNDERINVESTMENT AND THE REGULATORY FRAMEWORK

Report for Southern Water

Economic Insight Ltd

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1

INTRODUCTION AND EXECUTIVE SUMMARY

INTRODUCTION

In the water industry, it is well-established that companies have suffered from underinvestment historically. Furthermore, increasing infrastructure investment in the UK is also a key part of the Government's 'number one mission' to: deliver economic growth and address the UK's prolonged period of low productivity growth in recent decades.

Against this backdrop, the Government has launched what is expected to be the largest review of the water industry since privatisation. Specifically, the Cunliffe Review will consider whether the existing economic regulatory framework can support the long-term investment needed in the industry.

Therefore, the key questions for the Review to consider as part of its assessment include: (i) why does underinvestment occur in the water industry?; and (ii) how can it be corrected?

This report considers how underinvestment arises under the existing regulatory framework, to address the first question. The answer to the second question is, ultimately, for the Cunliffe Review to determine. However, we touch on the second question based on the lessons emerging from our assessment and our experience in the water industry.

OUR FINDINGS

We find that the regulatory framework in the water industry contributes to historical underinvestment, rather than addressing the issue. This is because: (i) there has not been sufficient focus on asset health and it is easy for long-term investment to be deferred without immediate consequences; (ii) the characteristics of the water industry make it challenging for Ofwat to identify the efficient level of investment using a 'yardstick' model; and (iii) the existing regulatory framework is overly punitive, and may prevent companies from independently addressing historical underinvestment.

CONTEXT

The UK has suffered from low levels of investment across the wider economy for over three decades.

Figure 1 illustrates that investment (as a proportion of output) in the UK has lagged significantly relative to its peers in the OECD and G7.[1] Within the UK, investment in the water industry has, however, trended downwards even more sharply than that of industries in the wider UK.

Figure 2 shows that that investment in the water industry has fallen as a share of output over the last two decades by around 30%. This has occurred at the same time as the demands on the water industry since privatisation have increased. The House of Lords note that the *"[l]evels of investment have not risen to match these demands. The result is a network unable to cope, and which relies on releasing polluted water into the environment."*[2] Overall, this suggests there has been significant underinvestment in the water industry, particularly when compared to overall UK investment levels which have remained relatively stable (albeit with levels below its peers).

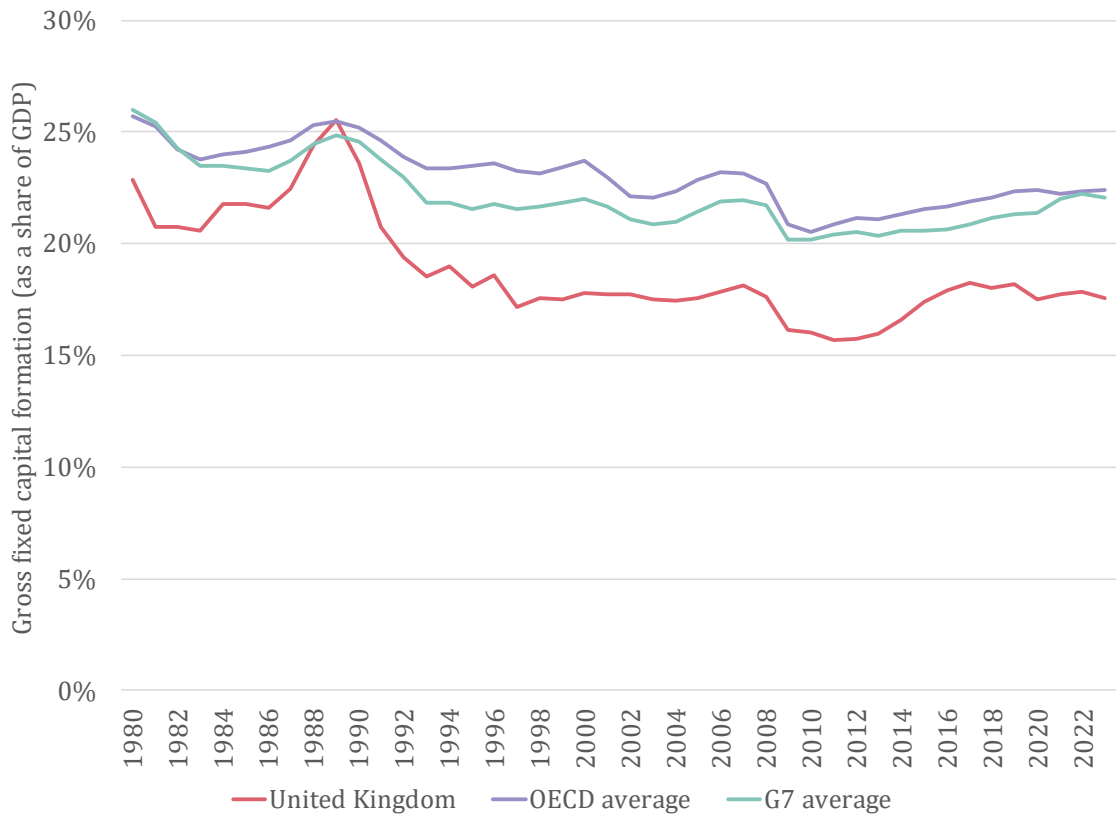
Investment decisions in the water industry are ultimately influenced by Ofwat. At each price control, Ofwat determines the expenditure allowances for water companies to deliver water and sewerage services to its customers. Over subsequent price controls, this in turn determines what water companies have at their disposal to make critical infrastructure investments, such as maintaining or replacing their assets (such as water pipes or reservoirs).

Ofwat's current regulatory framework relies on a 'yardstick' model to determine the funding levels (and therefore the potential investment) in the water industry. Since PR14, Ofwat has used econometric benchmarking to define the efficiency 'yardstick' to set these allowances. That is, Ofwat identifies and uses a notionally efficient company and benchmarks company performance across the industry against it. However, as we discuss in the following sections, there are practical challenges in using this 'yardstick' model to identify the efficient allowances to ensure sufficient investment in long-term assets.

[1] *Gross Fixed Capital Formation is a common measure of investment and GDP (Gross Domestic Product) is a common measure of output.*

[2] *'The affluent and the effluent: cleaning up failures in water and sewage regulation.' House of Lords (2023) Industry and Regulators Committee, page 4.*

Figure 1: Gross Fixed Capital Formation (as a share of GDP) over time



Source: Economic Insight analysis of World Bank data.

Figure 2: Index of investment to output ratio in the UK water industry vs. all other UK industries

Source: Economic Insight analysis of ONS and World Bank data.

Note: Investment to output ratio is defined as the ratio of Gross Fixed Capital Formation (GFCF) to Gross Domestic Product (GDP) for the UK and GFCF to Gross Value Added (GVA) for the water industry.

EXECUTIVE SUMMARY

1 Ofwat uses a 'yardstick' model to ensure consumers pay efficient costs.

Water companies are natural monopolies. That is, within each geographic area it is only economically efficient for a single water company to deliver services, because of the large infrastructure required to operate. As a result, water companies, left to their own devices, do not face a profit motive to compete on the price and / or quality of their services.

Economic regulation is therefore required to ensure that water companies face the incentives to deliver the outcomes one would expect in a competitive market (consumer prices, service quality and investment levels). However, economic regulation does not provide an automatic mechanism which reveals what companies should deliver in terms of efficient costs /prices, quality of services, or levels of investment which companies should deliver.

Therefore, regulators such as Ofwat use a 'yardstick' model to determine an efficient level of outcomes (i.e. service-levels and investment and, therefore, costs). Since PR14, Ofwat's has used an econometric benchmarking approach to assess the efficient costs of delivery in the industry. Simply put, this involves:

(a) Comparing water companies' costs against each other based on their characteristics such as scale, complexity and population density (which are referred to as 'cost drivers').

(b) Setting an industry 'benchmark' which effectively represents the notionally efficient water company in terms of cost efficiency.

(c) Setting each company's 'efficient' costs by applying the benchmark cost efficiency.

There are, however, many limitations with relying on a yardstick model to determine companies' efficient costs in practice. We detail these in the following sections.

2 The characteristics of the water industry make applying a yardstick model challenging in practice.

The water industry has several characteristics which make applying a yardstick model challenging: (i) the presence of joint and common costs; (ii) companies having a high degree of fixed costs; and (iii) water infrastructure having long-lived assets.

First, water companies have joint and common costs, which means it is hard to identify (and attribute) the costs of any specific activity. This makes applying the yardstick model to

identify efficient costs for a specific activity highly susceptible to measurement error. This is because of potential data issues, such as companies allocating costs differently, which can make cost comparisons across companies challenging, which consequently may lead to a skewed 'yardstick'.

For example, since PR19 Ofwat has considered base and enhancement expenditure separately, but we note there is no clear distinction between the two. Whilst Ofwat has definitions for base and enhancement, Ofwat itself has recognised the difficulties in identifying "what base buys".[3] Therefore, if the scope of activities and costs change over time (as is frequently observed[4]) or if different companies think of them differently, the underlying data on which the yardstick model is based can be fraught with issues. We note that Ofwat has made efforts to align cost categories across the sector, however, this is inherently challenging.

Second, infrastructure in the water industry is characterised by a high degree of fixed costs. As water companies vary greatly in scale (e.g., in terms of the number of households they serve) this can mean there is a large degree of variation in company unit costs. Whilst scale is generally controlled for within Ofwat's cost models, its models are designed to explain cost variations for the 'average' company, and therefore any non-linearity in the relationship between size and costs may not be fully captured. This means, if there are very small / large water companies which have unique characteristics, these may not be accounted for when assessing their efficient costs.[5]

Third, infrastructure is characterised by long asset lives. This has two key implications:

(i) In any given period, it is difficult to tell how much investment is needed to maintain and improve assets. For example, companies (and the regulator) could delay investment for a year, a price control or even longer without any immediate consequences. We note that fundamentally, neither companies nor the regulator can have 'perfect information' on what the economically efficient level of investment ought to be within a price control period. However, the consequences of not investing in the long-term can be extreme and very costly e.g., in instances of asset failure.

(ii) There are asset life cycles and companies may be in an asset maintenance 'peak' or 'trough' at separate times. This is problematic for setting the efficient yardstick. Specifically, there is a risk that companies in their 'peak' may be being compared to those in their 'trough'. For example, the regulator could over-estimate the cost efficiency of the notionally efficient company, if it is set on the basis of companies in an asset maintenance trough.[6]

[3] 'Roadmap for enhancing asset health understanding in the water sector.' Ofwat (2024), page 9.

[4] For example, at PR24 Ofwat has removed expenditure for Growth at Sewage Treatment Works from base costs and now considers it as part of enhancement expenditure.

[5] We note that Ofwat's off-model adjustments, e.g. through cost adjustment claims (CACs), do not fully address this issue because Ofwat has taken an increasingly tough stance on accepting any cost adjustment claims.

[6] We note that if the data covers the full length of companies' asset cycles (including both its 'peak' and 'trough' stages) any differences which arise due to being in different stages of the asset cycle would average out. However, Ofwat's base model data set covers 12 years (i.e. 2011-12 to 2023-24), while the catch-up efficiency is based on the last 5 years.

3 There are multiple indicators that the yardstick model is not working well in the water industry and, once this happens, it can become a repeating cycle.

The use of a yardstick regulatory model in a sector such as the water industry is particularly challenging due to the characteristics described above. In practice, the industry-wide underperformance across the range of cost and outcome measures suggests that the current regulatory framework is not functioning as intended (i.e. the underperformance is not limited to a handful of companies and, therefore, cannot solely be attributed to company-specific inefficiency).

This suggests that the current regulatory framework is at risk of providing companies with insufficient allowances to deliver the efficient levels of output / investment they need in the longer-term. This is for the following reasons:

(i) it is hard to identify the efficient level of asset health activity (such as the maintenance of existing assets) in any given price control period;

(ii) it is difficult to determine the 'true' efficient level of costs needed to deliver the assumed level of asset health activity; and

(iii) if regulators incorrectly set insufficient allowances, companies can delay any asset health expenditure, without any immediate impact – at least in the short-term. This is possible because of the long-lived nature of assets as previously described.

Ultimately, regulation is a 'repeated game' which is designed to allow companies reveal information (such as what the efficient level of asset health activity, and associated costs are) and the regulator can recalibrate (by adjusting actual allowances accordingly).

If the process of learning and recalibration works well, any issues which arise in the yardstick model in any given period can be 'reversed'. For example, any underinvestment in asset health, could be addressed in the following price control period. However, this process may fail if the following are true:

(a) companies are unable to reveal information regarding e.g., the optimal level of asset health activity (and the efficient costs associated with it);

(b) the regulator does not take information provided by companies into consideration when setting its initial approach (or does so incorrectly); or

(c) the regulator does not use the information revealed by companies to recalibrate its initial approach.

If this happens, following from (iii) a company may become stuck in a 'doom loop' whereby:

(iv) the regulator considers companies which have deferred investments or made 'cuts' to be 'low cost' and therefore cost efficient, resulting in a flawed cost efficiency benchmark;

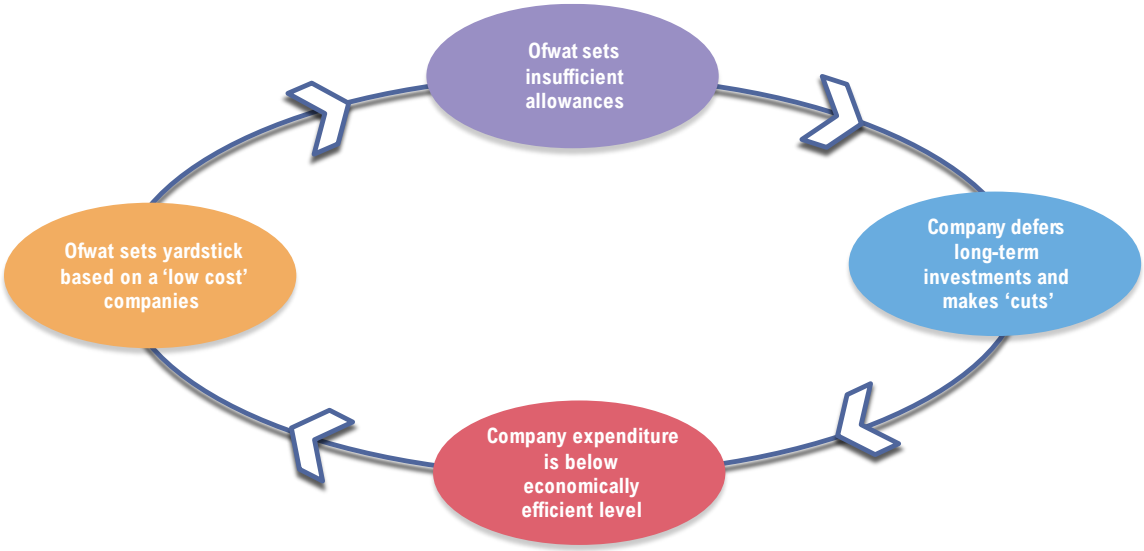
(v) on the basis of a flawed benchmark, the regulator erroneously sets (insufficient) cost allowances for companies;

(vi) companies which do not have enough financial headroom cannot overspend their allowances; and

(vii) companies are, again, forced to make a cut to asset health activity and the cycle above repeats.

Over subsequent periods, the impact of this will only manifest once a company's asset health is sufficiently severe. Once a company is in this position, it may be 'stuck' in a repeating cycle (sometimes referred to as a 'doom loop') whereby their asset health 'deficit' continues to grow, whilst the regulator provides them with fewer costs over time. A simplified 'doom' loop is shown graphically in **Figure 3** below.

Figure 3: A simplified 'doom loop'



Source: Economic Insight analysis.

4 **The regulatory framework appears to be creating challenges for investment.**

Challenge 1: There is insufficient focus on asset health in the current regulatory framework

We do not consider Ofwat has focused on ensuring that there has been sufficient investment in asset health historically. This is evident in the following:

- **There is wide recognition, including by Ofwat, regarding the gaps in asset health information.** For instance, the National Infrastructure Commission (NIC) assessed water company asset management and found that currently "*There does not appear to be a comprehensive and consistent understanding of asset condition across the sector and how this may change in the future. A more complete view of asset health in the sector would support a multi-AMP view of the investment required to maintain asset health and, consequently, service performance and reliability.*" [7]

- **Ofwat's approach to assessing asset health in the water industry is lacking and may not fully capture long-term risks.** In addition to data issues set out above, Ofwat's general approach: (a) does not use forward-looking metrics of asset health; and (b) does not represent a holistic assessment of asset health. For example, in the case of water mains, Ofwat uses just a single backward-looking metric (mains repairs) to assess asset health. We note that other regulated industries such as energy networks use a more holistic measure, such as Network Asset Risk Metrics (NARMs) to measure the risk / value of a network's assets.

- **Ofwat's conflates 'low cost' companies with 'cost efficient' companies.** As a result, companies that defer or deprioritise its asset maintenance could appear to be more efficient, in the short-term. In the long-term, this underinvestment is detrimental as it creates longer-term risks, such as asset failure. Indeed, we observe water companies which are relatively cost efficient but perform relatively poorly in terms of their asset health performance metrics (as defined by Ofwat).

Challenge 2: Ofwat's approach to cost modelling does not focus on identifying the 'true' efficient costs

We do not consider Ofwat's approach to cost modelling focuses on identifying the efficient costs of the notional water company. This is for the following reasons.

- **There are conceptual issues with Ofwat's econometric benchmarking approach.** Specifically, there are three key problems with Ofwat's approach: (i) Ofwat's top-down benchmarking models focus on minimising costs, instead of identifying efficient costs; (ii) Ofwat's models entirely rely on historical expenditure which, by design, 'bakes-in' any historical underinvestment; and (iii) Ofwat primarily focuses on econometric benchmarking and does not place sufficient weight on other alternatives, e.g. bottom-up engineering evidence, as a cross-check, despite inherent limitations of identifying efficient costs.

- **Ofwat's increasing scope of activities which it expects to be delivered out of base costs.** As Ofwat's costs models rely on historical data to estimate efficient costs, the efficient costs will relate to the outputs / service-levels which have been delivered historically. That is, historical expenditure will naturally exclude any 'new' expenditure for activities which Ofwat expects to be delivered such as meeting newly introduced environmental standards. Furthermore, at PR24 Ofwat has introduced price control deliverables (PCDs) which set specific expectations on what water companies are expected to deliver out of their base costs, and therefore limit companies' flexibility to use allowances efficiently.

- **Ofwat has consistently over-estimated ongoing efficiency / frontier shift in the water industry.** Ofwat's frontier shift target represents the assumed rate at which the water industry improves its productivity. The target is used to make downward adjustments to companies' efficient level of costs, on the basis that companies can make cost savings through productivity gains (reducing the volume of inputs required to produce a given volume of outputs). Over the

[7] *'Letter to Ofwat on asset management.' National Infrastructure Commission (2023).*

last two price controls, Ofwat has made assumptions on ongoing efficiency / frontier shift which far exceeds estimates of the outturn productivity in the UK water industry.

Challenge 3: Ofwat's regulatory framework encourages short-termism

We consider that Ofwat has tended toward taking a short-term view within its own regulatory decisions. This is for the following reasons.

- **Ofwat has prioritised keeping bills low.** There is a general consensus amongst industry stakeholders that Ofwat has prioritised keeping consumers bills down. For example, the House of Lords noted: *"Ofwat has failed to ensure companies invest sufficiently in water infrastructure, instead choosing to keep bills low at the expense of investment."*[8]

- **The UK water industry may be asset sweating.** A study by the National Institute of Economic and Social Research found that asset lives in the UK water collection, treatment and supply industry is around 80 years, which far exceeds the asset lives in other countries. In theory, this could be the result of advanced asset management techniques in the UK. However, in the absence of any evidence of such techniques, this appears to suggest companies are making assets last longer than their design lives.

Furthermore, Ofwat has also encouraged companies to take a shorter-term view as part of its regulatory framework. For example:

- **Companies respond to the regulation they are set.** The regulatory framework designed by Ofwat creates incentives for companies to engage in short-term activities. For example, within the price control period Ofwat will set targets, financial penalties / rewards, as well as reputational incentives. For example, where Ofwat sets overly ambitious targets, companies may prioritise these to minimise the financial penalties from underperformance. This could have a detrimental impact on long-term asset health if companies deprioritise long-term investments to deliver on short-term targets.

- **Companies are not encouraged to reveal accurate information.** At PR24, Ofwat's quality and ambition assessment (QAA) framework creates rewards and penalties which are based on the extent to which companies align with Ofwat's own view of specific assumptions, such as the allowed return on capital and ODI rates.[9] The QAA therefore incentivises companies to agree with Ofwat's position, and potentially commit to levels of service in the short-term which come at the expense of longer-term expenditure on e.g., asset maintenance.

Ofwat's regulatory framework may be contributing (and exacerbating) the underinvestment problem.

Ofwat's regulatory framework risks incorrectly attributing company underperformance to company inefficiency.

[8] *'The affluent and the effluent: cleaning up failures in water and sewage regulation.' House of Lords (2023) Industry and Regulators Committee, page 4.*

[9] *'Appendix 12 - Quality and ambition incentive.' Ofwat (2022), page 7.*

The three issues outlined above can result in a company finding itself in a 'doom loop' and reaching a critical state of poor asset health. Once a company finds itself in such as situation, to assess such underperformance fairly, a balanced regulator should begin by considering the following questions:

- How did the underperforming company end up in its position?
- What is the solution which is in the long-term interest of customers?
- Who should be responsible for implementing the solution?

In its existing framework, Ofwat's default position is to attribute any underperformance by companies to their deviation from what it considers to be the notionally efficient company. That is, Ofwat takes an overly punitive approach and assigns responsibility to the company and its shareholders to 'fix' any problems. However, there are efficient reasons to suggest that Ofwat's position may be flawed. That is, a companies' underperformance could be due to regulatory system failure. For example:

- **First**, (principally) if regulation works properly, companies should have the right incentives to invest in their assets. Therefore, if we find that they are not (which seems to be the case, as we set out above), a balanced regulator must consider the possibility that the regulatory framework may not be not working well.
- **Second**, given the difficulty in identifying the 'true' efficient level of costs (as detailed above), it is unbalanced for the regulator to conclude any deviation is due to company inefficiency. As previously set out, the characteristics of the water industry mean Ofwat is susceptible to 'getting things wrong' with its yardstick model.
- **Third**, there is evidence of industry-wide underperformance which suggests it may be driven by regulatory failure, rather than company-specific inefficiency. For example, at PR19, companies across the entire sector have been consistently overspending but underperforming.

Regulatory interventions are required to address historical underinvestment and prevent future underinvestment.

As set out above, Ofwat's regulatory framework can fail to ensure companies are able to deliver the long-term investments required. To ensure companies can make the necessary investments (and deliver a resilient service for their customers) going forward, the regulator needs to consider: (i) how to mitigate the risks of underinvestment arising in the future; and (ii) how to address historical underinvestment that has already happened.

Mitigating future underinvestment in the water industry

Below we set out the key implications for regulator to consider to mitigate / prevent the issue of underfunding and underinvestment arising within its regulatory framework. This includes the following.

- **The notionally efficient firm needs to be defined carefully to ensure a yardstick can be set appropriately** (i.e., that it is not falsely conflate a company which is low cost as cost efficient). This may require a more a holistic approach across the price control which goes beyond a single measure of cost efficiency e.g., one which takes asset health into account (as well as wider service quality metrics).

- **The regulatory framework needs to consider that the impacts of some regulatory decisions cannot currently be observed in the short-term** (i.e. the five-year price control period). This points to the need to address how best to determine, fund, and incentivise the right overall amount of capital maintenance within base cost allowances, in a way that preserves companies' flexibility to balance where and how they invest their asset maintenance efforts and resources, in the best interests of their customers.

- **The challenges in applying a yardstick model implies that a wider set of evidence, i.e. beyond the backward-looking econometric benchmarking, would be appropriate.** This is in order to break the link between artificially depressed historical expenditure data and future base cost allowances, which results in a persistence of underfunding that means companies cannot invest sufficiently to maintain good asset health going forward. This will prevent any historical underfunding reoccurring (noting that, as above, any such underfunding that has already occurred may itself require a correction).

Addressing historical underinvestment

In addition to the above, the regulator will need to consider how to address the historical underfunding that has already occurred (and the underinvestment it has created). That is, how best companies, which have been caught in the 'doom loop' (or are close to) can be supported to deliver for their customers in the long-term.

Ultimately, the historical underfunding of companies is a long-term issue which will require a long-term solution, as noted by the House of Lords:

> *"Putting right the problems in the infrastructure of the water and sewerage systems after decades of under-investment is urgent but it must be understood that this is going to take a decade or more. It is also going to require more effective coordination and proactivity on the part of the Government, regulators and water companies."*[10]

Whilst the details of 'how' the regulator can ensure historical underfunding can be addressed is beyond the scope of this report, we set out some initial considerations below.

- **Fixing historical underfunding requires more than just additional funding.** To address the root causes (and consequences) of any historical underinvestment, companies may for example, require: (i) the resource to develop a focused and long-term transition plan; (ii) sufficient time to implement it; and (iii) (possibly) a revised regulatory framework that allows them to focus on

[10] *'The affluent and the effluent: cleaning up failures in water and sewage regulation.' House of Lords (2023) Industry and Regulators Committee, page 4.*

delivering the transition plan (instead of, for instance, delivering small continuous improvements in performance).

- **Interventions should be consistent with the notionally efficient company over the long-term.** It is imperative that any interventions enable companies to make decisions consistent with the notionally efficient firm in the long-term, and that it does not directly (or indirectly) create incentives for companies e.g., meet short-term performance targets (such as year-on-year increases in performance) to signal a 'turnaround'. This may include ensuring short-term pain to deliver longer-term efficiency is properly incentivised.

- **It will be necessary to attract investors to support underfunded companies.** The regulator will need to consider how to create an environment which attracts investment in companies which are likely only to provide returns over the longer-term. This may include providing guarantees to investors on potential returns. In order to retain investors, it will be important for the regulator to credibly signal stability of the regulatory framework going forward. For example, the regulator could set predictable timelines for any reviews of regulatory changes.

REPORT STRUCTURE

The remainder of this report is structured as follows:

- **Chapter 2** sets out the wider investment trends in the UK compared to the water industry and provides context for the historical underinvestment in the sector.
- **Chapter 3** sets out the existing regulatory framework (a 'yardstick' model) used to determine the allowances (and therefore the investments) in the water industry.
- **Chapter 4** sets out the characteristics of the water industry which make the application of a yardstick regulatory model challenging in practice.
- **Chapter 5** sets out evidence of multiple indicators which suggest that the existing regulatory framework is not 'working'.
- **Chapter 6** sets out the challenges posed by the existing regulatory framework for investment.
- **Chapter 7** examines why Ofwat's regulatory framework may prevent companies from independently addressing historical underinvestment and sets out the key considerations for how underinvestment can be mitigated from arising in future, and how to support companies who have suffered from historical underinvestment.

2

INVESTMENT IN THE UK AND THE WATER INDUSTRY

We find that: (i) wider UK investment has lagged relative to its peers over the last three decades; and (ii) within the UK, investment in the water industry has trended downwards even more sharply.

2A Chapter structure

In this chapter, we set out the context for the historical underinvestment in the sector, by considering the wider investment trends in the UK and the water industry.

The structure of this chapter is as follows:

- **First**, we compare how investment in the UK has changed over time relative to its peers in the OECD and G7.
- **Second**, we compare the investment trends in the water industry relative to the wider UK industries.

2B Comparison of UK investment trends relative to its peers

The UK has suffered from low levels of investment across the wider economy for over three decades. Indeed, the UK Government and its bodies have cited low investment as the cause for the UK's slow growth over the same period.

- The UK Government states:

  "Low levels of public and private investment have led to low productivity and low growth. Our GDP-per-hour-worked has grown by only 0.6% since 2010, while in France, Germany and the US it has grown by around 1% a year.

  The UK lags behind every other G7 country when it comes to business investment as a share of our economy. That means the UK has fallen behind in the race for new jobs, new industries, and new technology."[11]

- The National Infrastructure Commission states:

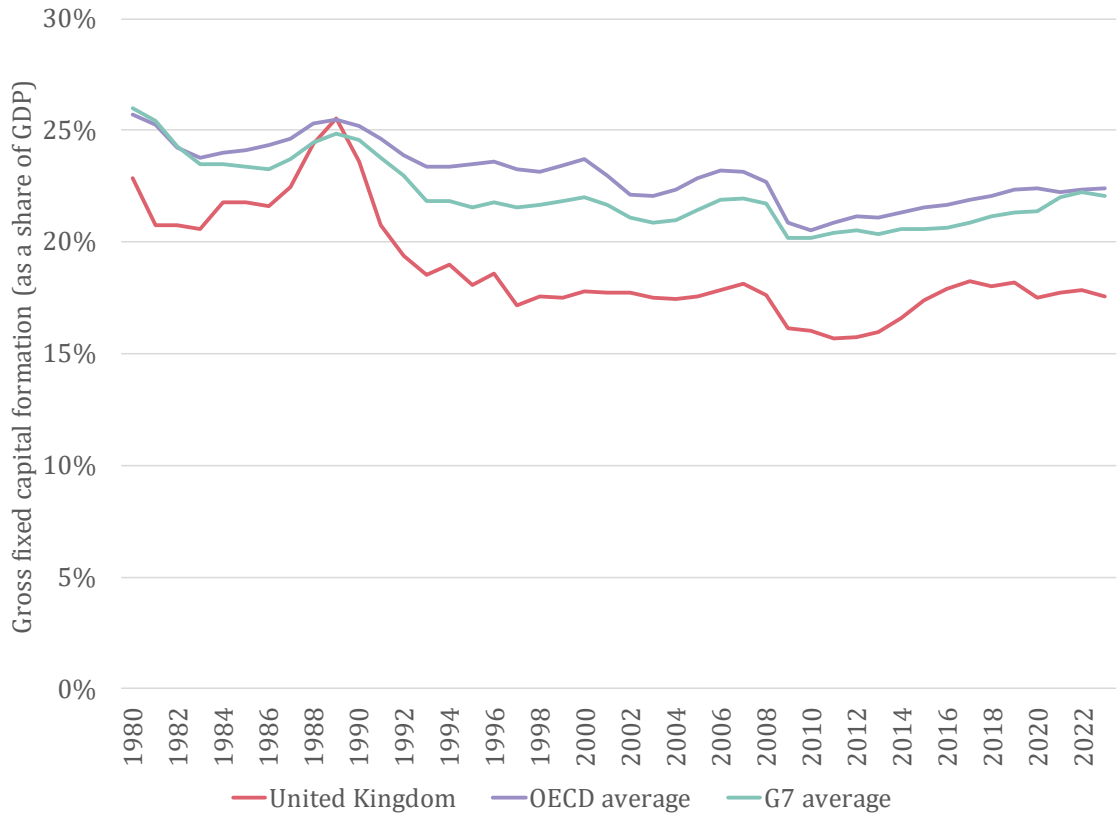
  "Part of the reason for the UK's slow growth is low levels of investment. Since 1980, the UK has invested, as a share of Gross Domestic Product, less than comparator countries such as France, Germany, and the United States."[12]

Figure 4 illustrates that investment (as a proportion of output) in the UK has lagged significantly behind the OECD and the G7 average. In the late 1980's, the UK had similar levels of investment, at around 25% of its output, but in the following period UK investment has been consistently below the OECD and G7 average.

[11] *'Kickstarting Economic Growth.' UK Government. Available at: https://www.gov.uk/missions/economic-growth [Accessed on 17th January 2025]*

[12] *'https://nic.org.uk/app/uploads/IPR-2023-Final.pdf.' National Infrastructure Commission (2023), page 6.*

Figure 4: Gross Fixed Capital Formation (as a share of GDP) between 1980 to 2022



Source: Economic Insight analysis of World Bank data.

Note: Gross Fixed Capital Formation (as a share of GDP) is a commonly used measure of investment.

2C Comparison of water industry investment relative to wider UK industries

Within the UK, investment in the water industry has, trended downward even more sharply than that of UK industries generally.

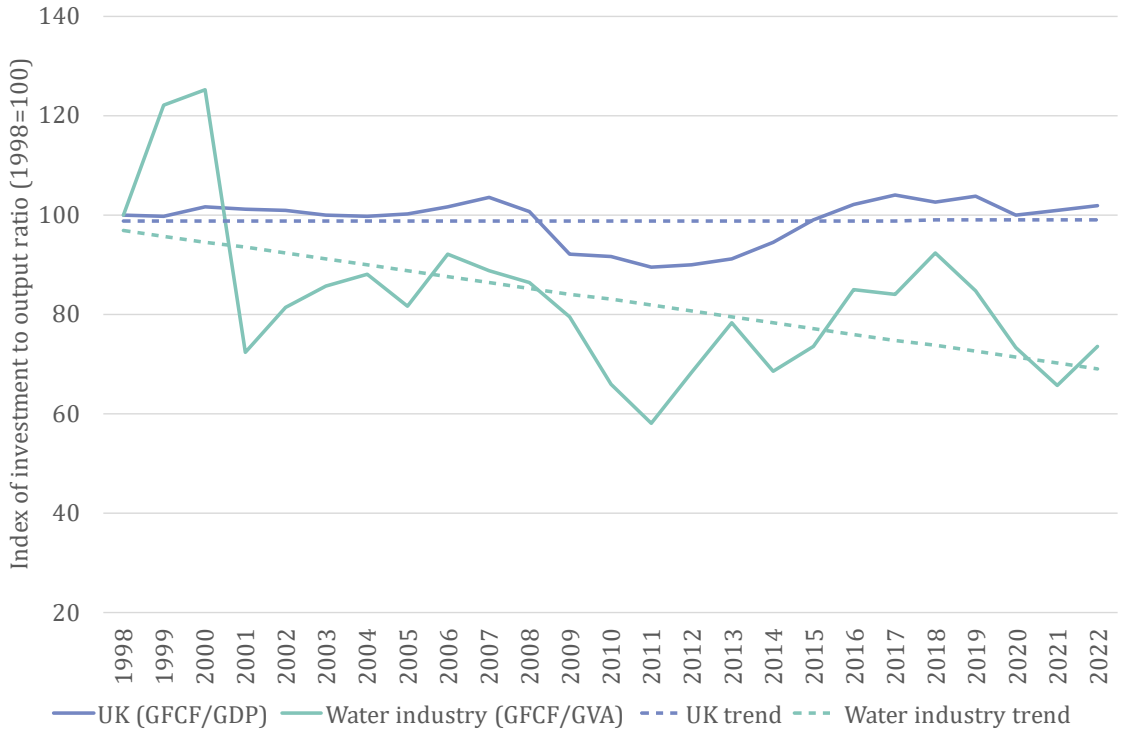
Figure 5 shows that the investment trend in the water industry, after an initial increase in the late 1990s, has declined as a share of output over the period by around 30%. Wider UK investment over the same period, however, has remained relatively constant, with some fluctuations during the period. The fall in investment in the water industry has occurred during a period where the demands on the water industry have been increasing. The House of Lords note that the *"[l]evels of investment have not risen to match these demands. The result is a network unable to cope, and which relies on releasing polluted water into the environment."*[13]

Overall, this indicates there has been significant underinvestment in the water industry, particularly when compared to overall UK investment levels, which have remained relatively stable (albeit with levels below its peers). The Angling Trust estimate that the combined 'funding gap' – defined as the

[13] *'The affluent and the effluent: cleaning up failures in water and sewage regulation.' House of Lords (2023) Industry and Regulators Committee, page 4.*

difference between Ofwat's allowances and companies' business plans – for the sector over the previous three price controls (PR04 to PR19) to be around £10 billion.[14,15]

Figure 5: Index of investment to output ratio in the UK water industry vs. all other UK industries between 1998 and 2022[16]



Source: Economic Insight analysis of ONS and World Bank data.

Note: Investment to output ratio is defined as the ratio of Gross Fixed Capital Formation (GFCF) to Gross Domestic Product (GDP) for the UK and GFCF to Gross Value Added (GVA) for the water industry.

2D Ofwat's regulatory framework is a key determinant of investment in the water industry

Investment decisions in the water industry are ultimately influenced by Ofwat. At each price control, Ofwat determines the expenditure allowances for water companies to deliver water and sewerage services to its customers. Over subsequent price controls, this in turn determines what water companies have at their disposal to make critical infrastructure investments, such as maintaining or replacing their assets (such as water pipes or reservoirs).

Ofwat's current regulatory framework relies on a 'yardstick' model to determine the funding levels (and therefore the potential investment) in the water industry. In line with best regulatory practice, Ofwat sets outcomes and allowances for a 'notionally efficient company'. Since PR14, Ofwat has used

[14] *'Time to fix the broken water sector: the case for increased investment in water and 'shadow' strategic priorities for Ofwat.' Angling Trust (2021), page 7.*

[15] *We note the Angling Trust's figure is an underestimate because it sums the differences of Ofwat's allowances and company business plans at each price control, without adjusting for the price base.*

[16] *We note the time period presented is shorter than in Figure 4 due to availability of water industry data.*

econometric benchmarking to define the efficiency 'yardstick' to set allowances. However, as we discuss in the following chapters, there are practical challenges with identifying the right benchmark.

3

OFWAT USES A 'YARDSTICK' MODEL TO ENSURE CONSUMERS PAY EFFICIENT COSTS

We set out: (i) why economic regulation is needed to determine outcomes (such as efficient costs) in the water sector; (ii) Ofwat's existing regulatory framework; and (iii) how Ofwat's 'yardstick' model determines the 'efficient' level of outcomes (such as costs) in the water industry.

3A Chapter structure

In this chapter, we set out the existing regulatory framework (a 'yardstick' model) used to determine the allowances (and therefore the investments) in the water industry.

The structure of this chapter is as follows:

- **First**, we set out the rationale for the economic regulation of the water industry.
- **Second**, we describe Ofwat's approach to determining the efficient level of outcomes (such as costs).

3B Rationale for the economic regulation of the water industry

Water companies are natural monopolies. That is, within each geographic area it is only economically efficient for a single water company to deliver services. It is neither practical nor desirable to have multiple companies to compete. This is because of the high fixed infrastructure costs required to deliver water and sewerage services including e.g. the network of water pipelines and treatment facilities.

However, in absence of competition water companies, left to their own devices, do not face incentives to compete with other companies on the price and / or quality of their services. As a result, a profit maximising company may prioritise cost-cutting and deprioritise service quality and reduce long-term infrastructure investments.

Economic regulation is therefore required to ensure that water companies face the incentives to deliver the outcomes one would expect in a 'competitive' market (consumer prices, service quality and investment levels).

3C Ofwat's approach to determining the efficient level of outcomes

Economic regulation does not provide an automatic mechanism which reveals what companies should deliver in terms of efficient costs /prices, quality of services, or levels of investment which companies should deliver. That is, Ofwat cannot simply observe what the 'correct' level of infrastructure investments within a price control period is, and how much (and when) customers should pay for it.

Ofwat therefore use a 'yardstick' model to determine: (i) the efficient levels of service; (ii) efficient levels of investment; and (iii) the efficient costs of delivery in the industry. Since PR14, Ofwat's has used an econometric benchmarking approach to model efficient totex allowances.[17] Simply put, this involves:

[17] *'PR14 Review: Discussion paper on findings.' Ofwat (2021), page 58.*

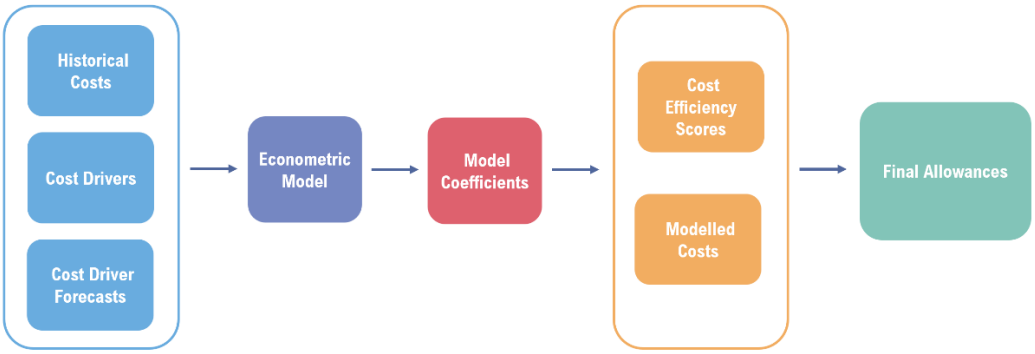
(a) Comparing water companies' costs against each other based on their characteristics such as scale, complexity and population density (which are referred to as 'cost drivers').

(b) Setting an industry 'benchmark' which effectively represents the notionally efficient water company in terms of cost efficiency.

(c) Setting each company's 'efficient' costs by applying the benchmark cost efficiency.

A graphical overview of Ofwat's econometric benchmarking approach is shown in **Figure 6** below.

Figure 6: Overview of Ofwat's econometric benchmarking approach



Source: Economic Insight analysis.

There are, however, many limitations with relying on a yardstick model to determine companies' efficient costs in practice, we detail these in the following chapter.

4

THE CHARACTERISTICS OF THE WATER INDUSTRY MAKE APPLYING A YARDSTICK MODEL CHALLENGING IN PRACTICE

We find there are several characteristics of the water industry which make the application of a yardstick model challenging in practice: (i) 'joint' and 'common' costs; (ii) high fixed costs; and (iii) the long-lived nature of water infrastructure assets.

4A Chapter structure

This chapter sets out the key characteristics of the water industry which make applying a yardstick regulatory model challenging in practice.

The structure of this chapter is as follows:

- **First**, we discuss how the presence of 'joint' and 'common' costs makes a yardstick model susceptible to measurement error.
- **Second**, we discuss how the high fixed costs present in the water industry creates modelling issues under a yardstick model.
- **Third**, we discuss how the long-lived nature of infrastructure assets in the water industry creates challenges for setting the efficient level of investments within a given period.

4B The presence of joint and common costs in the water industry

Water companies have joint and common costs, which means it is hard to identify (and attribute) the costs of any specific activity. As Ofwat notes, this can occur when a service is provided by a network:

> *"[I]t may be genuinely difficult to distinguish between the costs associated with providing an individual customer with a service, and the costs of other services. When the provision of services involves the same network there may be:*
>
> - *'joint' costs;*
> - *'common' costs; or*
> - *network benefits."*[18]

As a result, the application of a yardstick model to identify efficient costs for a specific activity can be highly susceptible to measurement error. This is because of potential data issues, such as companies allocating costs differently, which can make cost comparisons across companies challenging, and consequently may lead to a skewed 'yardstick'.

For example, since PR19 Ofwat has considered base and enhancement expenditure separately, but we note there is no clear distinction between the two. Whilst Ofwat has definitions for base and enhancement, Ofwat itself has recognised the difficulties in identifying "what base buys".[19] In particular, issues disentangling base from enhancement costs can arise for assets which: (i) Ofwat does not collect sufficient cost or activity data for; or (ii) are made up of multiple sub-components which make it difficult to allocate costs.[20]

[18] *'Bulk supply pricing - a statement of our policy principles.' Ofwat (2015), page 8.*

[19] *'Roadmap for enhancing asset health understanding in the water sector.' Ofwat (2024), page 9.*

[20] *'Roadmap for enhancing asset health understanding in the water sector.' Ofwat (2024), page 10.*

Therefore, if the scope of activities and costs change over time (as is frequently observed[21]) or if different companies think of them differently, the underlying data on which the yardstick model is based can be fraught with issues. Whilst Ofwat has made efforts to align cost categories across the sector this is ultimately challenging.

4C Water companies have high fixed costs

Infrastructure in the water industry is characterised by a high degree of fixed costs. Indeed, the academic literature notes that water services are extremely capital intensive, with fixed costs generally accounting for 80% of total costs.[22]

One of the implications of high fixed costs for water companies is a large degree of variation in companies' unit costs. This is because water companies can vary greatly in scale (e.g., in terms of the number of households they serve) and can mean there are structural differences in costs for companies. For example, larger companies can spread their fixed costs across more of its customers.

Whilst scale is generally controlled for within Ofwat's cost models, its models are designed to explain cost variations for the 'average' company, and therefore any non-linearity in the relationship between size and costs may not be fully captured. This means, if there are very small / large water companies which have unique characteristics, these may not be accounted for when assessing their efficient costs.[23]

4D Water infrastructure is characterised by long-lived assets

Water infrastructure is characterised by long asset lives. This has two key implications, which we set out below.

Implication 1: It is difficult to determine what the optimal level of investment is in any given period

In any given period, it is difficult to tell how much investment is needed to maintain and improve assets. This is because companies (and the regulator) could delay investment for a year, a price control, or even longer without any immediate consequences.

In theory, productivity measures of capital assets could be used to assess how well existing capital assets are performing. For example, low productivity would suggest that assets need maintenance / replacement (or that they are simply underutilised). However, Abbot and Cohen (2009) find that *"water industry capital productivity measures are difficult to calculate the given difficulty in measuring*

[21] For example, at PR24 Ofwat has removed expenditure for Growth at Sewage Treatment Works from base costs and now considers it as part of enhancement expenditure.

[22] 'Resilient Asset Management and Governance for Deteriorating Water Services Infrastructure.' Hukka, J. and Katko, T. (2015) Procedia Economics and Finance; Volume 21, page 112.

[23] We note that Ofwat's off-model adjustments, e.g. through cost adjustment claims (CACs), do not fully address this issue because Ofwat has taken an increasingly tough stance on accepting any cost adjustment claims.

capital inputs, and the often very long life of the assets."[24] We note that Ofwat has also accepted that historically it has lacked data on wider asset health measures in its operational resilience discussion paper.[25]

Furthermore, it is important to acknowledge that, neither companies nor the regulator can have 'perfect information' on what the economically efficient level of investment ought to be within a given price control period. Whilst investment in any given period may not be critical for a company's asset health in the short-term, the consequences of not investing can be extreme and very costly in the long-term (particularly in instances of asset failure).

Implication 2: Any yardstick regulatory model needs to ensure it is not based on the 'peak' or 'trough' of the asset life cycle

Water infrastructure can have asset life cycles which span several decades (or longer). This means, over time, some companies may be in an asset maintenance 'peak' or 'trough' at different times. For example, **Figure 7** shows a stylised diagram of two companies which are at different points of their asset cycles over time. In Period 1, Company A is in its peak, whilst Company B is in its trough (and does not reach its peak until Period 2).

The presence of asset cycles could be problematic for setting the efficient yardstick. Specifically, there is a risk that companies in a 'peak' may be compared to those in a 'trough'. This could result in the regulator over-estimating the cost efficiency of the notionally efficient company, if it is set on the basis of companies in an asset maintenance trough. In theory, this should average out, if the data covers the full length of companies' asset cycles, including both its 'peak' and 'trough' stages.

For example, if the efficiency benchmark is set based on the last five years period (Period 2) for Company A (Company B) in **Figure 7**, it will represent a company which is at the trough (peak) of its asset expenditure cycle. If Company A is used to set the efficient yardstick, it will be based on a time where capex, and therefore overall costs, are generally lower due to less asset maintenance being needed (when assets are at the start of their useful lives). This could result in mischaracterising 'low cost' companies as being cost efficient, rather than a company simply being in a maintenance trough.

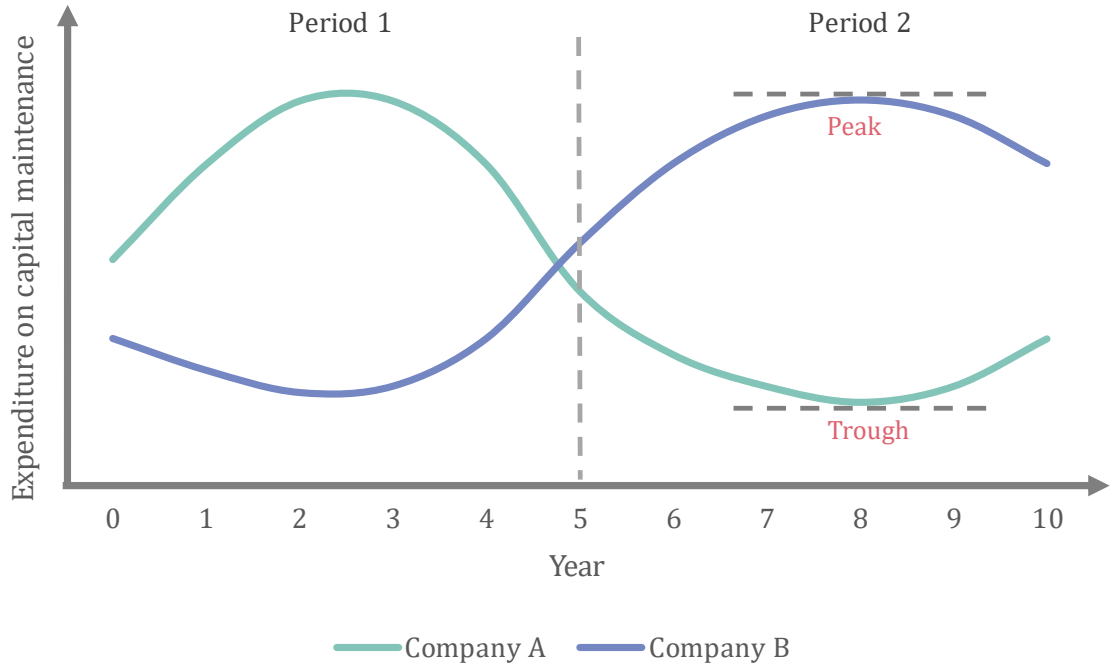
At PR24 draft determinations, Ofwat *"assessed if there was evidence that the companies which influenced the efficiency benchmark had uncharacteristically low capital spend per property over the last 5-years of outturn data that is used to set the benchmark."*[26] Ofwat found that, over the period, of the five efficient companies: (i) one company looked like it may be in a capital maintenance trough; (ii) two companies showed relatively high spend; and (iii) two companies showed volatile capital maintenance spend. Based on this analysis, Ofwat dismissed the concerns that the efficient companies were in a capital maintenance trough. However, we note this issue is more nuanced, given that Ofwat did find that at least one company was in a maintenance trough – which will, in turn, influence the benchmark set.

[24] *'Productivity and efficiency in the water industry', Abbot M. and Cohen, B., Utilities Policy (2009); Volume 17, Issues 3-4, page 235.*

[25] *'https://www.ofwat.gov.uk/wp-content/uploads/2022/04/Ofwat-Operational-resilience-discussion-paper-April-2022-1.pdf' Ofwat (2022), page 15.*

[26] *'PR24 draft determinations: expenditure allowances.' Ofwat (2024), page 24.*

Figure 7: Stylised asset life cycle



Source: Economic Insight analysis.

5

THERE ARE MULTIPLE INDICATORS THAT THE CURRENT REGULATORY FRAMEWORK IS NOT WORKING

In this chapter, we set out: (i) evidence of which indicates Ofwat's regulatory framework is not working, given observed underperformance at both the company and industry-level; and (ii) how a regulatory yardstick model could give rise to underperformance.

5A Chapter structure

In this chapter, we first present industry and company level indicators which suggest that Ofwat's existing model is not working as intended. We then explain how a regulatory yardstick model can give rise to underperformance and how such outcomes can persist over time.

The structure of this chapter is as follows:

- **First**, we set out evidence of industry and company underperformance for a variety of cost and outcome measures which suggest the current regulatory framework is not functioning as intended, and that underperformance cannot solely be attributed to company-specific inefficiency.
- **Second**, we describe how a regulatory yardstick model could give rise to underperformance (and consequently underfunding and underinvestment) by erroneously setting the 'efficient' level of outcomes / investment in a regulated industry.
- **Third**, we set out how 'wrong' outcomes which arise under the regulatory framework (which results in underperformance) can continue to persist over time.

5B There are indicators of industry-wide underperformance

We find evidence of industry-wide underperformance in the water industry for a variety of performance measures, including both cost and outcomes performance. The key implication of this is it suggests it is not possible to wholly attribute the underperformance of individual water companies solely to company-specific inefficiencies.

Industry underperformance in terms of costs

The overall performance of the industry in terms of costs can be assessed by comparing water companies' actual expenditure relative to their allowed expenditure.

Table 1 shows the industry overspend for PR14 and PR19, measured as the difference between actual and allowed total expenditure over the last two price controls. Whilst the industry had a relatively small overspend in PR14 at less than 1%, the PR19 overspend is equal to over 10% of allowed expenditure.

The overspend observed in the industry at PR19 is also not confined to a few underperforming companies, but an industry-wide issue which affects the majority of companies. **Figure 8** shows that the number of overspending companies has increased between PR14 and PR19. For PR19, all but one water company in the industry overspent relative to Ofwat's allowed expenditure for the period.

Table 1: Industry overspend deviation of actual total expenditure from allowed total expenditure (in 2022-23 prices)

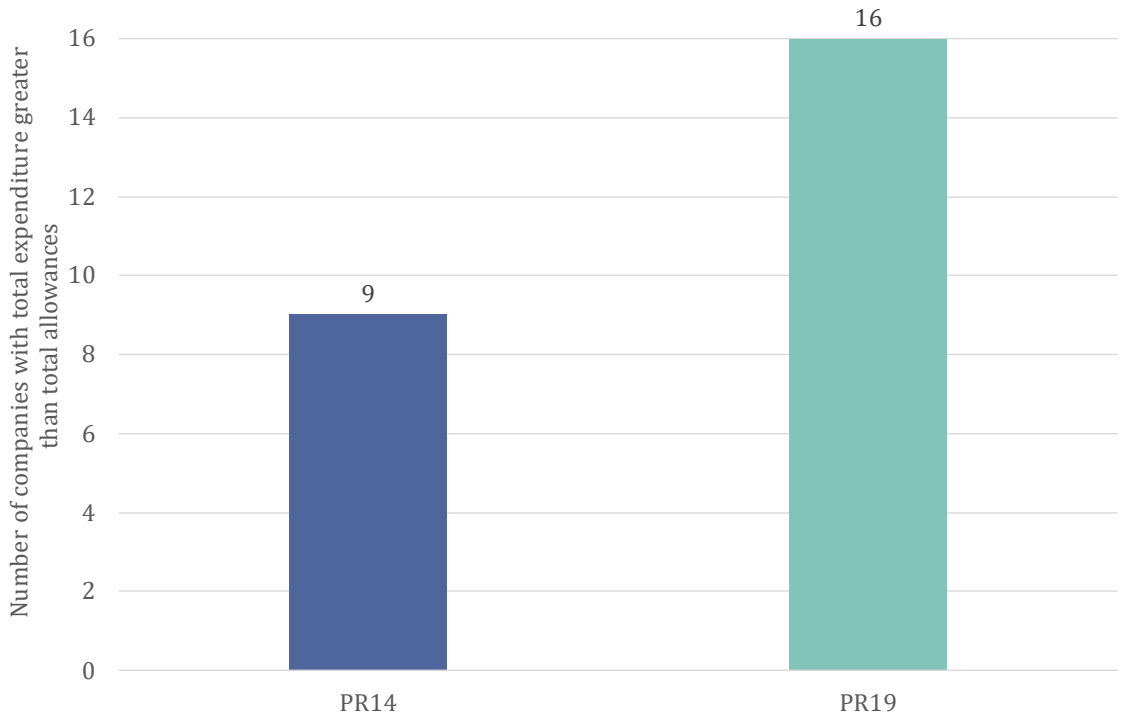
Wholesale total expenditure	PR14	PR19

Actual expenditure	£57.7bn	£43.4bn
Allowed expenditure	£57.2bn	£39.2bn
Overspend	£0.5bn	£4.2bn
Overspend as share of allowed expenditure	0.9%	10.8%

Source: Economic Insight analysis of wholesale total expenditure data from Economic Insight analysis of Ofwat's Water Company Performance Report 2023-24 data.

Note: PR19 figures exclude 2024-25 expenditure data which is not yet available.

Figure 8: Number of companies that overspent relative to their total expenditure allowance by price control



Source: Economic Insight analysis of Ofwat's Water Company Performance Report 2023-24 data.

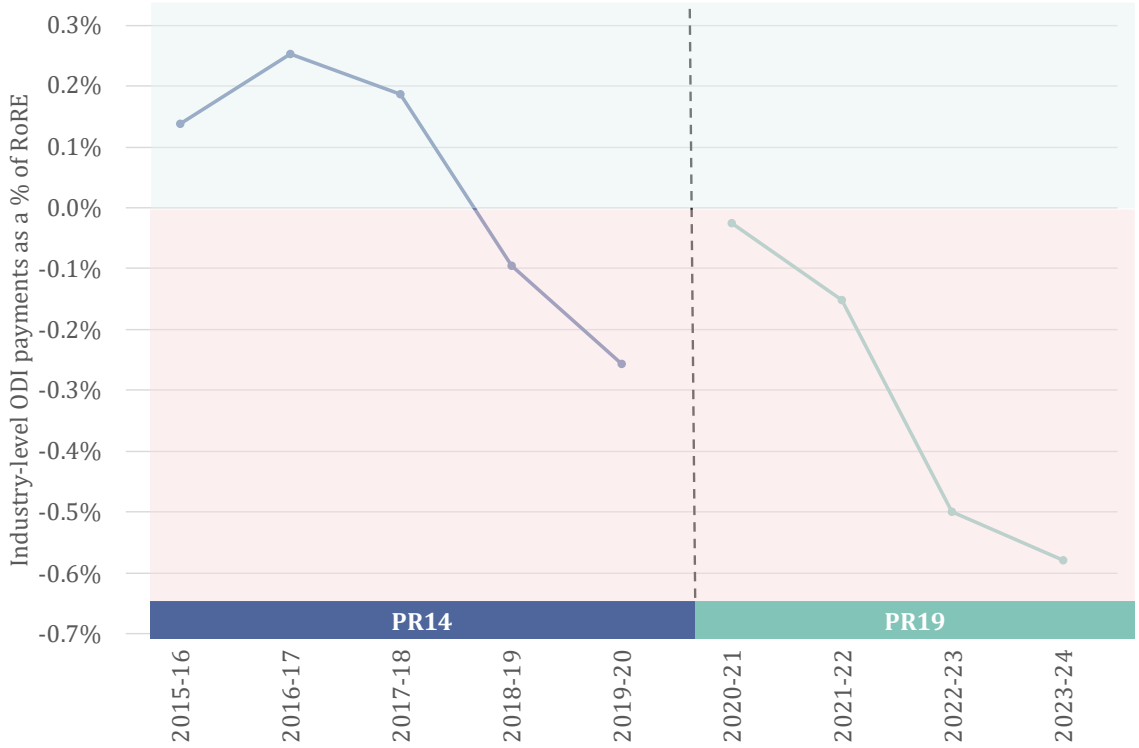
Industry underperformance in terms of outcomes

The performance of companies on outcomes over time can be assessed by looking at companies' historical ODI payments. ODI payments were introduced by Ofwat to incentivise companies to achieve the performance commitment levels set by Ofwat under different outcomes. Under this framework, companies receive rewards for outperformance and incur penalties for underperformance.

At the industry-level, companies have generally received fewer rewards and incurred more penalties over the last two price controls. **Figure 9** presents the industry-level ODI payments as a percentage of return on notional regulatory equity (RoRE). The red (green) shaded area represents where the industry is incurring penalties (receiving rewards), expressed as a proportion of RoRE. The figure shows a gradual decrease in ODI payments over time. That is, the industry has received fewer rewards and incurred increasing penalties for their performance over time. Since the end of PR14, the water industry has been consistently incurring penalties for its performance against its performance commitments.

In theory, ODI payments should incentivise companies to allocate their resources efficiently to achieve optimal performance (and avoid penalties). However, if a company underperforms, it might not be able to improve by the next price control period, and increasing penalties over time might act as a further barrier to improve, resulting in an underperforming company getting 'stuck' in a repeated cycle of underperformance.

Figure 9: Industry-level outcome delivery incentive payments as a percentage of return on regulatory equity



Source: Economic Insight analysis of ODI payments data from Ofwat's Water Company Performance Report 2023-24 data.

5C There are indicators that underperformance at the company level is persistent

In this section, we consider the performance of individual companies within the industry over time in terms of both costs and outcomes.

Company underperformance in terms of costs

We find that the number of companies which Ofwat's PR24 models would consider cost inefficient (defined as companies with actual costs exceeding modelled costs based on PR24 models) has increased over time. Specifically, we find that the number of companies considered cost inefficient as per Ofwat's PR24 models almost doubles between the PR09 and PR19 period.

Table 1 shows the difference between companies' actual expenditure across the previous three price controls, compared to the modelled costs using Ofwat's PR24 models.

Table 2: Difference between modelled costs and actual costs using Ofwat's PR24 base cost models (in 2022-23 prices)

	Absolute difference between modelled and actual costs (in £m)			Percentage difference between modelled and actual costs		
	PR09	PR14	PR19	PR09	PR14	PR19
Anglian Water	-£74	-£166	-£104	-3%	-4%	-3%
Hafren Dyfrdwy	£3	-£8	-£3	3%	-6%	-2%
Northumbrian Water	£58	£90	-£184	3%	4%	-8%
United Utilities	-£96	-£123	-£5	-3%	-2%	0%
Southern Water	£149	£34	-£900	7%	1%	-31%
Severn Trent Water	£234	£251	£211	5%	5%	4%
South West Water	£55	£87	-£259	4%	6%	-16%
Thames Water	£250	£141	-£639	4%	2%	-7%
Dŵr Cymru Welsh Water	-£152	-£277	£11	-8%	-11%	0%
Wessex Water	£31	-£34	-£156	3%	-2%	-10%
Yorkshire Water	£218	-£165	-£57	8%	-5%	-2%
Affinity Water	£19	£27	£7	2%	2%	1%

Bristol Water	-£133	-£39	£2	-45%	-10%	0%
Portsmouth Water	£20	£38	£35	16%	21%	19%
South East Water	-£10	£19	-£11	-2%	3%	-1%
South Staffs Water	£59	£89	£136	16%	18%	26%
SES Water	-£13	-£32	-£47	-9%	-18%	-25%
Industry	**£618**	**-£68**	**-£1,962**	**2%**	**0%**	**-5%**

Source: Economic Insight analysis of actual and modelled costs from Ofwat's PR24 base cost models.

Note: Percentage difference between modelled and actual costs is calculated as: (modelled costs – actual costs) / modelled costs. Red cells represent modelled costs below actual costs i.e., representing a funding gap, whilst green indicates a funding surplus of allowances. PR09 period excludes 2010-11 data.

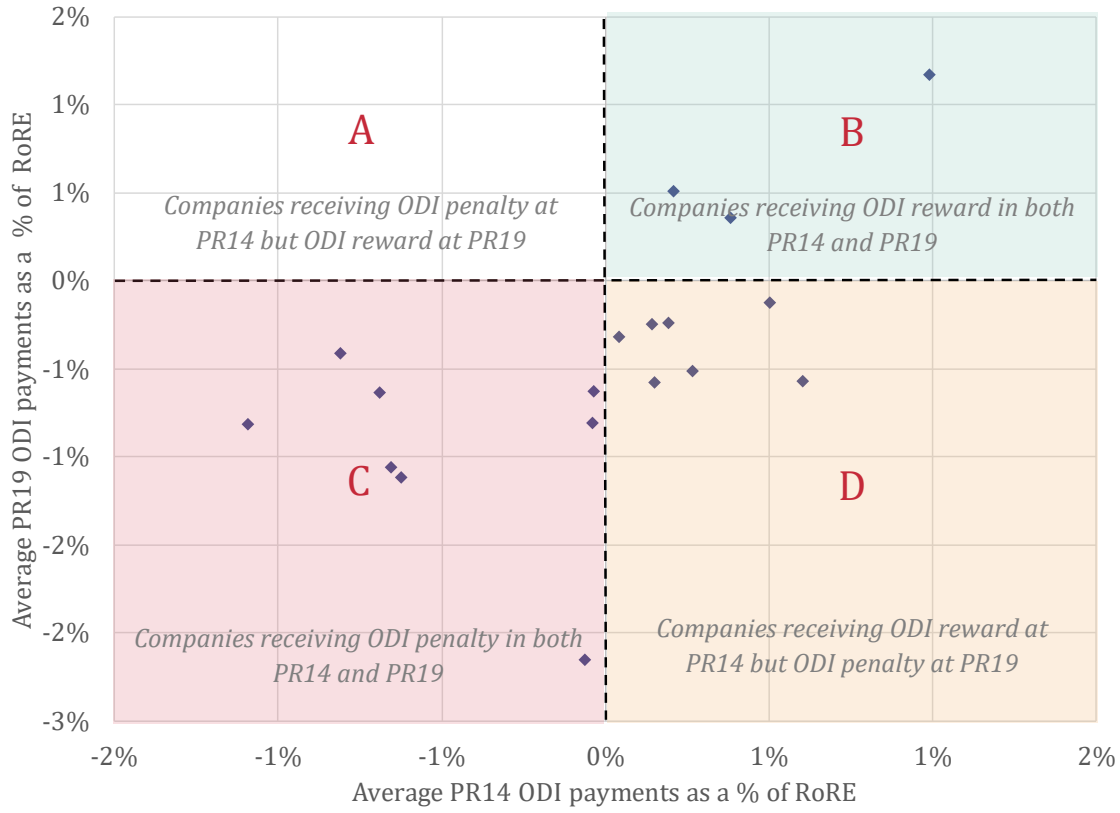
Company underperformance in terms of outcomes

Figure 10 shows a comparison between companies' average ODI payments at PR14 and PR19. The figure shows for each water company, their average ODI payment at PR14 compared to PR19, expressed as a percentage of its RoRE. Overall, we find:

- A positive relationship overall between PR14 and PR19 ODI payments. That is, high (low) penalties / rewards at PR14 are associated with high (low) penalties / rewards at PR19.
- All companies who incur penalties at PR14 also do so at PR19. In other words, no companies who incur penalties at PR14 receive rewards at PR19 i.e., no companies 'improve'. This is shown by half the companies in the industry being in quadrant C in the figure, whilst no companies are in quadrant A.
- Only around a third of companies who receive rewards at PR14 also receive rewards at PR19. This is shown by the three companies in quadrant B on the figure.

We note there is a limited period over which outcomes can be assessed given the relatively recent introduction of the outcomes framework, and the analysis is therefore limited to just two price controls. Nonetheless, we observe that underperformance in terms of outcomes has persisted for over half of the industry between PR14 and PR19.

Figure 10: Relationship between average outcome delivery incentive payments in PR14 compared to PR19



Source: Economic Insight analysis of ODI payments data from Economic Insight analysis of Ofwat's Water Company Performance Report 2023-24 data.

5D How a yardstick regulatory model can get things 'wrong'

The previous section suggest that a number of water companies have persistently underperformed over time. Whilst it is not possible to disentangle whether the underperformance of individual companies is due to 'inefficient' company decisions, or a result of the regulatory framework, we note observing persistent underperformance across the industry could suggest the regulatory framework is not functioning as intended. In this section we consider how underperformance could arise under a regulatory yardstick model.

As described in Chapter 4, the use of a yardstick regulatory model in the water industry is particularly challenging due to its characteristics. Ofwat is therefore at risk of providing companies with insufficient allowances they need to deliver the efficient levels of output / investment required in the longer-term. This is for the following reasons:

(i) it is hard to identify the efficient level of asset health activity (such as the maintenance of existing assets) in any given price control period;

(ii) it is difficult to determine the 'true' efficient level of costs needed to deliver the assumed level of asset health activity; and

(iii) if regulators incorrectly set insufficient allowances, companies can delay any asset health expenditure, without any immediate impact – at least in the short-term. This is possible because of the long-lived nature of assets, as previously described.

5E How 'wrong' regulatory outcomes can persist over time

Regulation is a 'repeated game' which is designed to allow companies reveal information (such as what the efficient level of asset health activity, and associated costs are) and the regulator can recalibrate (by adjusting actual allowances accordingly).

If the process of learning and recalibration works well, any issues which arise in the yardstick model in any given period can be 'reversed'. For example, any underinvestment in asset health, could be addressed in the following price control period. However, this process may fail if any of the following conditions hold.

- **Condition 1:** Companies are unable to reveal information regarding e.g., the optimal level of asset health activity (and the efficient costs associated with it).
- **Condition 2:** The regulator does not take information provided by companies into consideration when setting its initial approach (or does so incorrectly).
- **Condition 3:** The regulator does not use the information revealed by companies to recalibrate its approach for the next price control.

If any of the above conditions are met, a company may become stuck in a 'doom loop' once the regulator sets insufficient allowances. This follows the process described in section 5D. In response to being set insufficient allowances, companies defer investment or make 'cuts' to become 'low cost' – which the regulator interprets as cost efficiency, then:

(iv) on the basis of a flawed benchmark, the regulator erroneously sets (insufficient) cost allowances for companies;

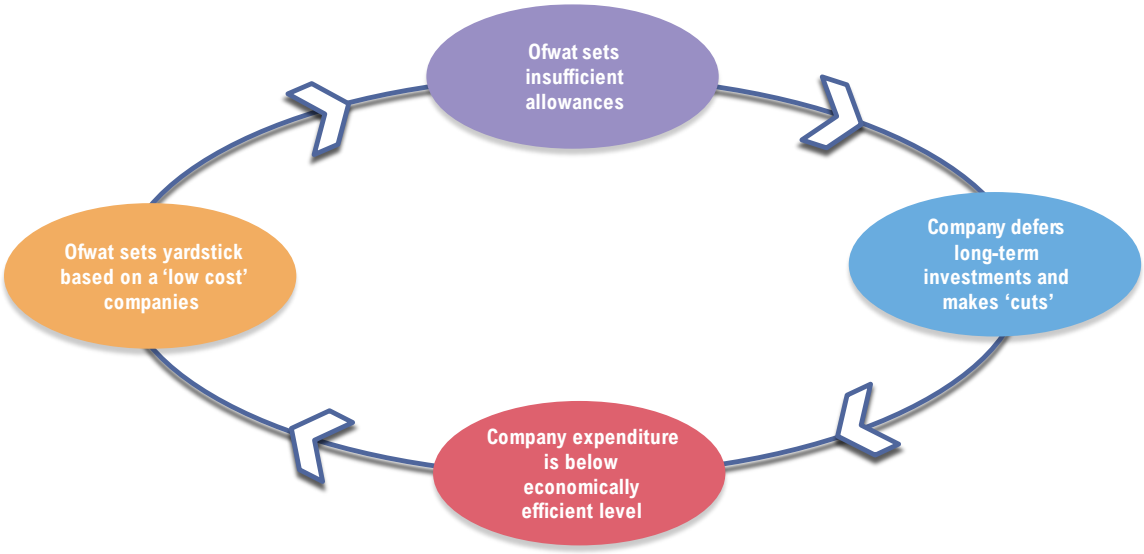
(v) companies which do not have enough financial headroom cannot overspend their allowances; and

(vi) companies are, again, forced to make a cut to asset health activity as the cycle repeats.

Over subsequent periods, the impact of this will only manifest once a company's asset health is sufficiently severe. Once a company is in this position, it may be 'stuck' in a self-reinforcing cycle (a 'doom loop') whereby their asset health deteriorates, whilst the regulator continually provides insufficient allowances. The consequences of such a process are consistent with the evidence of underperformance across a range of indicators presented in the previous section.

A simplified 'doom' loop is shown graphically in **Figure 11** below.

Figure 11: A simplified 'doom loop'



Source: Economic Insight analysis.

6

THE REGULATORY FRAMEWORK CREATES CHALLENGES FOR INVESTMENT

In this chapter, we set out challenges for investment in the water industry: (i) insufficient focus on asset health in the regulatory framework; (ii) Ofwat's cost assessment does not focus on identifying the 'true' efficient level of companies' costs; and (iii) Ofwat's regulatory framework encouraging short-termism.

6A Chapter structure

In this chapter, we set out the critical issues under the existing regulatory framework for water companies undertaking the 'efficient' level of investment. We find the regulator's current approach poses challenges for investment and may prevent companies from making the long-term infrastructure investment needed.

The structure of this chapter is as follows:

- **First**, we outline the evidence regarding Ofwat's lack of focus on asset health within the existing regulatory framework.
- **Second**, we explain how Ofwat's existing approach to cost assessment does not focus on identifying the 'true' efficient level of companies' costs.
- **Third**, we explain how Ofwat's regulatory framework has encouraged and incentivised companies to prioritise short-term performance.

6B Challenge 1: There is insufficient focus on asset health in the regulatory framework

We do not consider that Ofwat has had a sufficient focus on asset health within its existing regulatory framework historically. This is evident in: (i) several authorities, including Ofwat itself, highlighting the gaps in its asset health information; and (ii) Ofwat's lack of recognition for the asset health performance of companies when it sets its cost efficiency 'yardstick' (i.e. the lack of join-up between what companies are delivering and what that is costing).

Ofwat has itself acknowledged gaps in asset health information

The National Infrastructure Commission (NIC) assessed water company asset management and found that currently "*There does not appear to be a comprehensive and consistent understanding of asset condition across the sector and how this may change in the future. A more complete view of asset health in the sector would support a multi-AMP view of the investment required to maintain asset health and, consequently, service performance and reliability*."[27]

At the PR19 redeterminations, the CMA noted that: "*We acknowledge Anglian's and Northumbrian's argument that Ofwat's cost assessment is backward looking and that potential issues with capital maintenance may be forward looking. This 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*."[28]

[27] '*Letter to Ofwat on asset management*.' National Infrastructure Commission (2023).
[28] '*PR19 Redeterminations: Final Report*.' CMA (2021), paragraph 4.293

Ofwat has itself recognised that it *"need[s] to evolve [its] monitoring approach to provide a richer picture of operational resilience for customers and stakeholders."*[29]

Ofwat's approach to assessing asset health is lacking and may not fully capture long-term risks

In addition to the above, we consider Ofwat's general approach to be lacking because: (a) it does not use forward-looking asset health metrics; and (b) it does not represent a holistic assessment of asset health.

First, Ofwat's uses backward-looking asset health metrics. The key implication of this is that the measures can only consider what *has* happened, and not what *is* happening, or what *might* happen in terms of asset health. In other words, Ofwat's metrics (such as mains repairs, unplanned outages and sewer collapses) are symptomatic of asset deterioration that has already occurred, rather than being indicative of the *potential* asset failure risks. Indeed, the National Infrastructure Commission has suggested that Ofwat should develop forward-looking metrics when defining and measuring asset health:

> *"The Commission believes that Ofwat should take a lead on asset health and, building on its work on asset management maturity,* ***develop consistent forward-looking metrics for defining and measuring asset health****."*[30] [emphasis added]

Second, Ofwat uses only a limited number of metrics when assessing asset health, rather than taking a holistic view. For example, at PR24 Ofwat has continued to use mains repairs (the number of physical repairs to burst mains) as its key metric for measuring asset health of water mains.

> *"****We consider that the mains repairs performance commitment continues to be the best available performance commitment for PR24 to provide appropriate incentives for companies to improve the asset resilience of water mains****. It provides an appropriate incentive for all companies to manage their water networks, target mains to replace and reline, and ensure work is carried out to high standards to reduce the chance of future bursts occurring. Minimising the number of mains repairs also has a positive impact on vehicle and pedestrian delays, disruption to public and businesses, noise pollution, as well as additional carbon produced during traffic delays."*[31] [emphasis added]

Furthermore, we note there may be additional issues with using a single asset health metric (or limited metrics). For example, in the context of mains repairs:

- **The regulator has not conducted a thorough analysis to determine if it is the 'right' measure for all companies**. Ofwat has itself acknowledged the metric could create potential perverse incentives, namely: (i) disincentives for proactive leakage reduction activities, as identifying bursts would make a company appear as deteriorating in its asset health; and (ii) incentives to discourage customers from reporting leaks, as a company would appear to perform better if it is unaware of mains in need of repairs.

- **Mains repairs as a metric represents just one aspect of asset health.** We note other regulated industries such as energy networks use a more holistic measure, such as Network Asset Risk Metrics (NARMs) to measure the risk / value of a network's assets. Ofgem's NARMs

[29] *'Operational discussion paper.' Ofwat (2022), page 3.*

[30] *'Letter to Ofwat on asset management.' National Infrastructure Commission (2023).*

[31] *'Operational resilience discussion paper.' Ofwat (2022), page 21.*

are designed to measure the risk of assets failing, which are derived from the probabilities (and expected consequences) of assets failing.[32]

Ofwat does not account for asset health as part of its cost efficiency yardstick

In addition to having limited information on asset health (as discussed above), we find that there is a lack of join-up between its cost assessment framework and companies' asset health performance (even based on Ofwat's own metrics). Specifically, Ofwat's chosen benchmark company, which represents the notionally efficient company, is not set with any consideration for its performance on asset health (or anything except for cost).

This is problematic because companies that defer (or deprioritise) asset maintenance will appear, in the short-term, to be more cost efficient. The key implication is that Ofwat may base its benchmark on 'low cost' companies which do not represent the economically efficient company. This could result in companies being underfunded (because allowances are based on artificially low cost companies), potentially resulting in delaying infrastructural renewals (to reduce costs in the short-term). Whilst this may not immediately manifest, underinvestment may create longer-term risks, such as the failure of water infrastructure assets.

Indeed, we find that in Ofwat's PR24 models the companies which are considered to be (relatively) cost efficient are not necessarily the companies which perform well in terms of Ofwat's asset health metrics. **Table 3** and **Table 4** compare the cost efficiency scores and asset health performance rankings for the five most cost efficient companies for water and wastewater, respectively.

- For water, the best performing company in terms of cost efficiency is only ranked 11th in terms of mains repairs. Whilst the best ranking company for mains repairs is the 4th most cost efficient company. For unplanned outages, we find that none of the top five companies in terms of performance feature in the five most cost efficient companies.

- For wastewater, we note that the best ranked company in terms of sewer collapses does not feature in the top five most cost efficient wastewater companies, of which there are 11 (including HDD).

Table 3: Water cost efficiency and asset health performance ranking for top five companies by cost efficiency

	PR24 cost efficiency score	Mains repairs performance ranking (1=best)	Unplanned outages performance ranking (1=best)
South Staffs Water	0.756	11	6
Portsmouth Water	0.809	3	8
Anglian Water	0.966	12	12
Affinity Water	0.973	1	11
Thames Water	0.987	8	7

Source: Economic Insight analysis of Ofwat's PR24 base costs models and Water Company Performance Report 2023-24 data.
Note: Cost efficiency scores are calculated as actual costs divided by modelled costs using PR24 base costs. Asset health performance rankings are based on the average actual performance relative to target for the PR19 period, excluding 2024-25.

[32] *'RIIO-2 Regulatory Instructions and Guidance (RIGs) for Network Asset Risk Metric (NARM) Tables.' Ofgem (2021), page 3.*

Table 4: Wastewater cost efficiency and asset health performance ranking for top five companies by cost efficiency

	PR24 cost efficiency score	Sewer collapses performance rankings
Wessex Water	0.942	4
Welsh Water	0.949	7
Yorkshire Water	0.993	2
Severn Trent Water	0.998	6
Hafren Dyfrdwy	0.998	11

Source: Economic Insight analysis of Ofwat's PR24 base costs models and Water Company Performance Report 2023-24 data.
Note: Cost efficiency scores are calculated as actual costs divided by modelled costs using PR24 base costs. Asset health performance rankings are based on the average actual performance relative to target for the PR19 period, excluding 2024-25.

6C

Challenge 2: Ofwat's cost assessment approach does not focus on identifying the 'true' efficient costs

We do not consider Ofwat's approach to cost modelling focuses on identifying the 'true' efficient costs of the notional water company.

This is for the following reasons: (i) there are conceptual issues with Ofwat's econometric benchmarking approach; (ii) Ofwat has increased the scope of activities delivered out of base costs; and (iii) Ofwat has consistently over-estimated ongoing efficiency / frontier shift in the water industry.

There are conceptual issues with Ofwat's econometric benchmarking approach

There are several limitations with Ofwat's econometric benchmarking approach, which we detail below.

Limitation 1: The importance of setting the 'correct' notionally efficient company

To set the 'efficient' level of costs through a top-down econometric benchmarking approach requires identifying and setting a company as the efficiency 'benchmark' that all companies should achieve. In other words, a regulatory yardstick model puts significant weight on the yardstick being set correctly. If Ofwat selects the 'wrong' company (e.g., one which is 'low cost' but with poor asset health) it therefore risks setting cost allowances which harm long-term infrastructure investment. This may occur because:

- **Ofwat sets the benchmark based solely based on cost efficiency, and only over a five-year period.** That is, Ofwat's models use a benchmark based on cost minimisation, rather than economically efficient costs. As discussed in Chapter 4, the cost minimising company may not represent the 'true' cost efficient company because e.g., the company is in a capital maintenance trough, or simply appears 'low cost' because it has made 'cuts' to its service.

- **Ofwat's definition of the notionally efficient company is not consistently applied across all areas of the price control.** For example, the notionally efficient company differs between

for its assessments on costs, outcomes and financeability. This fragmented approach risks imposing a 'Frankenstein's notional company' onto the industry in aggregate, i.e., a notional company that is not achievable in practice (at least not across all areas of a price control).

Limitation 2: Over-reliance on historical expenditure creates risks of underinvestment

Ofwat's base cost models rely heavily on companies' historical expenditure data. This means Ofwat's estimates of 'efficient' company costs are based on the historical levels of expenditure, and therefore the associated (historical) level of asset health. This has two key implications:

- **Any historical underinvestment gets 'baked' into Ofwat's models.** By using historical expenditure for the basis of its models, Ofwat assumes previous levels of expenditure reflected the 'efficient' levels of spend and investment. As discussed in Chapter 2, the wider evidence suggests this is not the case – investment in the UK water industry has declined in recent decades. By using historical expenditure, Ofwat's approach will 'bake-in' any past underinvestment, and risks perpetuating underinvestment when setting company's cost allowances.

- **Ofwat's models do not account for future investment needs.** As Ofwat's costs models relate to the outputs / service-levels which have been delivered historically, they will naturally exclude any 'new' expenditure for new investments required. For example, this includes any new infrastructure / processes required to meet newly introduced environmental standards e.g., meeting net-zero targets. Therefore, without additional adjustments, Ofwat's models will risk underfunding companies for new investment needs.

We note that Ofwat's position is that companies can raise Cost Adjustment Claims (CACs) if they consider that Ofwat's models do not reflect its individual circumstances, such as historical costs not being reflective of its future needs. In practice, Ofwat has accepted few companies CACs, and rejected CACs for reasons including not being "unique" if other companies (even one other company) face similar circumstances.[33]

Limitation 3: Econometric models are based on multiple assumptions

Econometric benchmarking relies on multiple assumptions holding to 'work' effectively. This includes: (a) that historical expenditure provides a good basis to predict efficient costs going forward (which, as above, may not hold); and (b) the model captures the various drivers of efficient costs (including all differences between companies).

The limitations of econometric models are evident in Ofwat triangulating across a suite of models – as it cannot solely rely on the results of an individual model. Put simply, there is no perfect econometric benchmarking model that can predict the right view of efficient base costs, and therefore, relying on econometric models alone can risk underfunding efficient costs.

However, despite these inherent limitations, Ofwat appears to primarily rely on this approach to set efficient costs, and does not consider other methods (e.g. bottom-up assessments) even as a cross-check.

Ofwat has increased the scope of activities delivered out of base costs

[33] For example, Southern Water's coastal population CAC which Ofwat rejects because South West Water has a comparable coastal population, despite both being above the industry average. See SRN_CAC6 here: https://www.ofwat.gov.uk/wp-content/uploads/2024/12/PR24-FD-CA19-Base-cost-adjustment-claim-feeder-model-%E2%80%93-Southern-Water.xlsx

In addition to the above, Ofwat has made further regulatory decisions which put further pressure on what cost allowances (derived from its econometric benchmarking models) need to deliver. For example:

- **Ofwat has formally introduced Price control deliverables (PCDs) at PR24.**[34] PCDs set specific expectations on what water companies are expected to deliver out of their base costs.[35] The introduction of PCDs creates further demands on companies to deliver specific activities out of its base costs and removes companies' flexibility to use allowances efficiently. By asking companies to deliver more out of base costs, Ofwat risks companies having to deprioritise long-term expenditure (such as asset maintenance). As discussed in Chapter 4, it is 'easy' to do this given the long-lived nature of infrastructure assets. In other words, increasing demands on companies' base costs risks crowding out long-term infrastructure investments.

- **Ofwat has introduced several new performance commitments (PCs) at PR24.** Water companies will be expected to fund many of these new PCs through base costs. Specifically, Ofwat has introduced PCs including: (i) bathing water quality;[36] (ii) BR-MeX;[37] and (iii) serious pollution incidents.[38] As with PCDs, this creates additional pressures on base costs and crowds out 'discretionary' expenditure.

- **Ofwat assumes more stretching performance expectations due to introduced regulatory changes can notionally be delivered through the base costs.** This includes: (i) potential changes to regulations / standards for regulatory compliance (including ones implemented part-way through the price control such as changes to the Industrial Emissions Directive and Farming Rules for Water); and (ii) compliance with additional reporting requirements.[39]

Ofwat has consistently over-estimated ongoing efficiency / frontier shift in the water industry

Ofwat's frontier shift target represents *"the rate of efficiency improvements that even the most efficient companies in the industry can achieve, from improvements in working practices and the introduction of new technology"*.[40] The target is used to make downward adjustments to companies' efficient level of costs, on the basis that companies can make cost savings through productivity gains (reducing the volume of inputs required to produce a given volume of outputs).

Figure 12 shows Ofwat's assumed frontier shift assumption for previous price controls against the average Total Factor Productivity (TFP) growth of the water industry for the equivalent period (which represents a proxy for ongoing efficiency). For PR14 and PR19, Ofwat has made assumptions on frontier shift which exceeded estimates of the TFP for the water industry. For example, in the PR14 period (2015 to 2019) Ofwat assumed frontier shift to be just under 1%, whilst the 5-year average growth in TFP in the water sector was estimated to be just under 0%.

By over-estimating the frontier shift of the industry, Ofwat is underfunding companies by giving companies allowances which are lower than if Ofwat's assumptions were in line with the 'true' level

[34] *'Price control deliverables.' Ofwat. Available at: https://www.ofwat.gov.uk/regulated-companies/price-review/2024-price-review/price-control-deliverables [Accessed on 25th January 2025]*

[35] *PCDs are designed to protect customers from paying for things which do not happen. If companies fail to produce deliverables by a particular deadline, Ofwat returns the allocated funding to customers.*

[36] *'Bathing water quality.' Ofwat (2024), page 2.*

[37] *'Business customer and Retailer measure of experience.' Ofwat (2024), page 2.*

[38] *'Serious pollution incidents.' Ofwat (2024), page 2.*

[39] *'Issues with Ofwat's approach to base costs assessment.' Economic Insight (2024), page 6.*

[40] *'PR24 final determinations - expenditure allowances.' Ofwat (2025), page 260.*

of frontier shift in the industry. This disparity puts additional pressure on companies' cost allowances and exacerbates any underfunding further.

For example, for PR19 we estimate the industry faced a shortfall of around £800m in cost allowances, compared to if the frontier shift target had been set in line with the TFP growth in the water industry.[41] For PR24, Ofwat assumed a 1% frontier shift assumption for the period. This is higher than the 'PR24 focused range' we estimated of between 0.3% and 0.7% per year for the period.[42] Based on the mid-point of our range (0.5%), we estimate the sector would have received additional cost allowances of around £700m at PR24.

Figure 12: Comparison of water sector TFP growth and Ofwat's frontier shift target between 2000 and 2019

Source: Economic Insight analysis of EU KLEMS data and Ofwat's price review publications.

6D Challenge 3: Ofwat's regulatory framework encourages short-termism

[41] *We estimate this by increasing PR19 industry cost allowances by calculating a counterfactual allowance based on water sector TFP growth, rather than Ofwat's frontier shift target.*

[42] *'Productivity and Frontier Shift at PR24.' Economic Insight (2024), page 5.*

Ofwat is subject to consumer and resilience duties which should, in theory, prevent undue focus on the short-term. However, we find that Ofwat has tended toward taking a short-term view within its own regulatory decisions.

This can be seen in: (i) Ofwat prioritising low bills for customers; (ii) indicative evidence of the UK water industry 'asset sweating'; and (iii) the incentives created by Ofwat's outcomes framework. We discuss each of these in further detail below.

Ofwat has prioritised keeping bills low (over long-term investment)

In real terms, the average water and sewerage bill in the UK has been declining since around 2010. **Figure 13** shows the evolution of the average water and sewerage bills (in real terms) over the previous three price controls. The figure shows that bills in real terms have been relatively stagnant or have been declining since PR09 – with a decline in bills beginning in PR14.[43]

We note that in a scenario where the average water bill had simply remained constant (in real terms) from 2014-15 onwards, the average bill in 2023-24 would be significantly higher than actual bills have been.[44] This projection is shown by the green dashed line on the figure, which shows the average bill had it simply kept pace with inflation.

The gap between actual bills and our projection is presented in more detail in **Figure 14**. The figure shows a large divergence between actual historical bills compared to if bills had stayed constant in real terms. Specifically, the projection suggests that the average bill would be over £100 higher in real terms by 2023-24 in this scenario. We note that assuming bills remain constant in real terms is a conservative assumption, and ignores e.g., the increasing demands the water industry has faced. We note that declining bills are a counterintuitive finding for an industry on which there has been increasing pressure to improve services (such as reducing leakage, reducing supply interruptions as well as meeting investments needs).

Furthermore, we find that compared to other sectors, the evolution in water bills over the last decade has been consistently below other sectors such as energy. **Figure 15** shows average (real terms) bills in the water and sewerage against electricity indexed to 2009-10 levels. Over the last decade, water and sewerage bills have been mostly stagnant or declining, whereas electricity bills have increased by over 20% in real terms within a decade.[45]

Amongst industry stakeholders, there is a general consensus that Ofwat has prioritised keeping customer's bills low. For example:

- **House of Lords** has stated: *"Ofwat has failed to ensure companies invest sufficiently in water infrastructure, instead choosing to keep bills low at the expense of investment."*[46]
- **Environmental Audit Committee** has stated: *"The water regulator Ofwat has hitherto focused on security of water supply and on keeping bills down with insufficient emphasis on facilitating the investment necessary to ensure that the sewerage system in England is fit for the 21st century."*[47]

[43] We note this coincides with Ofwat beginning to use econometric benchmarking to assess totex cost allowances.

[44] We use 2014-15 to create an illustrative projection on the basis it corresponds to the period when Ofwat moved to using econometric benchmarking to set totex allowances.

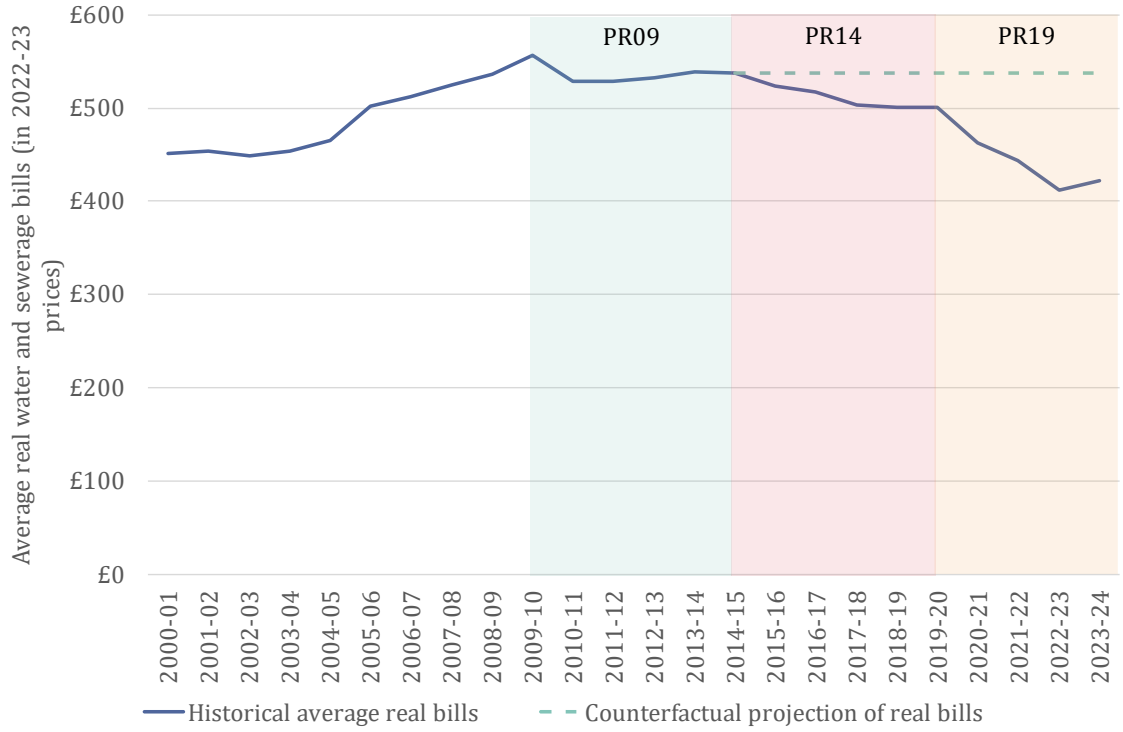
[45] We note that a large spike in electricity prices from 2021 onwards can be attributed to the Ukrainian war.

[46] 'The affluent and the effluent: cleaning up failures in water and sewage regulation.' House of Lords (2023) Industry and Regulators Committee, page 4.

[47] 'UK Water Industry: Myths vs. Water quality in rivers - Report summary.' Environmental Audit Committee (2022).

- **Global Infrastructure Investor Association** has stated: *"For too long, the regulator has prioritised low bills at the expense of investing in the resilience of the sector. The solution to this vicious circle sits with Ofwat – the regulator can't continue to penalise water companies for not meeting expectations without equipping them with means to provide the solution."*[48]

Figure 13: Historical average real water and sewerage bills and projection of constant real terms bills from 2014-15

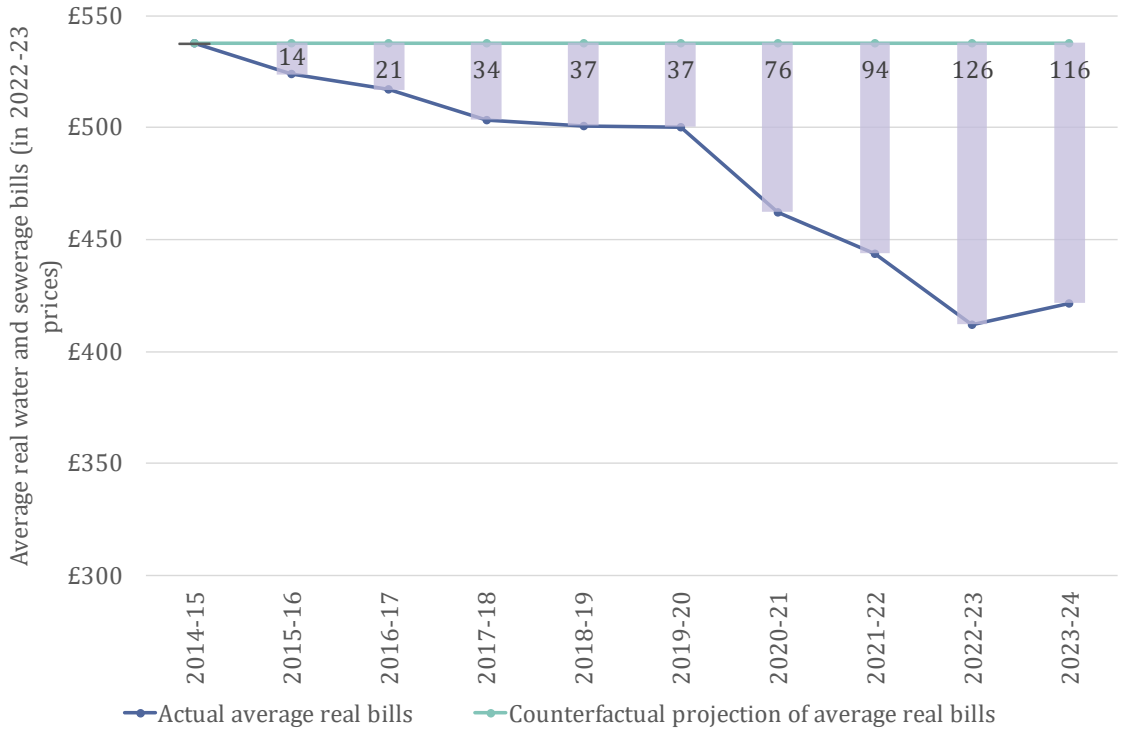


Source: Economic Insight analysis of Water UK data.

Note: The average real bills calculations consistent with Ofwat's indexation approach which changed from RPI to CPIH during PR19.

[48] *'Ofwat in danger of repeating same mistakes say water investors.' Global Infrastructure Investor Association (2024).*

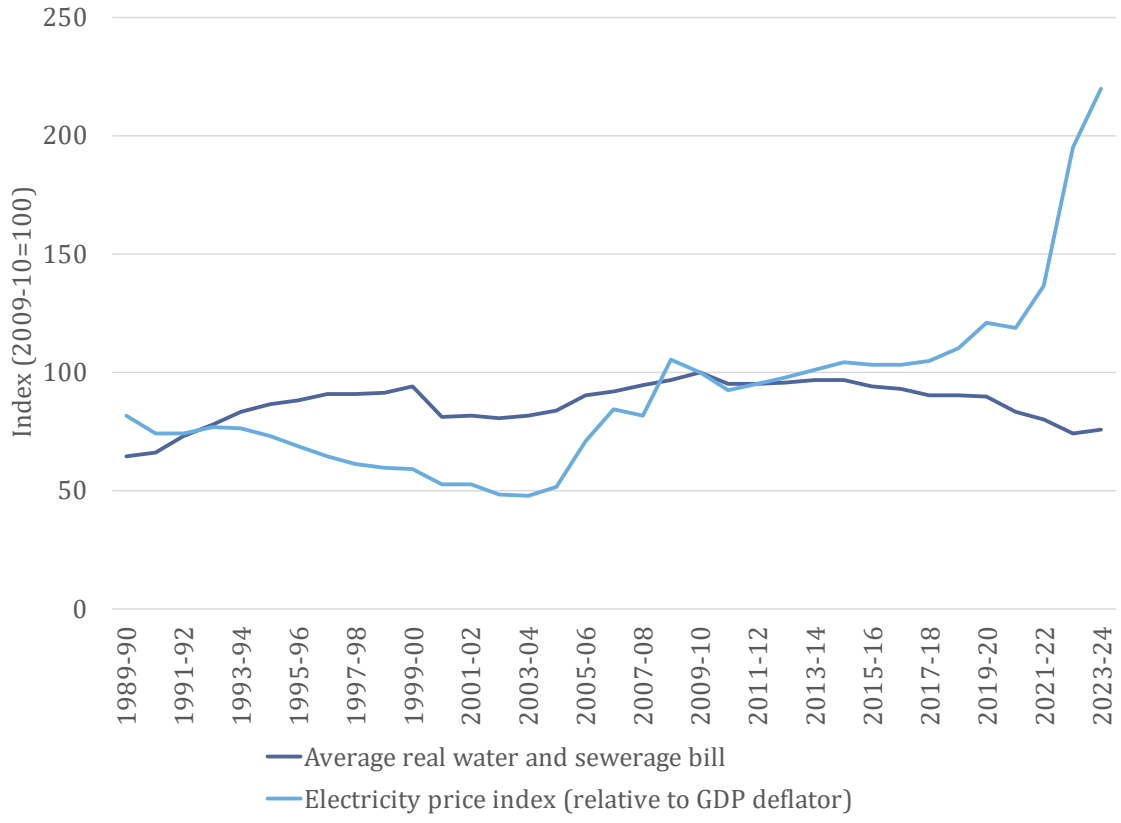
Figure 14: Difference between actual and projected average bills (constant in 14-15 real terms) during the PR14 and PR19 periods



Source: Economic Insight analysis of Water UK data.

Note: The average real bills calculations consistent with Ofwat's indexation approach which changed from RPI to CPIH during PR19.

Figure 15: Comparison of real water and sewerage bills against electricity price index (relative to GDP deflator) between 1989-99 and 2023-24



Source: Economic Insight analysis of annual household electricity bills data published by Department for Energy Security and Net Zero (DESNZ).

Note: DESNZ's electricity price index is also used by Ofwat to calculate its Real Price Effects for energy.

Water companies appear to be 'asset sweating'

In its academic review, the National Institute of Economic and Social Research found that asset lives in the UK water collection, treatment and supply industry is around 80 years, which exceeds the asset lives in other countries.

> *"In the water collection, treatment and supply industry the average life is 80 years (while it is in the range of 30 to 50 years in other countries); in sewerage it is 75 years (30-50 years); in waste collection, treatment and disposal activities it is 64 years (30-50 years)"* [49]

Whilst it can be difficult to make international comparisons, we note that the study may imply that the UK may be using water infrastructure beyond its originally intended lifespan. In theory, this could be the result of advanced asset management techniques in the UK. However, in the absence of any evidence of such techniques, this appears to suggest companies are making assets last longer

[49] *'Academic Review of Asset Lives in the UK.' National Institute of Economic and Social Research (2021), page 59.*

than their design lives (asset sweating). We note that assess sweating in the water industry could create material risks in terms of its operational resilience.

Ofwat's regulatory framework may itself be contributing (and exacerbating) the underinvestment problem. Specifically, Ofwat creates incentives for companies to engage in particular activities, and naturally, companies respond to the incentives they are set. This includes: (i) Ofwat's outcomes framework; and (ii) Ofwat's quality and ambition assessment framework. We discuss both in further detail below.

Ofwat's outcomes framework

At PR19, Ofwat introduced an outcomes framework with specific targets (known as performance commitments) to enable *"water companies to deliver for their customers, the environment and wider society."*[50] This involves setting targets in areas such as: (i) customer satisfaction; (ii) leakage reduction; as well as (iii) asset health. In addition, Ofwat links the performance against these service-levels against incentives, for example, through payments based on underperformance and overperformance.

It is important to consider the impacts in the context of capital investment. Specifically, whether the allowances given to companies are sufficient to deliver the performance targets set. If Ofwat has set overly ambitious targets, companies will struggle to meet them. This may result in companies having to prioritise against targets to minimise the financial penalties from underperformance. This can have a detrimental impact on long-term asset health if companies deprioritise long-term investments to deliver on other targets.

We note that, given the longer lead time to improve asset health performance, companies may have greater incentives to focus on meeting other targets, such as leakage reduction, where short-term expenditure can have a more material impact.

Quality and ambition assessment

At PR24, Ofwat's quality and ambition assessment (QAA) framework creates rewards and penalties which appear to be based on the extent to which companies align with Ofwat's own view of specific assumptions, such as the allowed return on capital and ODI rates.[51]

The QAA therefore incentivises companies to agree with Ofwat's position and potentially commit to levels of service in the short-term which come at the expense of longer-term expenditure on e.g., asset maintenance. Specifically, Ofwat's framework imposes financial penalties for companies which Ofwat considers have 'inadequate' business plans, which appear to be based on accepting Ofwat's approach (e.g. on the allowed return on capital).

We note Ofwat's position is that companies can deviate from its assumptions, provided appropriate supporting evidence is submitted.[52] Ultimately, however, Ofwat can decide (as evidenced above) unilaterally whether the evidence is not good enough.

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[50] *'PR19 Outcomes performance commitments - changes and corrections.' Ofwat. Available at: https://www.ofwat.gov.uk/regulated-companies/price-review/2019-price-review/pr19-outcomes-performance-commitments-changes-and-corrections [Accessed on 23rd January 2025]*

[51] *'Appendix 12 - Quality and ambition incentive.' Ofwat (2022), page 7.*

[52] *'PR24 final determinations Quality and ambition assessment summary.' Ofwat (2024), page 11.*

7

ADDRESSING THE UNDERINVESTMENT RISKS IN THE EXISTING REGULATORY FRAMEWORK

In this chapter, we set out: (i) how Ofwat attributes any company underperformance to company-specific inefficiencies; (ii) how Ofwat's existing regulatory framework may prevent companies from independently addressing any issues of historical underinvestment; (iii) considerations for mitigating the risk of underinvestment arising under the regulatory framework in future; and (iv) potential solutions to address existing historical underinvestment.

7A Chapter structure

In this chapter, we consider the challenges for companies facing historical underinvestment and discuss how the current framework may prevent them from independently addressing these issues. Furthermore, we set out key considerations for mitigating the risk of future underinvestment, as well as the potential solutions to resolve underinvestment for companies already in this position.

The structure of this chapter is as follows:

- **First**, we explain how Ofwat's existing regulatory framework attributes any company underperformance to company-specific inefficiencies.
- **Second**, we discuss how Ofwat's regulatory framework may prevent a company from being able to address its underinvestment issue independently.
- **Third**, we consider the key issues for regulator to consider in order to mitigate / prevent underinvestment arising within its regulatory framework.
- **Fourth**, we consider how the underinvestment by some companies can be resolved, given the position they are in now.

7B Ofwat's regulatory framework attributes any underperformance to company inefficiency

As discussed in Chapter 5, the issues outlined above can result in a company finding itself in a 'doom loop' and reaching a critical state of poor asset health.

In its existing framework, Ofwat's default position is to attribute any underperformance (such as deteriorating asset health) by companies to divergence from what it considers to be the notionally efficient company. That is, Ofwat takes an overly punitive approach and assigns responsibility to the company and its shareholders to 'fix' any problems (including underinvestment). However, there are efficient reasons to suggest that Ofwat's position may be flawed.

In other words, a companies' underperformance may be due to regulatory system failure, rather than company-specific inefficiency. For example:

- **First**, (principally) if regulation works properly, companies should have all the right incentives to invest in their assets. Therefore, if we find that they are not (which seems to be the case, as we set out above), it may be that the regulatory framework is not working.
- **Second**, given the difficulty in identifying the 'true' efficient level of costs (as detailed above), it is unbalanced for the regulator to conclude any deviation is due to company inefficiency. As previously set out, the characteristics of the water industry mean Ofwat is susceptible to 'getting things wrong' with its yardstick model.
- **Third**, there is evidence suggesting that regulation is lacking as opposed to company performance, i.e. it is not company-specific inefficiency. For example, as set out in section 5C, companies across the sector have been consistently overspending but underperforming at PR19.

7C Ofwat's regulatory framework may prevent companies from addressing historical underinvestment independently

Once a company is underperforming, Ofwat's existing regulatory framework may prevent companies from being able to improve and get 'back on track'. For example, the myopic nature of the regulatory framework may prevent underperforming companies (such as those with poor asset health) from making the decisions a notionally efficient company in that situation would make for the long-term. Specifically, for a company stuck in a 'doom loop' of deteriorating asset health, its customers need assets to be fixed and fully functional in the long-term. This requires:

(a) critical investment to address the underinvestment (and, therefore, willing investors);

(b) good management who can deliver investments; and

(c) supportive regulation.

The regulatory framework directly affects (c) and, by extension, (a) and (b). As discussed above, Ofwat's existing regulatory framework presumes that the underperformance of a company (such as one with poor asset health) can be wholly attributed to company inefficiency.

Therefore, to address underinvestment risks in the short- and long-term it is necessary for the regulator to: (i) mitigate underinvestment from arising in future; (ii) support companies who already suffer from historical underinvestment. Both are key in ensuring companies can make the necessary investments (and deliver a resilient service for their customers) going forward. We discuss these below.

7D Mitigating future underinvestment in the water industry

As set out above, Ofwat's regulatory framework can fail to ensure companies are able to make the long-term investments required. Below we set out the key issues for regulator to consider in order to mitigate / prevent underinvestment arising within its regulatory framework. This includes the following.

- **The notionally efficient firm needs to be defined carefully to ensure a yardstick can be set appropriately** (i.e., that it is not falsely conflate a company which is low cost as cost efficient). This may require a more a holistic approach across the price control which goes beyond a single measure of cost efficiency e.g., one which takes asset health into account (as well as wider service quality metrics).

- **The regulatory framework needs to consider that the impacts of some regulatory decisions cannot currently be observed in the short-term** (i.e. the five-year price control period). This points to the need to address how best to determine, fund, and incentivise the right overall amount of capital maintenance within base cost allowances, in a way that preserves companies' flexibility to balance where and how they invest their asset maintenance efforts and resources, in the best interests of their customers.

- **The challenges in applying a yardstick model implies that a wider set of evidence, i.e. beyond the backward-looking econometric benchmarking, would be appropriate.** This is in order to break the link between artificially depressed historical expenditure data and future

base cost allowances, which results in a persistence of underfunding that means companies cannot invest sufficiently to maintain good asset health going forward. This will prevent any historical underfunding reoccurring (noting that, as above, any such underfunding that has already occurred may itself require a correction).

7E Addressing historical underinvestment

In addition to the above, the regulator will need to consider how to address the historical underfunding that has already occurred (and the underinvestment it has created). That is, how best companies, which have been caught in the 'doom loop' (or are close to) can be supported to deliver for their customers in the long-term. Ultimately, the historical underfunding of companies is a long-term issue which will require a long-term solution, as noted by the House of Lords:

> *"Putting right the problems in the infrastructure of the water and sewerage systems after decades of under-investment is urgent but it must be understood that this is going to take a decade or more. It is also going to require more effective coordination and proactivity on the part of the Government, regulators and water companies."*[53]

Whilst the details of 'how' the regulator can ensure historical underfunding can be addressed is beyond the scope of this report, we set out some initial considerations below.

- **Fixing historical underfunding requires more than just additional funding.** To address the root causes (and consequences) of any historical underinvestment, companies may for example, require: (i) the resource to develop a focused and long-term transition plan; (ii) sufficient time to implement it; and (iii) (possibly) a revised regulatory framework that allows them to focus on delivering the transition plan (instead of, for instance, delivering small continuous improvements in performance).

- **Interventions should be consistent with the notionally efficient company over the long-term.** It is imperative that any interventions enable companies to make decisions consistent with the notionally efficient firm in the long-term, and that it does not directly (or indirectly) create incentives for companies e.g., meet short-term performance targets (such as year-on-year increases in performance) to signal a 'turnaround'. This may include ensuring short-term pain to deliver longer-term efficiency is properly incentivised.

- **It will be necessary to attract investors to support underfunded companies.** The regulator will need to consider how to create an environment which attracts investment in companies which are likely only to provide returns over the longer-term. This may include providing guarantees to investors on potential returns. In order to retain investors, it will be important for the regulator to credibly signal stability of the regulatory framework going forward. For example, the regulator could set predictable timelines for any reviews of regulatory changes.

[53] *'The affluent and the effluent: cleaning up failures in water and sewage regulation.' House of Lords (2023) Industry and Regulators Committee, page 4.*

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4 Limitations on liability

4.1 We will not be liable for any loss, damage, cost or expense arising in any way from, or in connection with, any dishonest, deliberate or reckless misstatement, concealment or other conduct on the part of any other person.

4.2 We will not be liable, whether in contract, tort (including negligence), breach of statutory duty or otherwise, for any loss of profit, loss of business, business interruption, or loss of business opportunity or any indirect or consequential loss arising under or in connection with the provision of our services (including but not limited to this report).

4.3 Economic Insight accepts no liability for any action taken on the basis of the contents of this report. Further to paragraph 2.2, any individual or firm considering a specific investment should consult their own broker or other investment adviser. Economic Insight accepts no liability for any specific investment decision, which must be at the investor's own risk.

4.4 Subject to losses wholly excluded under paragraphs 4.1 to 4.3, our aggregate liability for any damage, loss, cost, claim or expense arising out of, or in connection with, this engagement, including any reports or documents prepared pursuant to it, whether such liability arises in contract, tort, negligence or as a result of a claim for misrepresentation or breach of statutory duty or otherwise, shall be limited to the sum in accordance with our terms of service, or as separately agreed with you (The Client(s)).

4.5 If any provision or part-provision of this paragraph 4 is / or becomes invalid, illegal or unenforceable, it shall be deemed modified to the minimum extent necessary to make it valid, legal and enforceable. If such modification is not possible, the relevant provision or part-provision shall be deemed deleted. Any modification to or deletion of a provision or part-provision under this paragraph 4 shall not affect the validity and enforceability of the rest of this report.

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