CEPA
economics matters

Allocation of risk

Prepared for Ofwat

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FINAL

Important notice

Contents

EXECUTIVE SUMMARY

CEPA was commissioned by Ofwat to provide consultancy advice on the allocation of risk and the effectiveness of the regulatory framework in water in respect of the allocation of risk. The views set out in this report are CEPA's and have been prepared to challenge Ofwat's thinking in the early design of PR24.

Scope of work

Ofwat highlighted the following tasks within the scope of work:

- A review of Ofwat's approach to identifying and prioritising risks;
- Creation of a potential risk allocation framework;
- Consideration of the current allocation of risk to identify gaps, consider duplication and assess overall effectiveness of the regulatory framework with respect to risk allocation;
- Comparison of Ofwat's approach to others, including Ofgem; and
- Making provisional recommendations, including in respect of options to modernise[1].

Key definitions

Ofwat asked that we focus on first principles. As part of that we defined key terms that we use throughout the document. Our definition of company risk (i.e. incumbent monopoly water company) is how we would expect corporate finance practitioners to think about risk:

> *"Risk is defined in financial terms as the chance that an outcome or investment's actual gains will differ from an expected outcome or return"*.[2]

The definition captures both the potential for positive and negative variation relative to an expected outcome or return. The definition also highlights different dimensions to risk; namely the probability of deviation and the magnitude of that deviation.

Risk drivers are those factors that influence risk; a risk driver is a different concept to the risk itself. For example, Covid or Brexit are risk drivers rather than risks themselves.

Regulated companies are a natural starting point for assessing risk. A cornerstone of regulatory approaches is the 'notional entity', a hypothetical company that can be used as the basis for policy design[1]. While it may be informed by a review of evidence across the sector, it does not correspond to a given company. As such, individual companies will face risks that differ to the risks of the notional entity and from one another. It is from the notional entity's perspective that we consider company risk. A 'mismatch risk' exists where the expected revenue and expected cost for a company are not equivalent (in either direction).

We also refer to a 'risk budget', by which we mean the overall risk that can be allocated to a company under a balanced risk and reward framework[3]. Water, in common with other regulated utilities, is characterised as a relatively low risk and low reward sector. The size of the risk budget is constrained in the extent of risk that can be

[1] We understood the term 'modernise' to refer to updating the regulatory regime, not limited solely to incremental change options for the regulatory regime.

[2] Taken from Investopedia: https://www.investopedia.com/terms/r/risk.asp.

[3] Given impacts on financeability, the risk budget will include both diversifiable and non-diversifiable risks, though the WACC should only compensate for non-diversifiable risks.

placed on companies, given financeability constraints around investment grade credit ratings in licences and links to financing costs that customers ultimately pay.

The water sector includes a broad set of stakeholders, as well as companies involved in delivering water and sewerage services to customers. We adopt a definition of sector risk that is consistent with the corporate finance definition of company risk, but it encompasses outcomes for water sector stakeholders (including consumers, taxpayers and broader society). An 'outcome' in this context could refer to financial outcomes such as delivery costs or to more general issues of relevance to stakeholders such as service quality.

Key findings

We do not consider that there are errors in Ofwat's approach that necessitate extreme change; instead there are lessons learnt from recent price controls, new challenges and from taking a step back that can inform policy setting for PR24.

Our analysis of Ofwat's regulatory regime suggests that its current approach is consistent with wider regulatory practice of allocating risks to a party on the basis of the party who is best placed to manage risk. For the purposes of this report, we consider that the 'best placed to manage' decision rule is too high level a test in isolation on which to base risk allocation for the purpose of this report, which is inevitably more complex than a single characteristic. For instance, the rule implies that one party is better placed, but does not consider implications for overall risk exposure (i.e. the risk-budget concept) nor the outcomes expected from placing risk onto these parties.

We expect that in reality all regulators implicitly develop the concept further as they consider the overall quantum of risk that is appropriate and proportionate to allocate to companies and in what areas, rather relying solely on the best placed to manage criterion. We also consider that regulators are likely to be more sophisticated in managing the risk budget i.e. that they prioritise the areas that they wish regulated companies to be exposed to.

To make these implicit judgements more transparent and to aid consistency we identified desirable characteristics of risk allocation 'themes' and developed a set of questions that Ofwat could use as it considers each theme and unpicks how and why risk is allocated. These questions could form an initial framework for risk allocation[4].

Table E.1: Summary of analytical framework

1. Appropriate allocation of individual risks	2. Ensuring suitable company focus	3. Use of suitable risk mechanisms	4. Optimising the regime in line with best practice principles	5. Effective measurement of risk exposure
Are societal benefits maximised from the given allocation of risk?	**Is water company management focus directed at activities generating those societal benefits?**	**Are risk allocation tools proportionate, targeted and having their intended effect?**	**In the round, does the regime achieve balance across best practice principles such has consistency, transparency and complexity?**	**Are risks accurately measured and conveyed clearly / intuitively?**
Does the regulator have a comprehensive overview of relevant sector risks from all perspectives?	Does the regulator maximise delivery incentives, relative to an overarching financeability constraint?	Have risk mechanisms and measures been used in a consistent way, given the regulator's prioritisation of risk allocation?	Does each risk allocation and sharing mechanism serve a distinct purpose, minimising duplication across the regulatory regime?	How well does the approach estimate risk and predict outcomes?
Does the allocation of individual risks maximise potential net benefits to society in the long-term i.e. not just within control?	Has the regulator considered the opportunity cost of encouraging focus on one risk at the expense of another?	Are any mechanisms under-used or over-used, relative to what would be expected?	Do companies face a balanced package of risks in the round?	How well does the approach assist in informing stakeholders and setting policy?
	Could partial risk allocation maintain strong incentives on companies, while permitting sharper risk exposure elsewhere?	Is cashflow timing associated with individual risk mechanisms appropriate?	Is the overall approach transparent, pragmatic and internally consistent?	
	Are companies suitably exposed to risk in relation to long-term priorities?		Does the package strike a suitable balance between simplicity and complexity?	

[4] Where we discuss long-term societal benefits, this includes short-term impacts e.g. affordability, bill volatility.

In the early phases of our work we developed a register of risks faced by a notional company and separately considered wider societal risks that might not be captured when considering risk through a company lens. Those societal risk items typically relate to quality of service delivery or cost, but we have noted the channel through which this might occur.

We asked a small number of companies to comment on the register. The key risks identified are summarised in Table E.2 below:

Table E.2: Summary of relevant risks and issues across the water sector value chain

Perspective	Risk category	Risk items		
Company perspective	**Strategic risks**	• Political risk • Asset stranding • Network growth (investment) risk	• Risk from population growth and resulting pressure on supply chain	• Overall supply of water • Environmental & sustainability risks • Demand risk in markets open to competition
	Operational risks	• Asset failure • Internal & external service provision/ supplier failure risk • Technological risk (including cyber)	• Water pollution • Construction/cost volume risk • Input price variation risk (forecast vs outturn)	• Bad debt (including water poverty issues) • Interface risk (with connections and for water trading)
	Financial risks	• Cost of debt mismatch • Cost of equity mismatch	• Inflation risk • Pensions deficit risk	• Tax (cost) risk • Refinancing risk
	Compliance & regulatory risks	• Revenue/ cost risk from changes to licence conditions & minimum standards	• Totex mismatch risk	• Incentive exposure through outcomes • Enforcement risk
Perspective	Category	Risk items		
Societal perspective	**Short term**	• Inadequate service quality • Funding of outputs/ outcomes that are not delivered	• Asset failure risk • Rent extraction and 'double funding'	• Too much emphasis on 'minimising costs'
	Long term	• Company insolvency or failure • Companies are not engaged with their local communities	• Affordability (short-term and long-term) • Investment biases	• Water bill volatility • Failure to meet future demand needs • Environmental damage

This identification of sector risks formed the start point of our analysis. We then used the risk assessment framework that we developed to identify issues that Ofwat could choose to consider further in developing its approach to PR24. The issues that we identified are summarised below in Table E.3. The explanations of each issue provide an 'at a glance' view, with further detail provided in the subsequent text and in the main report.

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Table E.3: Summary of potential issues[5]

1. Appropriate allocation of individual risks	2. Ensuring suitable company focus	3. Use of suitable risk mechanisms	4. Optimising the regime in line with best practice principles	5. Effective measurement of risk exposure
Are long-term societal benefits maximised from the given allocation of risk?	**Is water company management focus directed at activities generating those long-term societal benefits?**	**Are risk allocation tools proportionate, targeted and having their intended effect?**	**In the round, does the regime achieve balance across best practice principles such as consistency, transparency and complexity?**	**Are risks accurately measured and conveyed clearly / intuitively?**
CONNECTIONS – DSRA Challenging to fine-tune incumbents' risk exposure	ODI REGIME Allocation may under incentivise focus here, relative to societal benefit generated	ODI REGIME Potential scope for caps and collars to distort optimal incentive properties	ODI REGIME High degree of complexity impacts on the ability of companies to respond	PRESENTATIONAL VALUE Communication around risk could be improved
LONG V SHORT-TERM PERSPECTIVES There may be opportunities to create a more optimal long v short term balance	LONG V SHORT TERM PERSPECTIVES Allocation may under incentivise focus here, relative to societal benefit generated	INFLATION RISK Potential unaddressed risk through use of nominal debt	RE-OPENERS (IDOK/SE) Calibration may not reflect recent changes to regulatory regime	ACCURACY OF RISK ESTIMATION Hard to be sure regime is calibrated as intended
ACCURACY OF RISK ESTIMATION Risks with shared drivers may warrant further review	ACCURACY OF RISK ESTIMATION Effective prioritisation requires accuracy	CONNECTIONS – DSRA Mechanism has scope for potentially unintended outcomes	RECONCILIATION MECHANISMS Interlinked models create some complexity – is this proportionate?	
		GOSM (GEARING) CMA redetermination of PR19 indicates there would be value in reviewing this mechanism	COST OF EQUITY INDEXATION Reducing forecast error would create greater consistency across regime	

[5] Glossary. DSRA = Developer Services Revenue Adjustment, ODI = Outcome Delivery Incentive, GOSM = Gearing Outperformance Sharing Mechanism, IDOK = Interim Determination of k, SE = Substantial Effect determination.

RE-OPENERS (IDOK/SE)

Are these licence-based reopeners needed given other risk sharing mechanisms?

In total we identified ten risk allocation issues for Ofwat to consider (note: some issues appear under multiple themes), based on an assessment using our analytical framework[6]. The reasons for considering these issues are discussed further below (with a more detail provided within Section 7.2).

Taking each theme of the framework in turn, we summarise our findings below.

In relation to **appropriate allocation of individual risks** we do not find any major issues, as might be expected in a mature regulatory regime. But, we identify a small number of risks that may merit further attention because current treatment may not, in practice, work as intended and there may be a more pressing need to ensure that the regime better balances the short and long term objectives of the sector[7].

- On inflation risk, stakeholders indicated to us that the approach adopted was, according to some, not having the intended effect; companies face varying amounts of inflation risk, based on their share of nominal debt and associated derivatives[8].
- It is challenging to fine-tune the balance of risk exposure in relation to new connections. Ofwat has sought to insulate incumbent companies from externally-driven risk relating to the volume of new connections. Partly as a result, financial incentives for companies to compete directly with other providers of new connection services are muted – potentially limiting the scope for competition between providers to deliver benefits for customers.

Our assessment of the allocation of individual risks also identifies two potentially more significant issues for groups of risk. There are two potential issues flagged around why risk allocation may not generate the long-term societal benefits that could be delivered by an alternative risk allocation:

- Firstly, we consider that there is potentially scope to improve the balance between short term and long term risks, in this context placing greater emphasis going forward on asset resilience and environmental risk.
- Secondly, it is possible that the current approach to risk measurement limits the ability to accurately assess impact, in particular around covariance and shared risk drivers i.e. where multiple outcomes are driven by single factors. Covid is an example of an event (or risk driver) having multiple impacts, with weather representing a further example of a driver of multiple outcomes.

In relation to designing **suitable individual mechanisms**:

- For the ODI regime, there are a variety of caps and collars applied to incentives. While there is a clear rationale for this, anecdotal evidence from stakeholder engagement suggested that the caps and collars had strong impacts on performance for individual ODIs that may not always be consistent with the behaviour Ofwat was seeking to incentivise. This is a point that requires detailed assessment not practicable within the scope of this project so we raise it as an area that Ofwat may wish to explore further.
- The Developer Services Revenue Adjustment Factor (DSRA) mechanism looks to protect water companies from facing volume risk. The overall number of connections required in a company's area is an externally-driven, uncontrollable risk, and so this treatment appears appropriate. However, the revenue allowance and any adjustments via the DSRA are calculated with reference to the total number of connections, irrespective of who delivers them. This means companies benefit financially where other market

[6] Some issues have been raised multiple times, hence there are more than ten boxes.

[7] Ofwat has discussed this within the December 2020 report on future challenges and opportunities for the water sector in PR24 and beyond here.

[8] Inflation swaps can be used to change a companies' exposure to inflation.

participants carry out the work – or, equivalently, are penalised financially where they carry out the work themselves. This may dampen incentives to improve their service to developers.

  - The use of an average unit cost rate (albeit a company-specific rate) in the DSRA means that companies are exposed to variations in the mix of work undertaken, which may also be considered uncontrollable. The rates are based on companies' forecast mix of work. Provided there are no structural reasons to expect shifts in volume or SLP penetration to be focused on particularly high- or low-cost work, this approach would represent a 'fair bet', and we acknowledge that use of disaggregated rates (which Ofwat did consider for PR19) would be more complex to implement.

- The CMA redetermination suggests that it would be beneficial for Ofwat to review the GOSM further in terms of its ability to address the long-term risks that highly geared companies present to consumers.
- Re-openers (IDoK and Substantial Effect (SE) determination) are included in our issues list because, prior to 2021, they have not been invoked since 2013. This, in itself, is not a problem as they are intended as a backstop and can be used as part of the gateway approvals process for Direct Procurement for Customer (DPC) projects. But, other mechanisms within the regime seem likely to limit their use further and they are now somewhat out of line with the rest of the regime e.g. in how they categorise and consider costs. There is therefore a question about their role going forward.

Focusing on individual mechanisms (or even groups of the same) naturally leads to proposing incremental change, where specific problems are identified. But a key observation from this project is that the mechanisms that Ofwat uses create a level of complexity such that the value of the mechanisms may not be proportionate to their impact. It is difficult to point to specific parts of the regime that should definitely be reduced in scale or individual mechanisms that might be removed altogether. For example, none of the individual reconciliations are unduly onerous but taken together, and because a change in one model necessitates change in others, they create a substantial work requirement both in terms of understanding and operation. A key finding therefore is that Ofwat should look across the mechanisms that it uses and seek to simplify where possible, recognising that simplification may result in a degree of 'rough justice' but then weighing the costs of this against a consideration of the benefits derived.

Our remaining three themes take more of an 'in the round' approach to assessing the regulatory regime.

Ensuring a suitable company focus. This theme considers whether the focus of water companies is clearly directed at those areas where they can best improve outcomes for customers, the environment and wider society. In order to be able to reasonably identify relevant constraints on risk allocation and think about prioritisation, the regulator needs to have an appreciation of the scale of risk, recognising that aggregate risk can vary substantially from the sum of individual risks.

It is not clear that the current regime supports such focus. Risks and incentives must be considered and prioritised carefully in order to focus on aspects of performance that matter most and better utilise the risk budget.[9]

The emphasis on in-period performance risks can detract from longer term thinking. For instance, in asset management terms, five-year periodic reviews are regulatory requirements not driven by the needs of company assets many of which are much longer lived. We wonder whether there is greater scope, even within the necessary restrictions of a regulatory environment, to utilise longer term plans for context and longer term objectives for which a five year period forms only a part. There is a clear read across to other issues such as climate change commitments here.

In addition, although difficult to evidence, we speculate that the complexity of the regime and the limits it places on outperformance may inhibit innovative behaviour, in particular within the price control period. Management focus is currently spread over a large range of cost and performance monitoring mechanisms from cost sharing to ODIs and

[9] ODIs is an example that we raise here. Prioritisation of risks and incentives are important under a high-risk, high-return framework, though the threshold is less likely to 'bite' in such a situation.

sharing factors, caps and collars etc. which limit upside. While this is intentional, and balance is clearly needed to restrict the opportunity for significantly enhanced returns, there may be scope to reduce the amount of regulation in selected areas to foster innovation. A valuable exercise might be to discuss with the companies whether scope for in period innovation exists within the current regime. In an unregulated business, plans might change substantially over a five year period if a new opportunity was identified. Companies may be best placed to provide evidence of innovative actions they would take absent elements of the current regime.

Optimising the regime around best practice principles again focuses on the big picture. The key issue here is complexity, which was frequently highlighted by stakeholders that we spoke to and which emerges strongly from application of our allocation framework. The ODI regime and reconciliation mechanisms create a burden on management time and Ofwat may wish to review to ensure that the approach is proportional in achieving its intended objectives.

In some areas Ofwat's approach could be made more internally consistent. In general, it has sought to limit exposure to drivers of risk outside of management control. Though challenging to apply and adding to complexity, indexing the cost of equity (rather than setting a fixed allowance) may fit better with the principle of consistency if indexation is maintained elsewhere. Rating agencies and companies continue to perceive IDoK and SE as valuable backstop mechanisms. However, as noted earlier, there may be scope to update the approach to re-openers to improve how they work alongside other mechanisms and within the broader regulatory regime.

Effective measurement of risk exposure is our final theme and extends to the measurement and presentation of risk analysis in an understandable and engaging way. Where of material consequence to decision-making, there is value in assessing the distribution and inter-relations of risks as well as their typical impact and frequency. Analyses of risk and policy setting should ideally use intuitive summary statistics and visuals that can support improved outcomes across the industry and build confidence that the regime is calibrated as intended. We consider that there is scope to improve on the current risk analysis (based on RoRE) to more accurately capture issues around co-variance.

Overall reducing complexity and duplication, becoming more sophisticated in risk measurement and improving prioritisation through greater use of targeting are broad themes to consider, as is extending the planning horizon and seeking to create space for innovation. It is these broader cross-cutting themes that we think should be the initial focus for Ofwat at this stage in the PR24 process, rather than focusing on one specific risk or mechanism.

Developing the regulatory regime for PR24?

Having applied our risk assessment framework, we package our findings into two strawman options; an 'incremental change' option and a 'fundamental change' option. The results of which are presented in Table E.4.

The incremental change option highlights that the current regulatory regime has evolved over multiple price controls, with clear rationale around the introduction of individual policy measures and a regulatory framework that is well understood by stakeholders. We do not consider that there are errors in Ofwat's approach that necessitate extreme change; instead there are lessons learnt from recent price controls, new challenges and taking a step back that can inform policy setting for PR24.

The more fundamental change option looks to scale back some of the mechanisms and policy options in order to try to direct the focus of company management to those factors that will best deliver a mix of short-term and long-term societal benefits. This approach would likely involve a degree of 'rough justice', but the regulatory framework is likely to be less complex and more targeted as a result.

Both strawmen contain a combination of options that do not necessarily need to be adopted together and should <u>not</u> be considered firm recommendations at this early stage. They should be treated as illustrative and an aid to thinking though the direction of travel for PR24.

Table E.4: Presentation of strawman options

Incremental change option	Fundamental change option
• Similar ODI regime – potentially with grouped ODIs to provide some level of simplification and ODIs based on asset health that extend the time horizon. • Continued evolution to models and process for reconciliation mechanisms; perhaps with a degree of automation to reduce the burden and risk of error. • Re-openers largely or fully unchanged on the basis that they are unlikely to be needed given other protections. • Limited changes to further reduce forecast error (where that remains) – e.g. consider cost of equity indexation. • Retention of RoRE presentation of risk, potentially with some refinements to accuracy of measurement that recognises covariance. • Limited number of new risk-allocation mechanisms and tools for PR24 relative to PR19, limiting any additional complexity.	• Materially reduced number of ODIs, focused on key long-term priorities of society – each ODI has more material revenue at stake, possibly without individual caps and collars. • Introduction of longer term performance obligations that direct greater focus on to issues like asset resilience and environmental commitments. • Reduction in the number of reconciliation mechanisms, with risks shared through sharing factors and re-openers playing a more prominent role in limiting more extreme outcomes; greater forecasting risk faced by companies. • Improved modelling capability to assess risks (individually and in aggregate) – such as Ofwat's own Monte Carlo analysis – supporting the prioritisation of the most important outcomes. Alternative presentation of risk in policy making e.g. flag chart concept.

1. INTRODUCTION

1.1. SCOPE

Ofwat has appointed CEPA to evaluate its approach to risk mechanisms. Ofwat's overarching objective is to assess the effectiveness of its current approach to risk allocation. It expects the work to cover:

- Its approach to identifying and prioritising risks;
- Creation of a potential allocation framework;
- Consideration of current allocation to identify gaps, consider duplication and assess overall effectiveness of the regulatory framework;
- Comparison of Ofwat's approach to others including Ofgem; and
- Make provisional recommendations including in respect of options to modernise.

In its work scope, Ofwat flagged specific issues and considerations that the project is to address:

- Consideration of its use of particular risk allocation mechanisms e.g. Reconciliations.
- Role of infrequently used mechanisms such as: i) interim determination of k (IDoK), ii) Substantial Effect (SE) determinations – do these remain appropriate within the overall framework?
- The use of indexation e.g. of the cost of equity, costs and benefits of full indexation in respect of the cost of debt.

The work requires us to consider a range of perspectives including debt and equity investors, companies and consumers.

The views set out in this report are CEPA's and have been prepared to challenge Ofwat's thinking in the early design of PR24.

1.2. REPORT STRUCTURE

Following this introduction our report is structured in two parts:

- Part A Our conceptual approach and framework for allocating risk.
- Part B Options for regulatory framework design in PR24.

PART A – DEVELOPING A CONCEPTUAL FRAMEWORK FOR RISK ALLOCATION

In Part A we develop a framework for assessing risk allocation from first principles drawing on Ofwat's earlier work and exploring the approaches adopted by other regulators.

In order to develop a framework we have:

- Defined core concepts which we set out in Section 2;
- Considered how to allocate risk including both the treatment of individual risks and balancing the overall package of risk exposure (Section 3);
- Assessed the role and uses of risk sharing mechanisms (Section 4); and
- Considered at a high level how to measure risk (Section 5).

The concluding section of this Part identifies the key questions arising from this treatment of risk and develops those into a framework for assessing risk. This framework is taken forward to Part B of the report.

2. CONTEXT

There are a number of ways in which the question of effectiveness of risk allocation might be approached. Given that is the case, in this section we:

- set out how we define risk and associated concepts within the project;
- demonstrate the value of thinking about risk from a range of perspectives; and
- outline some of the key characteristics of risks and why these are relevant to the questions of risk allocation, sharing and measurement.

2.1. KEY DEFINITIONS

The notion of risk may mean different things in different contexts. Whilst we do not seek to provide a definitive overall review of different treatments or conceptualisations, we consider it helpful to begin with a set of definitions of key terms as they are used in this report.

A helpful starting point is a definition of risk from a corporate finance perspective. The following definition is reasonably representative of how we would expect corporate finance practitioners to think about risk:

> *"Risk is defined in financial terms as the chance that an outcome or investment's actual gains will differ from an expected outcome or return"*.[10]

We adopt this as a definition for thinking about **company risk**. In the context of this report, unless the context indicates otherwise the term 'company' refers to regulated monopoly water networks.

The definition captures both the potential for positive and negative variation relative to an expected outcome or return. The definition also highlights different dimensions to risk; namely the probability/ chance of deviation and the magnitude of that deviation.

The water sector includes a broad set of stakeholders (including consumers), as well as regulated (and indeed unregulated) companies involved in delivering water and sewerage services to customers. We therefore also adopt a broader definition of **sector risk** that is consistent with the above corporate finance definition of company risk: sector risk is the chance that a tangible outcome relevant to water sector stakeholders will differ from an expected outcome. An 'outcome' in this context could refer to financial outcomes such as delivery costs, price or to more general issues of relevance to stakeholders such as service quality.

Whether discussing company risk or sector risk we can distinguish between **risk and uncertainty**. Strictly speaking, **risk** relates to instances where the probability (or probability distribution) of an outcome (or range of outcomes) is known. **Uncertainty** relates to instances where probability is unknown. In practice, however, the level of understanding of probability is likely to be less binary in nature, with most if not all risks including elements of uncertainty.[11]

The exposure of companies to risk in the water sector will be a function of both underlying risks in the sector and the specific regulatory approach. The regulatory approach will include both:

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[10] Taken from Investopedia: https://www.investopedia.com/terms/r/risk.asp.

[11] See Section 2, Ofwat (2010) "Allocating risk and managing uncertainty in setting price controls for monopoly water and sewerage services – a discussion paper" available online. Note that we do not delineate between risks and uncertainty when defining individual risks in the report.

- specific **features** of the regulatory package that encode regulatory principles that serve to allocate primary responsibility for holding and managing a risk in the first instance to one party or another; and
- risk-sharing **mechanisms** that can adjust or fine-tune the balance of risk exposure between parties and react to outturn data or new information.

Features and mechanisms can be difficult to disentangle or consider separately. But an example might be that companies are given a revenue allowance to manage cost risk (feature), but with a cost-sharing factor in place to mitigate the risk of over/under-spends (mechanism).

The regulatory framework may allocate risks to companies that they otherwise might not face, for example through incentives. This is in addition to allocating individual risks.

Finally, in addition to risks themselves we also consider risk **drivers**. A risk driver is something that gives rise to or is correlated with a risky outcome, but is of not necessarily of any direct consequence in and of itself (for example, bad weather conditions). When it comes to regulatory treatment drivers may be helpful in acting as triggers or indicators of associated risks.

2.2. Perspectives

Different parties experience risk differently. Risks faced by a regulated company are not necessarily the same as those faced by consumers, taxpayers and society. We consider risk allocation from a number of perspectives in order to ensure a comprehensive assessment of risk and to understand how sector participants regard the current allocation of risk in the water sector.

Regulated companies are a natural starting point for assessing risk. A cornerstone of regulatory approaches is the **'notional entity'**, a hypothetical company that can be used as the basis for policy design[12]. While it may be informed by a review of evidence across the sector, it does not correspond to a given company. As such, individual companies will face risks that differ to the risks of the notional entity and from one another. It is from the notional entity's perspective that we consider company risk. A 'mismatch risk' exists where the expected revenue and expected cost for a company may not be equivalent (in either direction).

Within the overall category of companies we distinguish between the following sources of finance:

- **Equity investors** represent the default perspective on company-level risk allocation, as they will be exposed to marginal variations in cash flows and investment values. Investors require compensation for the risk they take on for two main reasons:
  - where risks cannot be reduced or eliminated as part of a diversified portfolio, i.e. where the risk is systematic in nature; or
  - where investors may be required to manage the consequences of downside exposure – for example, where downside risks are not broadly matched by upside potential.
- **Debt lenders** provide a significant source of finance for water companies alongside equity. Two key points are relevant. First, though this varies depending on the credit quality of debt, in a regulatory context debt lenders are typically assumed to be exposed to minimal risk. Second, the fixed payment obligations resulting from debt are a source of risk – specifically financial risk – for equity investors[13].

A company's **customers** will be the party that experiences many relevant outcomes in the sector. Not all of these outcomes will naturally result in consequences for companies, and so the customer perspective is essential to a full

[12] The notional entity for PR19 was an efficiently run company, which is 60% geared with 33% debt index-linked.

[13] Given periodic resets for allowances.

understanding. Outcomes relevant to customers may be financial in nature – e.g. relating to the level and volatility of bills – but may also be non-financial i.e. related to the quality of service they receive.

Finally, wider non-water sector stakeholders including **taxpayers** and **society** will be affected by the sector in ways that go beyond its impacts on companies and customers.

The regulatory framework is a key component to mapping customer, taxpayer and society priorities to requirements or incentives placed on regulated companies. For example, absent regulation a captive customer base would result in poor incentives to improve customer experience as there would be no consequences in terms of customers leaving if companies under provided. It is the regulatory framework that creates a risk to be faced by the regulated company to better drive their behaviour to that desired by consumers, e.g. a company-facing incentive linked to a consumer survey on bills. Failing to consider different perspectives around risks can lead to sub-optimal regulatory outcomes.

This does not imply a static allocation of risk (although in a regulated environment we would expect a degree of stability). Few if any risks are subject to a fixed allocation and can in principle be re-allocated among the parties listed above – subject to any constraints or questions of balance.

2.3. Identification of risks in the water sector

To understand the current risk landscape in the water sector, we looked at a number of different sources of information. This includes:

- previous reports on risk commissioned by Ofwat for PR14 and PR19;
- water company risk registers;
- engagement with water companies and other stakeholders; as well as
- Ofwat and CEPA expertise.

We undertook a brief phase of stakeholder engagement on the project to help inform our assessment. Discussions included understanding risks faced by companies, areas where the current regulatory framework does not allocate risks appropriately and how risk should be measured. Stakeholder discussions were held under 'Chatham House Rules' i.e. statements are not attributed to a single party. The interviews conducted included:

- Four companies (a mixture of WoCs and WaSCs, securitised vs non-securitised, small and large);
- Three sell-side equity analysts; and
- One credit rating agency.

Given that we relied on a small sample of stakeholders, we have used the process to supplement our own wider analysis of the risk landscape and development of the risk register from a company perspective.

Based on stakeholder discussions, our literature review and Ofwat and CEPA expertise in the sector, we compiled a list of relevant risks faced by companies and society spanning the entire water sector value chain (Table 2.1).

Table 2.1: Summary of relevant risks and issues across the water sector value chain

Perspective	Risk category	Risks		
Company perspective	**Strategic risks**	• Political risk • Asset stranding • Network growth (investment) risk	• Risk from population growth and resulting pressure on supply chain	• Overall supply of water • Environmental & sustainability risks • Demand risk in markets open to competition
	Operational risks	• Asset failure • Internal & external service provision/ supplier failure risk • Technological risk (including cyber)	• Water pollution • Construction/cost volume risk • Input price variation risk (forecast vs outturn)	• Bad debt (including water poverty issues) • Interface risk (with connections and for water trading)
	Financial risks	• Cost of debt mismatch • Cost of equity mismatch	• Inflation risk • Pensions deficit risk	• Tax (cost) risk • Refinancing risk
	Compliance & regulatory risks	• Revenue/ cost risk from changes to licence conditions & minimum standards	• Totex mismatch risk	• Incentive exposure through outcomes • Enforcement risk
Perspective	**Category**	**Risk items**		
Societal perspective	**Short term**	• Inadequate service quality • Funding of outputs/ outcomes that are not delivered	• Asset failure risk • Rent extraction and 'double funding'	• Too much emphasis on 'minimising costs'
	Long term	• Company insolvency or failure • Companies are not engaged with their local communities	• Affordability (short-term and long-term) • Investment biases	• Water bill volatility • Failure to meet future demand needs • Environmental damage

3. ALLOCATING RISK

In this section we set out some overall principles on allocating risk in a regulatory context, informed by both theoretical considerations of risk and by practical experience. We have considered both the treatment of individual risks and the aggregate allocation of risk to which different parties are exposed.

When thinking about a framework for risk allocation we must consider:

- whether individual risks have been allocated appropriately;
- how that allocation is achieved, i.e. whether risks are allocated, mitigated or shared through appropriate mechanisms;
- how they come together into a package of risk that is commensurate with any overall constraints on risk exposure; and
- whether, in the round, risks are well-targeted.

It is natural to think about risk exposure from a company perspective. In the regulatory context, in addition to the regulatory framework allocating existing risks to companies and consumers, it is also important to consider scope to create or sculpt risk exposure where that can be used as a tool to incentivise performance and delivery of sector impacts, outcomes or outputs.

3.1. REGULATORY APPROACHES IN PRACTICE

We have reviewed Ofwat's approach to risk allocation and those adopted by other sector regulators. While it is true that all price controls have the effect of allocating risk between different parties, explicit discussion of the principles of risk allocation in previous regulatory decisions is relatively rare.

Ofwat's previous reviews of risk and risk allocation principles contain some of the most developed conceptual thinking that we have encountered from UK regulators.[14] In 2010, Ofwat published a discussion paper on allocating risk and managing uncertainty in setting price controls for monopoly water and sewerage services. The paper discussed the interlinkages between the probability and the consequence of a risk in order to illustrate the spectrum between risk, uncertainty and materiality of the outcome. At the time, the total risk profile was described as risks falling into eight broad categories; economic, operational, construction, regulatory, financial, political, environmental and business but disaggregating risks by value chain component was not possible given the limited information available to the regulator at the time. Ofwat also identified nine parties that bear risk in the sector; customers, taxpayers, Government, society, water companies, construction companies and/or the supply chain, new entrants, investors and regulators. Whilst the concepts set out in the discussion paper remain valid, the 2010 risk allocation conceptual framework is relatively light-touch in the context in which water and wastewater companies operate and when compared to the PR19 price control.

The 2010 paper also stated that the approach must have regard to the impact of allocation on:

- Lower cost ways of delivery (productive efficiency).
- The best way to use scarce resources (allocative efficiency).
- New and better ways of doing things (dynamic efficiency).

[14] For example, Ofwat (2010) "Allocating risk and managing uncertainty in setting price controls for monopoly water and sewerage services – a discussion paper" available online.

Similarly, in other sectors, such as electricity and gas networks, and related asset classes such as the regime for regulating Offshore Transmission Owners (OFTOs) in the energy sector, there are documents which refer to risk allocation in terms of the type of risk, which party bears that risk (or how it is shared), and the mechanism for sharing or reducing that particular risk[15], but there is less written about the rationale for the approach.

More information is available around risk allocation in a project finance setting with infrastructure projects. This is a contractual approach with more explicit sharing of risks, though little is written about the allocation of individual risks and more around aggregate risks and downside exposure for debt finance.

Although we find relatively little discussion of the *principles* of risk allocation, some common themes emerge.

Most UK regulators refer to allocating risks to "the parties best able to control or manage that risk".[16] The logic behind this statement is that the regulator looks at risk in terms of delivering desired outcomes at the most efficient cost (i.e. that it should cost no more than it needs to) whilst minimising the risk of an undesirable event for all stakeholders. Regulators have typically sought to allocate each risk to the party or parties "best placed to manage it". This may be:

- the party (or parties) best placed to manage the probability of the risk event occurring; or
- the party (or parties) best placed to manage the impact of the risk if it materialises.

Being "best placed" tends to be interpreted as the degree to which the risk is within the control of the relevant party. For example, the regulated company is often best placed to manage operational risk, because they have the most control over their assets and resources, and both the knowledge and the ability to manage them.[17,18]

While we agree that controllability and the ability to manage risks are key guiding factors, in the literature that we have reviewed, the two factors in practice are imperfect.

- The first reason is that the two factors provide an overly narrow definition that focuses discussion on one party facing all risk, where in practice many risks are shared.
- The second reason is that just because a company can manage a risk doesn't necessarily mean that it should; the criterion ignores the broader benefits and costs from assigning risk to the entity that can best manage said risk.

In the sections that follow we explore in further detail the main considerations relevant to treatment of individual risks and the overarching constraints that might constrain or guide aggregate risk exposure. The purpose of this is to provide objective, principles-based guidance on 'good practice' principles that are relevant to risk allocation, and to provide a framework for reviewing existing risk allocation.

3.2. Considerations in allocating individual risks

3.2.1. Principles for allocating individual risks

A decision rule that focuses only on controllability or the party best placed to manage a risk is too narrow and does not fully capture all considerations relevant to risk. Our approach looks to assess the benefits and costs of

[15] For example, see PwC (Oct 2018) "Offshore transmission: Market update" page 15, available online.

[16] For example, see Ofwat (2010) "Allocating risk and managing uncertainty in setting price controls for monopoly water and sewerage services – a discussion paper" available online.

[17] Ofwat (2010) "Allocating risk and managing uncertainty in setting price controls for monopoly water and sewerage services – a discussion paper" available online.

[18] The party that bears the initial risk may not be the same as the ultimate bearer of that risk. For example, a regulated company may manage operational risk, but ongoing costs may be shared between customers and investors at the next price review.

allocating risk (fully or partially) to different parties when considering the allocation of individual risks[19]. Whilst it is unlikely that such a framework could ever be applied mechanistically in the style of a cost-benefit analysis, it offers a basis for a richer, more detailed treatment of individual risks than might be captured by simpler decision-rules based on the party best placed to manage a risk. As such, we propose to use a "decision rule" that looks at the cost-benefit of assigning risk to a different party.

Any regulatory risk allocation should reflect both the costs and benefits – and typically these are best assessed from the customer's point of view, taking into consideration Ofwat's duties. For example:

- Customers may **benefit** from a risk being allocated to a regulated company via:
    - improvements in the quality of delivery outcomes that are incentivised by the risk exposure – which is likely to be predicated on or related to controllability; or
    - reduced volatility or greater predictability of resulting water charges to the extent that companies are able to manage fluctuations over time.
- By contrast, customers are likely to face a **cost** as a result of a regulated company managing risk on their behalf. This may take the form of a general allowance or provision in order to achieve a balance of downside exposure and upside potential, together with a risk premium as part of the cost of capital. The cost of capital reflects a provision that – in theory at least – compensates investors for the systematic, undiversifiable risk that they take on.

To some extent this framework of costs and benefits is likely to capture and codify much of what regulators already do, at least implicitly. The benefit of setting out these considerations clearly comes through defining an objective and transparent rules-based method for thinking about risk i.e. one which can be understood, discussed and applied consistently across the sector.

[19] Our approach also assesses risk more broadly, as the allocation of individual risks may provide an incomplete picture.

3.3. Overarching constraints

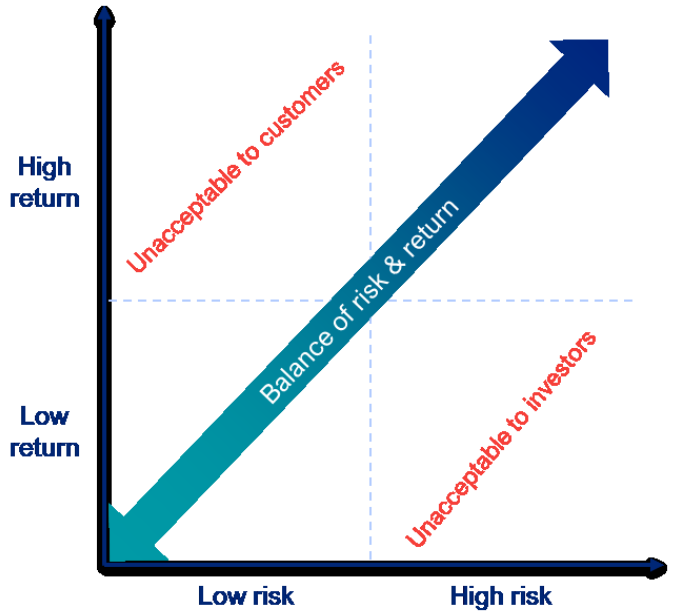
The capacity of companies and their investors to bear risk is not unlimited. Bearing this in mind a key question for regulators in allocating risk is the source and nature of constraints on allocation of risk to companies. The following sections discuss key overarching constraints in further detail.

These overarching constraints form part of our analytical framework and will be discussed further in Section 6. In particular, we discuss 'risk in the round' and have considered prioritisation within a 'risk budget'.

Balance of risk and return

In general, investors will require returns commensurate to the risks they are exposed to. There is no single 'correct' allocation of risk, though packages that are imbalanced are likely to be unacceptable to either customers (where the returns offered outweigh the risks faced) or investors (where the risks faced outweigh the returns offered). Figure 3.1 below illustrates this concept, with several potential combinations of risk and return achieving a balance.

Figure 3.1: Setting a balance of risk and return



Source: CEPA

The regulatory regime in water (and other regulated network assets such as electricity and gas) is typically characterised as a 'low risk, low return' investment opportunity. In part this reflects the essential service and natural monopoly characteristics of these sectors: unlike other sectors there is generally limited risk of large variations in demand or the threat of new entrants, at least over the short and medium term. Regulated regimes have also evolved in such a way as to align other aspects of risk with this 'low risk, low return' characterisation. For example, investors are largely protected from inflation risk through indexation.

This evolution reflects a view that overall outcomes for consumers are optimised where the company faces a lower proportion of risk within the price control. Whilst in principle regulators could adopt positions on the balance of risk and return at any point on the spectrum in Figure 3.1, in practice the overall package should be consistent with the low risk asset class to which regulated infrastructure assets belong. There is a degree of flexibility within the low risk assessment and the allowed return is designed to reflect systematic risk.

The optimised regulatory package is one in which company management focus is directed where it can deliver greatest long-term consumer benefit and not be encumbered by a high reporting and monitoring burden.

Typically, financial theory and regulatory precedent focuses on systematic or non-diversifiable risk. Investors can mitigate uncorrelated sources of volatility in the value of investments simply through holding a diversified portfolio.

Where risks are highly idiosyncratic in nature – at least in theory – they can be allocated to companies with limited read-across to the allowed return on capital, subject to the additional constraints discussed in this chapter[20].

Credit rating

Ofwat's statutory duties include ensuring that water companies are able to finance the proper fulfilment of their statutory functions. This requirement is not determined by reference to a particular credit rating, but it is widely acknowledged that the loss of an investment grade credit rating would make it difficult for a company to secure financing at efficient rates.

What then are the prerequisites of a (notional) water company maintaining an investment grade credit rating? At a very high level, credit ratings provide a transparent and objective way of quantifying the risk that a company will default on its debt obligations. The very highest credit ratings are reserved for organisations with an extremely low, almost negligible probability of default; low credit ratings are consistent with a material risk[21].

An investment grade credit rating is relatively high and is therefore consistent with a low (but not zero) probability of default. Though rating agencies do not typically make a direct explicit link between any one company's credit rating and its default probability, they may publish statistics that enable a view to be taken on the order of magnitude. Broadly speaking, such analyses might indicate that defaults occur on investment grade debt only rarely – perhaps as a 1 in 50 year event.

The requirement to achieve an investment grade credit rating sets a limit on the allocation of risk within the price control. In order to maintain consistency of assumptions, the aggregate amount of downside risk to which companies are exposed should not result in default except in remote scenarios. Certain combinations to the top-right of Figure 3.1 may therefore deliver outcomes that are inconsistent with Ofwat's regulatory duties. Having water companies bear a very high degree of risk could create challenges for company financeability and provide less headroom to absorb shocks. Separating out activities from the main price control is a further method by which a regulated could allocate particular risks.

'Fair bet' principle

A question discussed within the CMA PR19 determination relates to the symmetry of risk. The overall symmetry of risk is relevant in ensuring that the returns available are consistent with the risk faced and in ensuring that the regulatory framework is well calibrated. This helps achieve a 'fair bet' for investors.

What is meant by a 'fair bet'? We define this with respect to expected outcomes: in order to recover its cost of capital in expectation, the ex-ante expectation of probability-weighted returns must accommodate recovery of all costs (including the cost of capital) on average, over time.

There is no requirement for the allocation of each individual risk to be a 'fair bet'; rather this is a constraint on the overall package. Several structural factors in economic regulation may result in a degree of asymmetry in relation to some areas of risk:

- The information asymmetry that exists between regulator and company may enable companies to consistently outperform regulatory packages.
- Targets or performance incentives may not necessarily be set on a symmetric basis, for example providing for greater penalties than rewards or vice-versa[22].
- Enforcement penalties by their nature are downside-only.

[20] In practice, distinguishing between systematic and non-systematic risks can be challenging and subjective.

[21] Ofwat noted that Moody's upgraded their ratings for revenue risk and the complexity of the capital programme subsequent to the PR19 Final Determination.

[22] For example, an incentive that is linked to a scorecard from 1-10, with the target for the incentive is set at 9.

Regulators may also deliberately design incentive mechanisms to be downside-only where consumers have expressed that the companies should not be rewarded for carrying out activities or meeting obligations that are funded through baseline allowances.

Where these features are not broadly in balance it may be necessary to make an adjustment in the price control package.

4. RISK-SHARING MECHANISMS

This section concerns the various mechanisms that a regulator may deploy in order to deliver the desired allocation of risk based on the principles outlined in Section 3. The main overarching consideration is that mechanisms used ought to be consistent both with the nature of the risk concerned and with the regulator's objectives in allocating that risk – both in terms of maximising benefits and minimising costs.

Certain core features of the regulatory regime serve to allocate certain risks to companies in the first instance as well as insulating them from others. Most notably:

- The application of an allowed revenue cap (covering the majority of the water sector), combined with the use of a Regulatory Capital Value (RCV) base that is based on the principles of financial capital maintenance, largely insulates companies from short- and long-term demand risk.
- The use of ex ante cost allowances combined with pre-determined performance commitments require companies to manage the cost of delivering an agreed level of service.

Beyond this a wide range of mechanisms serve to calibrate and fine-tune companies' risk exposure. Some of these may serve to mitigate or share risks that would otherwise fall entirely on companies. Others may be used to *introduce* a source risk to companies where none naturally exists[23], i.e., to incentivise an outcome that can be quantified but would not naturally have financial implications for companies, e.g. C-MeX

For the purpose of this section we focus on four overarching categories:

- **Fixed estimates** (whether static or reflecting forecast trends or changes) of price control parameters e.g. predetermined allowances, which generally leave associated risks sitting with companies.
- **Mechanistic updates** to price control parameters to facilitate sharing of risk based on a readily identified and quantifiable driver. Examples include indexation, materiality thresholds and incentives.
- **Re-openers with fixed thresholds** to price controls which allow for adjustments to be made where these cannot be encoded in a mechanistic process[24].
- **Judgement-based re-openers** to price controls allow for further flexibility, such as the application of a gated process.

The main decisions that must be made in each case are:

- the selection of robust drivers – i.e. a quantifiable metric that will be used to inform the application of the mechanism – and credible source data for drivers used; and
- calibration of risk-sharing parameters – including incentive rates, caps/collars, deadbands and tiering.

The latter point in particular should be done in a way that is consistent with the regulator's objectives in allocating the risk and with the nature of the risk itself. As a simple example, applying a cap and collar in relation to a risk

[23] i.e. de-risking for consumers

[2424] A company may though need to request this is triggered e.g. IDoK and SE mechanisms. These may be thought of as akin to a 'pressure release value' where the re-opener is triggered to avoid the company (or consumers) bearing excessive risk.

whose main impact occurs in the form of a low probability/ high impact 'tail risk' may appear inconsistent – for example a prolonged and severe climatic event.

Finally, there is the question of timing, i.e. when is a risk-sharing mechanism applied? Where 'live' data is available through the price control this may enable automatic in-period adjustments – though the use of these may need to be balanced against any volatility that is introduced as a result. This is likely to depend on each risk's serial correlation: for example, where risks are likely to be positively correlated over time there may be particular value in applying in-period adjustments to avoid the build-up of extreme positive or negative positions. The use of end of period reconciliations may be considered a special case of each form of adjustment mechanism, with the timing of the update pre-determined as the end of the price control period.

5. MEASURING RISK

The measurement of risk is largely a practical question rather than a conceptual one, and so in this section we provide relatively brief contextual comments.

5.1. OBJECTIVES

As a starting point it is important to be clear on the objectives of measuring risk. Put simply, the overall purpose is to enhance understanding of the various characteristics of risk set out in Section 2.2. In doing this, two objectives are central to the functioning of the regulatory process:

- **Accuracy** – how well does the approach estimate risk and predict outcomes.
- **Presentational value** – how well does the approach assist in informing stakeholders and in setting policy.

Accuracy is the most important objective. An effective presentation of results based on inaccurate information does not have value in policy setting. A key consideration should be ensuring that any approach to measuring risk is as representative of future outcomes as is possible.

To the extent that risks can be quantified accurately, such information should be conveyed in such a way as to inform and facilitate discussion and policy development. There will be several aspects to ensuring presentation value, including:

- simple and intuitive visuals;
- comprehensive coverage of the totality of risks faced;
- comparability across the sector;
- use of metrics that focus, in particular, on what is relevant to companies; and
- ensuring the right focus from company management.

Measurement and discussion of risk must also be relevant to the question of regulatory policy. For example, where literature discusses Brexit risk or Covid risk, we need to understand what the underlying risks are, e.g. tangible implications for availability of materials or labour from overseas resulting from Brexit or quantifiable increases in bad debt resulting from Covid.

5.2. MEASUREMENT ISSUES

As a starting point, risks are often summarised on the basis of two of their key characteristics: potential impact and probability. Whilst this may serve a purpose in many contexts, in others it is likely to be an over-simplification.

Most importantly, very few if any risks manifest as single events that can be captured in a binary probability that they occur or don't occur in a given time period. Risks will generally have a range of potential outcomes and an

associated **probability distribution**. Where probability distributions are more 'exotic' in nature – for example, as a result of 'fat tails' – they can be particularly challenging to capture fully through conventional metrics.

The existence of **correlations** – both over time for a given risk and between different risks – further complicates measurement. This is particularly true when seeking to capture aggregate exposure to multiple risks. Where such risks are correlated, simple additive aggregate measures may over- or under-state overall risk exposure.

The two examples of recent, topical sources of risk highlight how risks can be inter-related. A single event or driver – such as Brexit, Covid or extreme weather patterns – might lead to a certain set of outcomes occurring across multiple risks with the potential to create a shift in the intended balance of risk and return.

6. ANALYTICAL FRAMEWORK

We conclude Part A with a summary of a framework that Ofwat can apply in thinking about risk, which goes further than the high-level decision rule of allocating risks to the party best able to manage them. This takes the form of a set of key questions arising from the issues discussed. Our intention is not to provide prescriptive guidance, as the issues involved are nuanced and inter-related. Rather these questions can serve as a reference when reviewing treatment of individual risks as well as the overall package of risks to which companies are exposed.

Our analytical framework contains five themes:

- **Appropriate allocation of individual risks**. Are long-term societal benefits maximised from the given allocation of risk?
- **Ensuring suitable company focus**. Is the risk budget used effectively to direct water company management focus at activities generating those long-term societal benefits?
- **Use of suitable risk allocation mechanisms**. Are risk allocation tools proportionate, targeted and having their intended effect?
- **Optimising the regime around best practice principles**. Does the regime achieve balance across best practice principles such has consistency, transparency and complexity??
- **Effective measurement of risk exposure**. Are risks accurately measured and conveyed clearly/ intuitively – for example to inform the use of the risk budget?

We discuss each of these themes below in more detail, highlighting the questions and issues we address under each given theme.

6.1. THEMES

Appropriate allocation of individual risks

Risk allocation should be informed by an assessment of long-term societal benefits and costs. A number of basic questions relate to the high-level understanding of the risk landscape and the treatment of individual risks or categories of risk:

1. Does Ofwat have a comprehensive overview of relevant sector risks from all perspectives?
2. Where risks have been allocated (in full or in part) to companies, is there rationale for doing so based on the benefits that may accrue to customers and society and the costs involved in compensating companies for holding those risks?
3. Are risk allocation and sharing mechanisms consistent with the characteristics of the risks they apply to, and have suitable drivers been adopted?

In a mature regulatory regime that has evolved over multiple price controls it is unlikely that individual risks in isolation have been substantively mis-allocated. In carrying out a periodic review such as this we therefore expect that useful insights are more likely to be generated from questions addressing the themes of: **prioritisation** in risk allocation; **proportionality** and **targeting** of risk-sharing mechanisms; delivery against **best practice principles**; and accounting for **complexity** in understanding, measuring and communicating risk exposure.

Ensuring suitable company focus

This theme relates to sharpening the management focus on the areas that deliver most important outcomes i.e. prioritisation. In the context of a relatively low risk overall regime a regulator will have at its disposal a relatively limited 'risk budget' to which companies can be exposed.

As discussed in Section 3.3 risk exposure will be constrained by the need to maintain consistency with the low cost of capital of the regulated infrastructure asset class and by the need to maintain an investment grade credit rating for debt finance.

Ensuring suitable company focus implies that the regulator understands the regulatory framework and can measure risk sufficiently accurately to be able to utilise the 'risk budget' concept. There will be areas where there is uncertainty e.g. an absence of quantitative information on probability distributions, that will need to be considered when allocating risks. This uncertainty could lead to more headroom being built into that overall assessment.

In order to prioritise effectively in this context the following key questions need to be considered:

1. Does aggregate risk exposure maximise incentives on firms to deliver beneficial outcomes, while limiting downside risk linked to a financeability constraint?
2. Where Ofwat has introduced financial risk to companies through incentives, have these incentives been appropriately calibrated based on both the benefit to customers of the associated outcomes but also the cost to customers – including the opportunity cost of focusing on one outcome or risk category at the expense of another?
3. Could a more partial allocation of any risk deliver comparable incentive properties while allowing for sharper risk exposure elsewhere in the package and/or a reduced allowance for risk?
4. Are companies sufficiently exposed to risk in relation to key long-term sector priorities and does their exposure to risk facilitate and incentivise long-term planning?

Use of suitable risk allocation mechanisms

Risk allocation mechanisms should be proportionate, targeted and achieving their original intent. The individual questions we considered in this regard include:

1. Have risk mitigation measures been used in a way that is consistent with the regulator's prioritisation of risk allocation?
2. Are any mechanisms over-used or under-used?
3. Is the timing of application of risk-sharing mechanisms appropriate? Should any mechanisms apply over horizons longer than a single price control?

Optimising around best practice principles

There are further questions relating to ensuring that the approach is consistent with general regulatory practice principles in a practical sense.

1. Does each risk allocation and sharing mechanism used serve a distinct purpose that could not be achieved through an existing or alternative mechanism?
2. Has Ofwat minimised duplication in the treatment of related risks?
3. Do companies face a balanced package of risks overall?

4. Does the overall approach to risk deliver on the principles of transparency, pragmatism and consistency?
5. Considered as a whole, does the suite of risk allocation and sharing mechanisms strike an effective balance between simplicity and complexity? Are mechanisms well-understood and appropriately interpreted by sector stakeholders?

Effective measurement of risk exposure

Finally, optimal discussion and decision-making in relation to risk must be based on accurate, comprehensive and informative measurement and communication of overall risk exposure. Metrics chosen to measure and communicate risks should avoid over-simplifying risks while remaining accessible. The two overarching questions are:

1. How well does the approach estimate risk and predict outcomes? (accuracy)
2. How well does the approach assist in informing stakeholders and in setting policy? (presentational value)

6.2. Summary of analytical framework

We have summarised the analytical framework in Figure 6.1. The columns represent our five themes, with questions within each theme presented as a row. In Part B we use the framework to assess Ofwat's current approach in order to identify a set of issues and themes that might be considered as part of preparing for PR24.

Figure 6.1: Summary of analytical framework for risk allocation

1. Appropriate allocation of individual risks	2. Ensuring suitable company focus	3. Use of suitable risk mechanisms	4. Optimising the regime in line with best practice principles	5. Effective measurement of risk exposure
Are societal benefits maximised from the given allocation of risk?	**Is water company management focus directed at activities generating those societal benefits?**	**Are risk allocation tools proportionate, targeted and having their intended effect?**	**In the round, does the regime achieve balance across best practice principles such has consistency, transparency and complexity?**	**Are risks accurately measured and conveyed clearly / intuitively?**
Does the regulator have a comprehensive overview of relevant sector risks from all perspectives?	Does the regulator maximise delivery incentives, relative to an overarching financeability constraint?	Have risk mechanisms and measures been used in a consistent way, given the regulator's prioritisation of risk allocation?	Does each risk allocation and sharing mechanism serve a distinct purpose, minimising duplication across the regulatory regime?	How well does the approach estimate risk and predict outcomes?
Does the allocation of individual risks maximise potential net benefits to society in the long-term i.e. not just within control?	Has the regulator considered the opportunity cost of encouraging focus on one risk at the expense of another?	Are any mechanisms under-used or over-used, relative to what would be expected?	Do companies face a balanced package of risks in the round?	How well does the approach assist in informing stakeholders and setting policy?
	Could partial risk allocation maintain strong incentives on companies, while permitting sharper risk exposure elsewhere?	Is cashflow timing associated with individual risk mechanisms appropriate?	Is the overall approach transparent, pragmatic and internally consistent?	
	Are companies suitably exposed to risk in relation to long-term priorities?		Does the package strike a suitable balance between simplicity and complexity?	

PART B – OPTIONS FOR REGULATORY FRAMEWORK DESIGN IN PR24

We concluded Part A with our conceptual framework for risk allocation. In Part B, we apply this conceptual framework in practice. This has involved:

- Assessing the existing regulatory framework against the five themes highlighted in Part A.
- Setting out potential options for each of the ten priority risks identified for further assessment.
- Evaluating those options in making provisional recommendations to Ofwat for the PR24 regulatory framework.

We note that the options and recommendations are provided at a relatively high-level. Given the stage of the regulatory cycle and engagement still to come, our approach has focused on breadth over depth. The recommendations provided should not be considered as definitive, with future analysis and evaluation useful in further exploring these potential issues.

7. POTENTIAL ISSUES TO ADDRESS FOR PR24

In this Chapter we set out the potential issues identified from the application of our analytical framework set out in Part A of the report.

7.1. SUMMARY OF POTENTIAL ISSUES IDENTIFIED THROUGH ANALYTICAL FRAMEWORK

In Section 6 we set out the analytical framework that we proposed to apply for assessing risk allocation in the water sector (summarised in Figure 6.1). This focused on five themes, spanning across a granular focus on individual risks to considering cross-cutting issues relating to risk in the round and how risk exposure is measured.

In Figure 7.1, we provide the list of potential issues identified from the application of the analytical framework. The five themes continue to be presented as columns. The rows show potential issues raised by our analysis, with a short description that is elaborated upon later in the section.

Figure 7.1: Summary description of potential issues identified

1. Appropriate allocation of individual risks	2. Ensuring suitable company focus	3. Use of suitable risk mechanisms	4. Optimising the regime in line with best practice principles	5. Effective measurement of risk exposure
Are long-term societal benefits maximised from the given allocation of risk?	**Is water company management focus directed at activities generating those long-term societal benefits?**	**Are risk allocation tools proportionate, targeted and having their intended effect?**	**In the round, does the regime achieve balance across best practice principles such as consistency, transparency and complexity?**	**Are risks accurately measured and conveyed clearly / intuitively?**
CONNECTIONS – DSRA Challenging to fine-tune incumbents' risk exposure	ODI REGIME Allocation may under incentivise focus here, relative to societal benefit generated	ODI REGIME Potential scope for caps and collars to distort optimal incentive properties	ODI REGIME High degree of complexity impacts on the ability of companies to respond	PRESENTATIONAL VALUE Communication around risk could be improved
LONG V SHORT-TERM PERSPECTIVES There may be opportunities to create a more optimal long v short term balance	LONG V SHORT TERM PERSPECTIVES Allocation may under incentivise focus here, relative to societal benefit generated	INFLATION RISK Potential unaddressed risk through use of nominal debt	RE-OPENERS (IDOK/SE) Calibration may not reflect recent changes to regulatory regime	ACCURACY OF RISK ESTIMATION Hard to be sure regime is calibrated as intended
ACCURACY OF RISK ESTIMATION Risks with shared drivers may warrant further review	ACCURACY OF RISK ESTIMATION Effective prioritisation requires accuracy	CONNECTIONS – DSRA Mechanism has scope for potentially unintended outcomes	RECONCILIATION MECHANISMS Interlinked models create some complexity – is this proportionate?	
		GOSM (GEARING) CMA redetermination of PR19 indicates there would be value in reviewing this mechanism	COST OF EQUITY INDEXATION Reducing forecast error would create greater consistency across regime	
		RE-OPENERS (IDOK/SE) Are these license based reopeners needed given other risk sharing mechanisms?		

.

In total we identified ten risk allocation issues for Ofwat to consider (note: some issues appear under multiple themes), based on an assessment using our analytical framework[25]. The reasons for considering these issues are discussed further below (with a more detail provided within Section 7.2).

Taking each theme of the framework in turn, we summarise our findings below.

In relation to **appropriate allocation of individual risks** we do not find any major issues, as might be expected in a mature regulatory regime. But, we identify a small number of risks that may merit further attention because current treatment may not, in practice, work as intended and there may be a more pressing need to ensure that the regime better balances the short and long term objectives of the sector[26].

- On inflation risk, stakeholders indicated to us that the approach adopted was, according to some, not having the intended effect; companies face varying amounts of inflation risk, based on their share of nominal debt and associated derivatives[27].
- It is challenging to fine-tune the balance of risk exposure in relation to new connections. Ofwat has sought to insulate incumbent companies from externally-driven risk relating to the volume of new connections. Partly as a result, financial incentives for companies to compete directly with other providers of new connection services are muted – potentially limiting the scope for competition between providers to deliver benefits for customers.

Our assessment of the allocation of individual risks also identifies two potentially more significant issues for groups of risk. There are two potential issues flagged around why risk allocation may not generate the long-term societal benefits that could be delivered by an alternative risk allocation:

- Firstly, we consider that there is potentially scope to improve the balance between short term and long term risks, in this context placing greater emphasis going forward on asset resilience and environmental risk.
- Secondly, it is possible that the current approach to risk measurement limits the ability to accurately assess impact, in particular around covariance and shared risk drivers i.e. where multiple outcomes are driven by single factors. Covid is an example of an event (or risk driver) having multiple impacts, with weather representing a further example of a driver of multiple outcomes.

In relation to designing **suitable individual mechanisms**:

- For the ODI regime, there are a variety of caps and collars applied to incentives. While there is a clear rationale for this, anecdotal evidence from stakeholder engagement suggested that the caps and collars had strong impacts on performance for individual ODIs that may not always be consistent with the behaviour Ofwat was seeking to incentivise. This is a point that requires detailed assessment not practicable within the scope of this project so we raise it as an area that Ofwat may wish to explore further.
- The Developer Services Revenue Adjustment Factor (DSRA) mechanism looks to protect water companies from facing volume risk. The overall number of connections required in a company's area is an externally-driven, uncontrollable risk, and so this treatment appears appropriate. However, the revenue allowance and any adjustments via the DSRA are calculated with reference to the total number of connections, irrespective of who delivers them. This means companies benefit financially where other market participants carry out the work – or, equivalently, are penalised financially where they carry out the work themselves. This may dampen incentives to improve their service to developers.

[25] Some issues have been raised multiple times, hence there are more than ten boxes.

[26] Ofwat has discussed this within the December 2020 report on future challenges and opportunities for the water sector in PR24 and beyond here.

[27] Inflation swaps can be used to change a companies' exposure to inflation.

  - The use of an average unit cost rate (albeit a company-specific rate) in the DSRA means that companies are exposed to variations in the mix of work undertaken, which may also be considered uncontrollable. The rates are based on companies' forecast mix of work. Provided there are no structural reasons to expect shifts in volume or SLP penetration to be focused on particularly high- or low-cost work, this approach would represent a 'fair bet', and we acknowledge that use of disaggregated rates (which Ofwat did consider for PR19) would be more complex to implement.

- The CMA redetermination suggests that it would be beneficial for Ofwat to review the GOSM further in terms of its ability to address the long-term risks that highly geared companies present to consumers.
- Re-openers (IDoK and Substantial Effect (SE) determination) are included in our issues list because, prior to 2021, they have not been invoked since 2013. This, in itself, is not a problem as they are intended as a backstop and are used as part of the gateway approvals process for Direct Procurement for Customer (DPC) projects. But, other mechanisms within the regime seem likely to limit their use further and they are now somewhat out of line with the rest of the regime e.g. in how they categorise and consider costs. There is therefore a question about their role going forward.

Focusing on individual mechanisms (or even groups of the same) naturally leads to proposing incremental change, where specific problems are identified. But a key observation from this project is that the mechanisms that Ofwat uses create a level of complexity such that the value of the mechanisms may not be proportionate to their impact. It is difficult to point to specific parts of the regime that should definitely be reduced in scale or individual mechanisms that might be removed altogether. For example, none of the individual reconciliations are unduly onerous but taken together, and because a change in one model necessitates change in others, they create a substantial work requirement both in terms of understanding and operation. A key finding therefore is that Ofwat should look across the mechanisms that it uses and seek to simplify where possible, recognising that simplification may result in a degree of 'rough justice' but then weighing the costs of this against a consideration of the benefits derived.

Our remaining three themes take more of an 'in the round' approach to assessing the regulatory regime.

Ensuring a suitable company focus. This theme considers whether the focus of water companies is clearly directed at those areas where they can best improve outcomes for customers, the environment and wider society. In order to be able to reasonably identify relevant constraints on risk allocation and think about prioritisation, the regulator needs to have an appreciation of the scale of risk, recognising that aggregate risk can vary substantially from the sum of individual risks.

It is not clear that the current regime supports such focus. Risks and incentives must be considered and prioritised carefully in order to focus on aspects of performance that matter most and better utilise the risk budget.[28]

The emphasis on in-period performance risks can detract from longer term thinking. For instance, in asset management terms, five-year periodic reviews are regulatory requirements not driven by the needs of company assets many of which are much longer lived. We wonder whether there is greater scope, even within the necessary restrictions of a regulatory environment, to utilise longer term plans for context and longer term objectives for which a five year period forms only a part. There is a clear read across to other issues such as climate change commitments here.

In addition, although difficult to evidence, we speculate that the complexity of the regime and the limits it places on outperformance may inhibit innovative behaviour, in particular within the price control period. Management focus is currently spread over a large range of cost and performance monitoring mechanisms from cost sharing to ODIs and sharing factors, caps and collars etc. which limit upside. While this is intentional, and balance is clearly needed to restrict the opportunity for significantly enhanced returns, there may be scope to reduce the amount of regulation in selected areas to foster innovation. A valuable exercise might be to discuss with the companies whether scope for

[28] ODIs is an example that we raise here. Prioritisation of risks and incentives are important under a high-risk, high-return framework, though the threshold is less likely to 'bite' in such a situation.

in period innovation exists within the current regime. In an unregulated business, plans might change substantially over a five year period if a new opportunity was identified. Companies may be best placed to provide evidence of innovative actions they would take absent elements of the current regime.

Optimising the regime around best practice principles again focuses on the big picture. The key issue here is complexity, which was frequently highlighted by stakeholders that we spoke to and which emerges strongly from application of our allocation framework. The ODI regime and reconciliation mechanisms create a burden on management time and Ofwat may wish to review to ensure that the approach is proportional in achieving its intended objectives.

In some areas Ofwat's approach could be made more internally consistent. In general, it has sought to limit exposure to drivers of risk outside of management control. Though challenging to apply and adding to complexity, indexing the cost of equity (rather than setting a fixed allowance) may fit better with the principle of consistency if indexation is maintained elsewhere. Rating agencies and companies continue to perceive IDoK and SE as valuable backstop mechanisms. However, as noted earlier, there may be scope to update the approach to re-openers to improve how they work alongside other mechanisms and within the broader regulatory regime.

Effective measurement of risk exposure is our final theme and extends to the measurement and presentation of risk analysis in an understandable and engaging way. Where of material consequence to decision-making, there is value in assessing the distribution and inter-relations of risks as well as their typical impact and frequency. Analyses of risk and policy setting should ideally use intuitive summary statistics and visuals that can support improved outcomes across the industry and build confidence that the regime is calibrated as intended. We consider that there is scope to improve on the current risk analysis (based on RoRE) to more accurately capture issues around co-variance.

Overall reducing complexity and duplication, becoming more sophisticated in risk measurement and improving prioritisation through greater use of targeting are broad themes to consider, as is extending the planning horizon and seeking to create space for innovation. It is these broader cross-cutting themes that we think should be the initial focus for Ofwat at this stage in the PR24 process, rather than focusing on one specific risk or mechanism.

7.2. Shallow dives on potential issues

The sections which follow are initial pieces of thinking on each of the issues that we have observed. They follow a consistent format of providing context, discussing the issue and providing options that Ofwat may wish to consider further as it prepares for PR24. The sections vary in detail. They are also not developed to firm conclusions, rather they present options and early thinking.

7.2.1. Issue 1: Long v short term perspectives

Summary of issue

- **Appropriate allocation of individual risks**: Our assessment identified some risks that may be better considered over a longer time horizon than the five year price control period. For example, we consider that consumers may bear more risk around the long-term resilience of assets than is optimal and that longer term issues such as the net zero objectives might be better considered over more than 5 years.
- **Ensuring suitable company focus**: it is important that the sector gets the balance right between short-term and long-term priorities. Our review indicates that there could be better linkage of long-term priorities to the five-year regulatory cycle.

Context

Our analysis of risk from the wider societal perspective identifies a concern about a focus on the short term (5 year) horizon. Although there are a range of strategic planning frameworks which aim to focus on the long term, such as WRMPs and DWRMPs, we identify some risks e.g. asset resilience and environmental objectives, to be in this group. In this shallow dive we use long term asset health as an example of an issue that might be better considered over a longer time horizon, but we also draw parallels to the need to deliver on long term environmental objectives in box 7.1

Water companies are the stewards of long lived operational assets. It is possible to underinvest in many of those assets for a significant period before the effects are seen in reduced resilience and poor performance. Companies may not be sufficiently incentivised to invest in measures that reduce the likelihood and impact of asset resilience problems on customers even though the potential impact on customers is high. As assets are in the regulatory capital value (RCV) and earn the weighted average cost of capital (WACC), the financial impact of having low asset resilience as a regulated monopoly is, without other incentives, relatively low. In contrast, the potential impact on customers of asset resilience issues is high (e.g., supply interruptions; flooding; internal sewer flooding; etc.).

Ofwat has sought to mitigate this risk through the introduction of asset health and resilience performance commitments (PCs) and outcome delivery incentives (ODIs) in PR14 and PR19 which incentivise companies to minimise short term operational resilience issues (PR19 also required companies to put forward plans for improving 'resilience in the round' and enforcement action is possible). However, although Ofwat has committed to maintaining the outcome regime beyond the five-year horizon, there are other factors that may mean that without an explicit mechanism to deliver long term focus, companies prioritise the short term; one of these factors is the drive for efficiency. The drive for efficiency in one period may lead to the need for additional investment in later controls. These may in effect negate efficiency savings or worse, increase overall costs as issues are being addressed in a piecemeal manner rather than as part of a long term plan. There are also other factors behind short term focus such as the expected length of time the executive / senior managers expect to be in place as well as the financial structure of the company.

Box 7.1: Long-term priorities in environment

In relation to environmental objectives the same need for long term planning is noted, although there are other regulators that act in this area such as the Environment Agency and Natural Resources Wales. There are good examples of this within PR19. Ofwat's regulatory framework incentivises companies to reduce environmental damage through PCs and ODIs (e.g., pollution incidents; per capita consumption; etc.) which companies may reasonably expect to be maintained in some form in future price control periods; and to work together to meet capacity requirements (e.g., strategic water resources). The industry's Public Interest Commitment (PIC) aimed at achieving net zero carbon emissions by 2030 provide a long term plan and reputational incentives. Progress towards the net zero goal will be independently assessed each year, with key milestones reported publicly. This may provide sufficient independent incentive to promote long-term planning but to the extent that Ofwat wishes to introduce financial incentives in this area, explicitly aligning PCs and ODI to the longer term objectives may help ensure they are delivered in the most efficient way.

Suggested options

We propose five options that Ofwat may wish to consider around long-term asset resilience risk. These are:

- Requiring companies to provide a long-term asset management strategy/plans as part of the price review process.
- Drawing more on explicit asset health metrics.
- Setting longer price controls.
- Commitment to multi-period allowances or incentive targets.
- Conditional allowances i.e. allowances that are linked to delivery.

We discuss each of these in more detail below.

Long-term asset management planning

Every five years, water companies develop Water Resources Management Plans (WRMPs), which set out how they propose to manage the water supplies in their respective regions to meet current and future needs over a minimum of 25 years. These played a key role in the assessment of supply-demand balance expenditure / investment at PR19. Importantly WRMPs provide a forward / long-term look at supply-demand balance investment requirements, which Ofwat use alongside historical supply-demand balance expenditure.

This approach is in contrast to asset management / capital maintenance, which was a component of wholesale modelled base costs at PR19. Ofwat assessed modelled base costs using historical cost benchmarking models. The CMA concluded that this approach provided companies with sufficient funding for capital maintenance costs. In particular, the CMA acknowledged that while companies may experience peaks and troughs in individual price control periods (i.e., AMPs), there should be no systematic [under]funding in the long run.

However, the CMA also recognised that Ofwat's approach to determining capital maintenance allowances is backwards looking and that some issues may require a forward looking assessment (e.g., increased threat of climate change, population growth, etc.). The CMA therefore suggested that Ofwat considers enhancing its analysis with a forward-looking element at PR24 that could assist in triangulating results from its base cost econometric modelling analysis of historical costs.

Ofwat could ask water companies to provide a long-term asset management strategy alongside the WRMPs for the price review process, building on lessons and insight from the Asset Management Maturity Assessment (AMMA) in collaboration with water companies. We understand that some water companies already prepare these as an input into their business plans, which would limit any increase in regulatory burden. For example, Southern Water developed a long-term asset management strategy at PR19, to enable them to enhance the resilience of water supplies whilst meeting the challenges of increasing population and decreasing raw water availability over the next 50 years.[29]

The need for a long-term asset management strategy was also recognised by the Water Industry Commission for Scotland (WICS) in its Strategic Review of Charges 2021-27[30], which we summarise in Box 7.2.

Box 7.2: WICs thoughts on capital maintenance in its Strategic Review of Charges 2021-27

Ahead of the Strategic Review of Charges 2021-27, WICs accepted that the existing regulatory framework did not focus sufficiently on a strategy for the long-term replacement of its assets. It accepted that it was highly likely that there would be increased expenditure: not necessarily immediately but in the medium to long term.

[29] See Southern Water's Long Term Asset Management Strategy. Available here.

[30] Source: WICS, 2018. 2018 Decision Paper 5. Capital Maintenance. Available here.

WICs recognised that Scottish Water had much to do to build confidence among stakeholders that it could effectively and efficiently deliver the investment needed to address asset replacement over the long-term. In particular, WICs considered that Scottish Water needed to evidence the required level of resources necessary to maintain and replace its assets in a sustainable way. WICs concluded that this required a comprehensive work plan with clear actions and milestones, with progress reported through the performance monitoring regime.

WICs also acknowledged that Scottish Water needed time to develop a full understanding of its assets before developing a long-term assessment management strategy / plan, and committed to working with Scottish Water to develop plans and approaches that ensure that customers receive value for money from capital maintenance investment. It considered that establishing a long-term approach to asset management will ensure that future customers are not unfairly faced with higher charges or reduced service levels.

Use of explicit asset health metrics

It is generally agreed that water companies should apply a risk-based approach to asset management. By this we mean that companies should not 'gold plate' their network. Rather, companies should prioritise interventions based on the likelihood and impact of asset failure on its network and customers.

To quantify the risk of asset failure, it is important that water companies understand the health of their assets and the consequences of failure. It is unclear whether companies use forward looking asset health indicators to inform their decision making, although the sector (via UKWIR) is working on this. Instead, there has been a focus on short-term 'measure of success' metrics, such as mains bursts, sewer collapses, and unplanned outages. As a result, it is difficult for Ofwat to assess the effectiveness of each company's asset management plans and delivery from a long-term perspective. There may also be an initial challenge in developing incentives with good quality data and avoiding scope for windfall gains or losses following establishment.

Ofwat may want to consider developing forward looking asset health and resilience metrics with the industry ahead of PR24[31]. Lessons can be learnt from Ofgem's Network Asset Risk Metric (NARM) for the Electricity Transmission Gas Transmission, and Gas Distribution Networks (GDNs)[32], which we summarise briefly in Box 7.3.

Box 7.3: Ofgem RIIO-2 NARM

The NARM was developed by Ofgem to quantify the benefit to consumers of companies' asset management activities. In RIIO-2, this will be used as an output to hold companies to account for their investment decisions.

A key component of the NARM is monetised risk, which takes into account the probability of failure and the monetised consequence of failure. Monetised risk therefore creates a common currency across different asset classes, enabling investment strategies to be compared, trade-offs to be analysed, and performance targets to be set.

The metric ties together expenditure and a measure of the risk output the expenditure is expected to deliver. There is a concept of a unit cost with respect to risk that is used when assessing allowances and delivery of outputs within the price control period.[33]

Longer price controls / multi-period allowances or incentive target commitments

Extending the price control interval beyond 5-years might naturally provide a greater incentive on companies to deliver longer-term societal outcomes. The CAA was considering a 15-year control for Heathrow for instance given the length of the then proposed new runway project. While noting that a longer price review period has both pros and cons, Ofwat might set certain allowances (e.g. maintenance and capital maintenance) or incentives over a longer time period. For example, a 10 or 15 year capital maintenance allowance might be set at PR24 with the

[31] We note that during the course of the project, Ofwat has published a report containing an asset management maturity assessment: https://www.ofwat.gov.uk/publication/asset-management-maturity-assessment/

[32] Source: Ofgem, 2021. RIIO-2 Final Determinations NARM Annex (Revised). Available here.

[33] See further at: https://www.ofgem.gov.uk/system/files/docs/2021/02/final_determinations_narm_annex_revised.pdf

ability to reopen in defined circumstances and use of reconciliations to manage issues such as forecasting risk (likely associated with a multi-period PC and ODI).

While we note that this approach might improve the incentives, we are also aware that asset lives in the sector can be very long so this option in isolation may be insufficient to merit the work that would be required to introduce it. There is also a clear issue around the ability to forecast for longer periods and greater implications from miscalibration of the price control. We note that Ofgem's RIIO-2 price controls have returned to 5-year periods, after having used 8-year price controls in RIIO-1.

Conditional allowances

Ofwat could set conditional capital maintenance allowances for companies if it had substantive concerns regarding delivery. This could utilise a gated process. While this would move regulatory burden from the price control determinations to within period assessment, it would also reduce the risk that that water companies are funded to deliver capital maintenance that is ultimately not delivered or beneficial[34].

Initial evaluation of suggested options

Option	Evaluation
Long-term asset management planning	• Greater role for forward-looking long-term evidence around asset management planning. • The clear benefit is improving the linkage to long-term planning and providing a commitment on the companies to deliver these plans. • However, this planning would need to be appropriately built into the price control to represent a meaningful change and justify any further burden.
Use of explicit asset health metrics	• Potentially provides more detailed evidence and a basis for effective regulation where measures are monitored over time. • Potential issues include incorporating the metrics within incentives, given a potential informational disadvantage for the regulator and scope for windfall gains and losses with a new type of incentive. Good quality and objective data would need to be available to facilitate this. • If Ofwat wishes to leave total risk exposure from ODIs unchanged, increased use of asset health metrics comes at the expense of reduced company exposure to shorter term customer-facing outcome-based incentives.
Longer price controls	• Longer price controls provide greater scope for companies to commit to delivering outcomes and ensuring that there are clear incentives around delivering projects that lead to benefits e.g. with respect to innovation. • However, the key drawback is the regulator's ability to set ex-ante decisions for a longer period, with a greater scope for forecasting risk and windfall gains and losses.
Multi-period allowances or incentive targets	• Companies assessing rewards from undertaking work have greater certainty to justify going ahead with projects. • However, the issue of accurately setting targets for a longer period still apply.
Conditional allowances	• The approach can better ensure that expenditure is linked to clear outputs that benefit customers (more so than at present). • However, this could go against the principles of the totex and outcomes framework adopted

Conclusions

We consider that stronger ties to longer-term targets is holistically beneficial given the importance of, and costs associated with, issues such as the environment and asset health. This would involve incorporating long term asset

[34] We note that this does not guarantee that the right capital maintenance is undertaken – for example, ensuring that the right mix of work proceeds.

management planning into the regulatory structure, including the introduction of longer term incentives. This fits with the need to ensure that long term and short term priorities are balanced. It may come at the expense of flexibility e.g. the ability to correct for issues that emerge, although this might be mitigated through a mix of mechanistic adjustments, reconciliation and/or reopeners, with enforcement action acting as a backstop where this is justified.

7.2.2. Issue 2: ODI regime (complexity and incentive properties)

Summary of issue

- **Ensuring suitable company focus:** While Ofwat provides evidence on the revenue available/ at risk from individual incentives within the ODI part of the Outcomes framework, exposure is spread across a substantial range of incentives. Constrained management focus means that company behaviour may not ultimately be aligned to expected consumer outcomes.
- **Use of suitable risk mechanisms:** A variety of caps and collars are applied. Although there is generally a clear rationale for their application we consider that the this could be revisited, using historical performance data, to assess whether design of the ODI regime drives the desired behaviours in practice.
- **Adherence to best practice principles**: The number of PCs and ODIs creates substantial complexity. This is not necessarily an issue, but given the revenue available/ at risk relative to, for example, a cost of debt or tax allowance, we consider that the level of complexity is something that should be reviewed for PR24.

Context

Under the PR19 outcomes framework, there are approximately c. 650 individual performance commitments (PCs). There are 15 common PCs across all WASCs (11 are common across WOCs), giving a total of c.275 common PCs, and c.400 PCs that are largely bespoke to individual water companies. PCs may have financial or reputational incentives (ODIs) attached to them. Although there is a common format and set of parameters for financial ODIs, the individual values of the parameters, and the extent to which companies are penalised for under-performance vs rewarded for over-performance varies from PC to PC and company to company. ODIs are typically, but not in all cases, settled on an annual performance basis ("in-period").

Performance commitment levels were intended to be calibrated against historical and forecast performance data (including comparative data across the industry where appropriate) on each PC metric, and ODIs were individually calibrated against customer willingness to pay and other evidence provided by each company on each PC (again subject to an element of challenge based on cross-company comparisons where appropriate).

The distribution of cashflow outcomes in PR14 for incentives was narrower in RoRE terms than for other categories included in reporting – namely totex, finance and retail[35]. As the potential rewards and penalties are spread across the whole suite of ODIs, management focus is spread across a range of incentives, with limited revenue typically at stake for each individual ODI.

There is a trade-off with respect to the use of caps and collars, in respect of the proportionality of the mechanisms to the risk. The maximum level of underperformance (collar) or outperformance (cap) may be applied, though not for all PCs. The approach adds complexity, while limiting risk exposure.

- Caps are intended to provide protection for customers from increased bills for unexpectedly high performance, and also mitigate the risk that a company's objectives could be distorted by the opportunity to outperform on particular ODIs.
- Collars are intended to mitigate the risk that underperformance on one PC could lead to extreme penalty levels for a company (especially where that underperformance may be as a result of exogenous circumstances such as extreme weather events)[36].

[35] The difference between P90 and P10 outcomes was around 150bps.

[36] Ofwat made clear to companies in the PR19 FD that the existence of collars did not remove the threat of enforcement action for poor performance (especially if it was a result of factors within management control including having appropriate levels of resilience to, and planning for, extreme events).

The appropriate level of caps and collars is clearly a matter of judgement, but Ofwat typically set them on a PC-by-PC basis taking account of the ranges of historic and forecast performance for the sector and company concerned.

For a very small number of common / comparable PCs (the two statutory measures, CRI and TWC, and, for some companies, mains repairs and unplanned outage following the CMA water appeals) there is also a deadband below the annual Performance Commitment Level (PCL), specifying the range of underperformance before ODI penalties are incurred. In principle, Ofwat could have set deadbands for outperformance ODIs as well but didn't at PR19. For the statutory compliance PCs, deadbands were put in place largely because the PCLs are set at 100% compliance to align with other regulators' targets and there are challenges in achieving full compliance; some deviations are beyond company control. Nevertheless it was recognised that in practice there will be small deviations in performance which may not be in management control or where management has not objectively failed in managing the commitment and where the measure has very little tolerance for error.

The issue of the role and appropriateness of deadbands was debated at the CMA water appeals for PR19. The CMA considered that the circumstances in which deadbands may be appropriate are wider, including (a) where delivery of the outcome is not wholly within management control and (b) as a transitional mechanism where measures are new, and the relationship between management actions and performance levels is not yet clear. In each of these cases the CMA considered that a deadband might offer some protection to companies while maintaining incentives for good performance. With this in mind, the CMA redetermination includes a number of additional deadbands for the disputing companies. Ofwat considers that, since deadbands dampen companies' incentives to improve performance, they should be applied only in exceptional circumstances (which is why their application was reduced between PR14 and PR19).

All of the mechanisms noted above operate on a PC-by-PC basis. In addition, Ofwat introduced at PR19 an aggregate outperformance payment sharing mechanism under which, if a company earns gross outperformance rewards above 3% of RoRE on an annual basis, the excess is shared 50:50 with customers. This is intended to provide additional protection to customers from unexpectedly high outperformance payments (for example arising from miscalibration of PCLs and ODIs or because management incentives were distorted by the opportunity to outperform on a number of inter-connected and mutually reinforcing PCs).

We have developed suggested options in two areas: i) reducing complexity and consolidating the ODI regime, and ii) preserving effective incentives. We have split our discussion into these two themes.

Suggested options – reducing complexity

We have developed five options in this area, as set out below.

- Incremental change only; small tweaks to the outcomes regimes.
- Reduce the number of bespoke PCs.
- Reduce the number of common / comparable PCs (in absolute terms)
- Group PCs into measures by i) theme (e.g. asset resilience), or ii) higher level outcomes (e.g. wholesale water, clean rivers).
- Balanced scorecard approach (similar to PR09); providing a weighted incentive metric built up on multiple individual inputs.

Initial evaluation of suggested options – reducing complexity

Option	Evaluation
Incremental change	• Adopting this approach would signal that the complexity of the ODI regime is justified by delivering regulatory certainty and net benefits overall. • Reputational incentives remain in place e.g. on leakage, over and above the financial incentives.

Reduce the number of bespoke PCs	• A greater focus on common and comparable measures provides simplicity and potential for a focus on the most pressing national priorities. • Consolidation • potentially reduces scope for gaming around more niche items. • However, the approach would likely involve some reduction in connection to local customers' priorities.
Reduce the number of common PCs	• The approach would be opposite to the points raised above around reducing the number of bespoke PCs. • The approach would be more akin to PR14 in design, with a more limited number of ODIs overall.
Groups PCs into measures by theme or outcome	• Allows management flexibility to manage across the grouped measure, which may lead to more innovation and focus on the theme. • It potentially puts more risk exposure on a smaller number of PCs. • Where there are issues around covariance, grouping PCs may avoid companies placing undue weight on one area only, at the expense of others. • There will inevitably be issues around definition of and incentive structure on sub-measures within the "theme PC", and the risk of unintended consequences. • We understand that the experience from PR14 was that simpler headline measures can be associated with greater underlying complexity at the detailed level.
Balanced scorecard approach	• The approach would consider performance against a targeted basket of measures and allow a greater focus on a smaller number of items in a more holistic fashion. • However, this may distort incentives in specific areas as companies would potentially trade-off performance in one area against performance in others depending on how the balanced scorecard incentives were designed.

Conclusions – reducing complexity

A review of the complexity of the ODI regime would be a valuable input into PR24. Evidence on performance within PR19 would allow Ofwat to assess how they drive behaviour, especially if more is done ahead of the next price review on overall risk measurement. There is a clear interaction between ODIs and the scale of financial and reputational incentives that companies face. Where the financial rewards are limited on a per ODI basis, it may not be proportionate in complexity terms for this revenue at risk be diluted over numerous individual performance requirements. Where the incentive reward or penalty are based on customer engagement research, the solution may be to remove restrictions on incentives (e.g. caps and collars), though this does come with issues to, for example greater pressure on properly calibrating any incentives and consideration of the 'risk budget' concept.

The options to reduce complexity presented above are not mutually exclusive. The recommended policy options should include a set of 'no regrets' actions to adopt, including ensuring clarifying any gaps and existing duplication[37], even if Ofwat ultimately concludes that there is no basis for large scale change.

We discuss separately the role of covariance in PCs and ODIs (see Issue 9) and the potential implications of complexity and risk of duplication with other aspects of the regime in our overall conclusions.

[37] Gaps may exist because they are being addressed elsewhere in the price control or Ofwat's wider regulatory toolkit.

Suggested options – maintaining suitable incentives

We identify four options for ensuring that the regulatory framework continues to provide suitable incentives (with respect to caps, collars and deadbands) and that this subset of the overall approach has desirable impacts on incentives. Ofwat set out the basis and justification for its approach in PR19[38]. The four options are:

- Incremental change with more 'pragmatic' setting of the levels of caps and collars e.g. 0.25% of regulated revenue or using historic performance (similar to RIIO-2 approach in energy).
- Setting caps and collars on 'groups' of PCs (e.g. asset health, environment).
- Putting focus on an aggregate cap and collar approach, rather than on individual PCs (e.g. RoRE or revenue based sharing of out/under-performance)[39].
- Removing caps and collars, reflecting the additional risk within the base allowed return and / or reducing sharing factors.

Initial evaluation of suggested options – maintaining suitable incentives

Option	Evaluation
Incremental change	• The use of more 'pragmatic' calibration of caps and collars is valuable from simplicity and comparability perspectives, where attempting to be more precise with estimates may involve spurious accuracy[40]. • However, the intention behind the more 'bottom-up' method of setting the level of incentive rewards (plus caps and collars) is to connect the value to the risk that the mechanisms are intended to mitigate[41].
Caps and collars on groups of PCs	• Grouped caps and collars may be beneficial from a risk mitigation perspective, where performance is likely to be correlated and/ or individual PCs are effectively sub-measures of a wider overall outcome that has value to consumers. • The approach could reduce unintended consequences of overlapping incentives, for example limiting outperformance across ODIs with a common underlying driver. • However, the approach could lead to an opportunistic focus on the easiest to meet targets within the group.
Aggregate caps and collars	• The aggregate approach means there is a reduced need to get individual caps and collars 'right' and overall returns are constrained within suitable bands. • However, the sharpness of incentives reduces and protections against miscalibration can be an issue.
Remove all caps and collars	• The approach would be simple and clean, plus properly calibrated ODI payments ensure that any rewards are tied to delivering customer value. • However, customers would be exposed to greater bill volatility and mis-calibrated ODIs, companies would face greater financial downside risk, that might impact cashflows and credit ratings.

[38] See Sections 7.2 and 7.3 of the Final Determination 'Delivering outcomes for consumers policy appendix.' https://www.ofwat.gov.uk/wp-content/uploads/2019/12/PR19-final-determinations-Delivering-outcomes-for-customers-policy-appendix.pdf

[39] This could be graduated, such that management's exposure to risk changes as the scale of out/underperformance changes.

[40] A project should proceed where the benefit to the consumer is at least as great as the cost of doing so. The cost depends on the totex sharing mechanism within period, and the effect of this expenditure in setting allowances in future periods, together with the value of the incentive payment.

[41] We note that Ofwat is consulting on how to draw upon stakeholder evidence is setting incentive levels.

- The approach may also expose companies to greater reputational risks (through significant rewards or large penalties).

Conclusions – maintaining suitable incentives

The design of caps and collars cannot be considered in isolation from the overall design of the performance incentive regime. Caps and collars provide protection that limits risk; these are especially valued where the driver of risks is exogenous and/or due to PC miscalibration. For outcomes due to management failure, there are other measures in Ofwat's toolkit to address these e.g. reputational incentives and enforcement actions may act as powerful restraints.

Further questions around caps and collars involve whether these are settled annually or based on performance over five years. The former addresses impacts after they have occurred, but does not allow the smoothing impact of exogenous events (e.g. weather) over the settlement. There are similar issues around deadbands, although the question of whether they should be used for individual PCs and where they should be set is probably more an issue of regulatory judgement, as set out in the recent CMA determinations.

A detailed review of PC and ODI parameter data would provide Ofwat with greater certainty around the benefits of adopting particular approaches, including the overall distributions of financial outcomes across the outcomes framework. The envisaged approach would look to test the financial impact of recalibrating deadbands, caps and collars on PR14 and PR19 data, noting the behavioural effects should these be removed and interactions with other ODIs. If outcomes are grouped around the caps and collars, then it is feasible that the impact of recalibration could be material.

7.2.3. Issue 3: Re-openers (backstop re-openers to the overall price control settlement)

Summary of issue

- **Use of suitable risk mechanisms:** Despite substantial external events like Covid, Brexit and extreme weather e.g. Beast from the East, companies did not seek to invoke an Interim Determination of K (IDoK) or Substantial Effect (SE) determination. This may related to the materiality of the costs involved or be the result of the operation of alternative mechanisms that have rendered these reopeners unnecessary.
- **Adherence to best practice principles:** the mechanisms now appear somewhat out of step with the development of the wider regime. We highlight four items discussed further below:
  - Distinction between capex and opex within a totex-based regime.
  - Consistency in setting the discount rate.
  - Equivalence of the threshold across different companies.
  - Estimating turnover, given presence of other regulatory tools.

Context

The IDoK and SE mechanisms are intended to limit exposure (in both directions – upside and downside risk) faced by companies in relation to material changes of circumstances during a price control period for issues that are out of company control. In this sense, they may be thought of as backstop mechanisms. The re-openers were intended to provide clarity. They create confidence and transparency of *if, when* and *how* Ofwat will act should financial difficulties arise.

Both mechanisms are entrenched in the licences, so changes to them require company consent which limits Ofwat's ability to make amendments. Our initial analysis suggests that they are no longer well aligned with the wider regulatory regime and that bringing them into alignment could also create space for a wider review of thresholds and the continued existence of two separate mechanisms. However, the introduction of other risk sharing allocation mechanisms means that these re-openers are likely to be lower priority for PR24, with a low likelihood that the thresholds will be triggered.

We note that we have grouped the re-openers together, although each should be considered separately.

Distinction between opex and capex

Box 7.1: Thresholds

IDoK

- 10% materiality threshold (10% of company turnover) for costs considered in present value terms.
- 2% triviality threshold – (2% of relevant service turnover) the value of a change relating to one issue is at least two per cent of the company's turnover to be included in the materiality test, for costs considered in present value terms.

SE

- 20% materiality threshold (20% of company turnover)
- Could the company have taken action to mitigate the impact on costs? And Is an adjustment necessary?

The separation in opex and capex anticipated by the mechanism now appears to be inappropriate. The IDoK and SE mechanisms anticipate dealing with opex and capex individually, whereas other parts of the regime consider totex.

Consistency in setting the discount rate.

In order to calculate the NPV of each item Ofwat needs to apply a discount rate. Depending on the individual licence of the company, Condition B states that the rate should reflect either the cost of debt[42] or the weighted average cost of capital.[43] For example for the Thames Water 2012/13 IDoK request, the WACC was used.[44] They assumed a real pre-tax cost of capital (6.26%) that was consistent with the cost of capital assumed at PR09 and with the discount rate Thames Water assumed in its own application.

We open discussion around if it is appropriate to allow different discount rates. If not, which is more appropriate?

- For consistency with elsewhere in the price control, use of WACC is arguably most logical. The use of a discount rate is to account for the time-value of money, and the underlying assumptions between time-value of money calculations elsewhere in the price control is that any money spent by the company attracts the cost of capital that is the WACC.
- There is a case for cost of debt: if the company knows they would be repaid in the future, the company can invest in the cost of debt today of the equivalent value. However, do companies in reality have this visibility? It is not an automatic recompense of what has been spent.
- If a company's licence specifies the use of cost of debt, this would need to be the cost of new debt. Embedded debt is irrelevant to financing decisions as the cost of taking out the debt finance is today's cost of debt as opposed to the average of cost of debt incurred over the last 20 years.
- The choice between cost of debt or cost of capital would lead to significant material differences. For example, let's assume a 15 year NPV opex saving, under the scenarios of a cost of debt of 2% versus a WACC of 5%. Applying the WACC figure gives a 24% higher threshold over a 15 year period. This is a material difference. Lack of standardisation leads to a materially different risk thresholds under IDoK for water companies.

Figure 7.2: Estimating the impact of different discount rates (using indicative figures)

Years in future			1	2	3	4	5	10	15	End of period	Percentage difference
NPV of £1	Cost of Debt	2%	0.980	0.961	0.942	0.924	0.906	0.820	0.743	12.849	
	WACC	5%	0.952	0.907	0.864	0.823	0.784	0.614	0.481	10.380	23.7%

The time period for discounting also varies. The present value calculation for opex impacts is longer (15 years) and capex shorter (5 years). This is to correct for bias as opex may be smaller but have larger cashflow impacts (capex revenue impact is around foregone RCV run-off and WACC return).

Equivalence of the threshold across different companies

These mechanisms address cost shocks therefore setting the threshold in percentage turnover terms make sense, but it may disadvantage smaller companies. Setting the thresholds as a percentage of turnover as opposed to percentage of the RCV (regulatory capital value) implies that different companies face different risks. There would be variation in risk faced by small/large companies and for WoCs/WaSCs, with the threshold in RoRE terms likely to be larger in magnitude for smaller companies and WoCs, than for larger WaSCs. Our analysis of two companies – Portsmouth Water, a smaller RCV WoC, and Thames Water, a larger RCV WaSC, shows that revenue-based thresholds require a much larger RoRE impact before triggering a re-opener for companies with a higher revenue-

[42] For example: Anglian, Hafren, Northumbrian and Portsmouth refer to 'rate of return upon borrowing'

[43] For example: Severn Trent, Southern Water, Wessex Water, Thames Water refer to 'rate of return'

[44] Ofwat (2013) Final Determination of Thames Water's IDoK application. Available here.

to-RCV ratio. In the case of Portsmouth Water, the RoRE impact is 78% higher than for Thames Water, based on PR19 figures[45].

Estimating turnover, given other regulatory tools

The mechanisms operate alongside other sharing factors. This raises two key questions. Are the cost-sharing mechanisms taken into account 'before' the materiality and threshold test (Scenario 1)? Or is the IDoK threshold calculation independent of other cost-sharing mechanisms (Scenario 2)?

The question arises around when a company has a cost overrun, would the cost sharing mechanisms kick in first? This would mean the company needs to see if their exposure is still sufficient to trigger an IDoK after a cost-sharing mechanism is triggered. The initial instinct is that to trigger an IDoK would require a substantial cost overrun, with the re-opener intending to provide protection from a financeability perspective. At the point of conception the design of the IDoK wouldn't have acknowledged these forthcoming mechanisms.

Whether other risk sharing mechanisms are considered before the threshold is estimated can have a material impact. To illustrate we present the below scenarios. Let's assume we have a hypothetical company who have an allowed revenue of £500 million. Therefore the IDoK materiality threshold of 10% equates to £50 million. The cost-overrun in Scenario 1, inclusive of cost sharing mechanisms, results in a cost overrun of at least £100m before an IDoK is triggered.

Table 7.1: Scenario of thresholds

	Scenario 1.			Scenario 2.
	a.	b.	c.	a.
Cost overrun of …	£50 million	£99 million	£101 million	£50 million
Net costs remaining post 50:50 cost-sharing mechanisms	£25 million	£49.5 million	£50.5 million	N/A
IDoK materiality threshold met?	No	No	Yes	Yes

We understand that Condition B of the company licences suggests that materiality is to be compared to the turnover attributable to the Appointed Business in the latest financial year for which regulatory accounts have been submitted to Ofwat. The basis for these regulated accounts and the timing of recognising revenue reconciliations (for example, cost of new debt indexation or inflation) affects any re-opener thresholds.

Suggested options and evaluation

Option	Evaluation
Remove IDoK and/ or SE mechanisms	• Ofwat could look to remove these mechanisms, based on their infrequent use and low probability of impacting on cashflows and because here are a number of other protections in place. • However, statements by companies and credit rating agencies have indicated that they have value as an overall downside protection that is embedded in licences.
Update IDoK	• Our initial review of the mechanism is licences indicated three areas in which updates might be made: i) distinction between capex and opex, ii) discount rates, and iii) the role of reconciliation mechanisms in base revenues. • However, the process to change licences may be challenging and time consuming to address for something that is used infrequently, given other protections in place. • The approach could lead to requests for wider/other additions to the licence having material impacts e.g. adding references to the RCV where none currently exist.

[45] Our calculations use PR19 allowed revenues and the average of the opening and closing RCVs in PR19.

Broadening inclusivity of re-openers	• Ofwat might look to include more expenditure within the re-opener category, more aligned with Ofgem's approach in RIIO-2 – this would not be under IDoK or SE, but represent an alternative re-opener mechanism. • The advantage of such an approach is that it allows the regulator to manage uncertainty in a pre-defined way,
Change IDoK threshold value – form	• As the basis for the materiality threshold is in revenue terms, firms with a larger revenue to RCV ratio are more exposed to risk as a proportion of their notional equity (or RCV) prior to the threshold being breached. • A RoRE-based threshold could have the benefit of achieving consistency across companies in relation to overall company value. However, this represents a material change in approach and there are distributive consequences of such a change.
Change IDoK threshold value – magnitude	• the threshold level itself might be reviewed to ensure that the approach is having the intended risk-reducing effect in practice/ it does not duplicate the protections elsewhere in the regime; any change would likely be a decrease from current levels reflecting three aspects: i) tighter financeability metrics, ii) the role of sharing mechanisms in adjusting revenues, and iii) the infrequent use of such mechanisms in risk allocation. • However, decreasing the threshold whilst retaining the other protections is likely to lead to duplication in protection and pass risks further onto consumers, so this option should only be considered alongside wider changes to the regulatory framework.

Conclusions

Despite their limited use and developments in the regime, the re-opener mechanisms do appear to have some value (to companies and rating agencies) as a licensed- based backstop mechanism. We consider that use of the mechanisms now would be likely to require some level of change for the reasons set out above.

Such revision may be low priority given the wider protections of the regulatory regime (cost sharing etc.) which may mean that the IDoK and SE mechanisms are now unlikely to be triggered, even for low probability events.

An alternative way to consider their role might be as a larger part of the overall protections that water companies benefit from. In the context for instance of reviewing complexity Ofwat might consider whether these more 'in the round' type reopener mechanisms are more appropriate to generally large and established businesses than an extensive range of caps, collars, dead bands and wider sharing arrangements that apply on sometimes small parts of the cost base or that limit risk exposure in very specific areas.

7.2.4. Issue 4: Reconciliation mechanisms

Summary of issue

- **Adherence to best practice principles:** While some reconciliations are likely fundamental to the regulatory regime e.g. reconciliation of revenue collected, others are introduced through policy choice e.g. those which correct forecasting error. There is complexity both in terms of undertaking them for all companies and in the fact that the output of one reconciliation will impact others, with cashflow implications. The burden of work needs to be proportionate to the policy benefit. Our high-level review has not identified any individual reconciliations that do not deliver a policy benefit individually, so the focus may be on trying to reduce the burden.

Context

There are 21 reconciliation models and a 210+ page reconciliation rulebook. Reconciliation adjustments can apply in three ways:[46]

- In-period revenue adjustments which apply to revenues during the control period, and in general apply two years after the event has occurred. The purpose is to provide stronger incentives on current company management to act and link outcomes to costs more closely.
    - Price controls are adjusted in-period to reflect performance under C-MeX and D-MeX, the Revenue Forecasting Incentive (RFI) to address under/ over-recovery, Bilateral Entry adjustments and Bioresources revenue reconciliation.
- End-of-period revenue adjustments which will apply to revenues in the next control period, which runs from 2025 to 2030.
    - There are numerous end of period reconciliations, including cost reconciliations, cost of new debt reconciliation, Gearing Outperformance Sharing Mechanism (GOSM) reconciliation, tax reconciliations, RPI-CPIH reconciliation, WINEP, residential retail reconciliation, trading incentive, DSRA and a reconciliation on innovation.
    - ODI performance is covered by a mixture of in-period and end-of-period adjustments.
- RCV adjustments which are applied through midnight RCV adjustments prior to the start of the next control period and recovered over time through the run-off of the RCV and the recovery of the allowed return on capital on the RCV balance.

Companies submit data annually to facilitate reconciliations alongside their annual reporting of performance. For ODIs, companies can request or Ofwat can initiate changes to price controls over the forthcoming charging year.

A challenge is the interactions between reconciliations; for example, tax is an input to allowed revenues, with under- or over-recovery of allowed revenue being the basis for another reconciliation. The ODI performance model is particularly complex given it is subject to both in-period and end-of-period adjustments to the RCV and Revenue. Across the 17 largest water companies, it affects all revenue controls across a total of 675 performance commitments of which 461 have financial outcome delivery incentives. Excluding C-MeX and D-MeX, there are 368 in-period ODIs which bring ODI payments closer in time to when customers experience a given level of performance. 59 PCs have end-of-period ODIs[47].

[46] Page 9, https://www.ofwat.gov.uk/wp-content/uploads/2020/12/PR19-Reconciliation-rulebook-guidance-document.pdf

[47] We acknowledge that not all staff within a water company need to understand all facets of the regulatory framework to deliver the right behaviour, for example, a bioresources manager can understand the implications on their part of the business and act accordingly.

Although the in-period reconciliations of the outcomes regime are mostly mechanistic, any ODI adjustment that exceeds +/-1% of notional equity can be subject to smoothing as companies have the option to defer the excess to the subsequent year to avoid material bill volatility.

Ofwat makes use of caps/collars on individual PCs to limit overall risk exposure. ODI risk range for out / underperformance was set +/- 1% to 3% of base equity return at PR19. Most financial ODIs are applied in-period to bring payments closer to the time when customers experience a given level of performance.

The Revenue Forecasting Incentive (RFI) is a symmetric revenue adjustment applied in-period to reconcile any revenue under- or -over-recovery in an earlier year. Where differences between actual and allowed revenues are greater than 2%, the RFI applies a financial penalty. The RFI is applied to the network plus and water resources controls. this mechanism also contributes to bringing payments closer to the time when customers experience a given level of performance.

We consider that there is likely scope to simplify but this will necessitate a degree of pragmatism.

Suggested options

Our options represent a top-down assessment of reconciliation mechanisms (a fuller bottom-up review may be justified).

- *Retain reconciliation mechanisms, but improve automation and streamline the process*: a bottom-up assessment of mechanisms could improve and standardise the mechanisms themselves.
- *Greater use of sharing mechanisms without reconciliation mechanisms*: remove full reconciliations and use sharing as a measure of 'rough justice' in a consistent way across the control – for example, with respect to real price effects on wage costs.
- *Application of materiality thresholds to reconciliations*: put in place a deadband such that companies would only trigger a reconciliation if they could evidence that an individual reconciliation payment on an individual mechanism (or the aggregate net payment across all mechanisms) was more than X% of revenue or RoRE.
- *Greater role for annual updating through digital response:* use more real time data by increasing the use of digital regulation to decrease the lag between the consequences of performance and any pay out or top up as well as automate some reconciliations, where appropriate.
- *Removal of within period reconciliations - single reconciliation at end of period:* the reconciliations could be done at the end of the price control only, with effects spread over the following price control period (unless requested/ initiated).
- *Onus on companies to complete reconciliations, with targeted Ofwat review:* Ofwat's burden could be reduced if the companies undertook reconciliations, with Ofwat providing critical checks on some but not all of the calculations (either itself or through a third party).

Initial evaluation of suggested options

Option	Evaluation
Retain reconciliation mechanisms, but improve and streamline the process	• Each reconciliation mechanism has a defined purpose and is justified. • There may be reduced complexity elsewhere through the use of these mechanisms e.g. not needing to use ex-post assessment of developer services costs. • The scale of the reconciliation mechanism, though principled as a policy, may not justify the use of the reconciliation mechanism.
Greater use of sharing mechanisms without reconciliation mechanisms	• The use of sharing mechanisms without reconciliation mechanisms potentially reduces complexity, though its applicability is limited to areas

	where a sharing rate applies (currently totex; we discuss potential approaches for tax and debt variation separately in this report). • Scale is an important issue as this approach moves away from a principled allocation of risk and uses part of the 'risk budget'. One example could be in relation to CPIH-RPI and the reconciliation there; the basis is clear in terms of neutrality, though the gap may not be especially volatile. • We know that real price effects have been subject to forecast error leading to windfall gains and losses. • The reconciliation mechanisms adopted are principled and justified individually – for example on the cost of new debt, the NAO has criticised a fixed allowance and Ofwat has moved more in step with Ofgem here. Changes to the approach may reduce predictability of the regulatory regime.
Application of materiality thresholds to reconciliations	• Use of materiality thresholds (in theory) ensures that Ofwat responds to material changes in circumstances and any action is justified. • Materiality thresholds could reduce complexity, but the calculations themselves may increase it, so the net effect is not clear. • Such an approach could potentially impact negatively on incentives, with potential deadbands up to the cap and/ or possible 'cliff-edge' effects around adjustments once the threshold is triggered. There is scope for gaming, which in turn could increase regulatory burden.
Greater role for annual updating through digital response	• More frequent reconciliation is beneficial if it improves the speed of cost recovery (for example, in-period cash flow adjustments may be preferable from a creditworthiness perspective) and linking costs to outcomes (e.g. on C-MeX). Where impacts tend to trend in one direction and revenue impacts are cumulative i.e. demonstrate positive serial correlation, more frequent adjustment helps to avoid an end of period step change. • We note that Moody's credit rating for Ofwat-regulated water companies improved for PR19 with respect to revenue risk, following more automatic and faster cashflow adjustments. • There may also be value in tracking differences on an annual basis even where the reconciliation is made at the end of period, to ensure potential bill impacts for the next regulatory period are well understood.
Removal of within period reconciliations - single reconciliation at end of period	• Where annual results are likely to be 'noisy' and not exhibit year-to-year positive correlation, annual reconciliations are less helpful and the approach could create an ongoing burden, with monitoring and analysis. • The high materiality thresholds used for re-openers implies that any financial implications of waiting until the end of period should not be an issue for companies (with scope to request this possible).
Onus on companies to complete reconciliations, with targeted Ofwat review	• Placing more onus on the companies reduces Ofwat's own burden, but in the overall scheme of things, the cost of monitoring reconciliations is likely to be very small relative to their financial impact. • Ofwat would need to be confident in the calculations adopted by the companies and set very clear rules.

Conclusions

Reducing the number of reconciliation mechanisms would represent a change in direction for Ofwat; PR19 looked to reduce the scope for windfall gains or losses through external drivers. Alongside other mechanisms such as ODIs the water price control has become more complex and detailed, informed by stakeholder engagement and our review of the evolution of the regulatory regime.

Our options recognise that there are trade-offs between complexity and simplicity that may require a degree of pragmatism. We suggest that there should be:

- development of a suitable framework and principles for where reconciliations are applied.
- a fundamental assessment of the trade-offs in policy setting e.g. whether reducing forecasting error justifies the additional complexity.
- simplifying/automating as far as possible the process for the reconciliations that remain.

Ofwat has evolved the PR19 reconciliation approach from PR14 and it is better understood by those involved in the process. Over the course of PR19, it will be important to monitor the in-period adjustments in such a way that can help Ofwat assess whether the increased level of complexity and burden of the reconciliations is proportionate to the benefit delivered throughout the price control. Alongside this, modelling bill impacts from within period adjustments versus end of period adjustments would be a useful exercise to best appreciate the implications of Ofwat's policy choices.

7.2.5. Issue 5: Inflation risk

Summary of issue

- **Appropriate allocation of individual risks**: Our assessment of individual risks indicates that forecast error / mismatch risk for the notional company does not lead to long-term societal gains. This is because mismatch risk does not incentivise better consumer outcomes or remove volatility, while carrying a risk for companies that carries a risk premium and that utilises part of the 'risk budget'. Discussions with stakeholders indicated that firms do bear some inflation risk, which in their view is an example of a mismatch risk and did not support delivering positive outcomes.

Context

Under the PR19 price control, the RCV is indexed to inflation. 50% of the pre-March 2020 RCV is indexed to RPI, 50% to CPIH, and additions to the RCV from March 2020 will be indexed to CPIH. The asset base indexation approach is well established in UK regulation and is consistent with the principle of financial capital maintenance. Such an approach is straightforward to rationalise given companies' lack of ability to control economy-wide inflation and is a key characteristic of the UK regulated utility asset class.

The underlying issue is that firms receive real allowances, yet interest expenses for the company are more likely to be in nominal form (nominal vs index-linked mismatch). Feedback from company stakeholders has indicated that exposure differs across companies and that the present allocation may not be efficient. However, if the mix of index-linked exposure (through debt and derivatives) is under management control, the case for Ofwat changing their approach weakens.

A secondary issue is a potential CPI-RPI mismatch issue arising from the switch to CPIH for indexing new RCV additions. Firms may face exposure of any difference in expected revenue from this transition, though Ofwat has looked at this issue in depth and designed an approach that reflects companies' index-linked exposure.

Suggested options

Our options cover mismatch risk on inflation. The three options we propose cover two different sources of mismatch i) nominal vs index-linked exposure, and ii) CPIH vs RPI linked exposure:

- Retention of existing approach.
- Separation of nominal and inflation-linked allowances (i.e., having part of the RCV linked to an inflation index, and part compensated through a nominal WACC).
- Full switch to CPIH indexation (noting that this aims to reduce longer term scope for mismatch risk, but does not solve the issue in the short term).

Initial evaluation of suggested options

Option	Evaluation
Retention of existing approach	• The current approach sets an allowed cost of debt (and WACC) in real terms, suggesting that the scope for mismatch is driven by company decisions around nominal or index-linked exposure (through debt and derivatives). • The approach is simple and supported by regulatory precedent. • However, this approach may be less appropriate where the choice is outside of company control, or the cost of minimising inflation risk is prohibitive.
Separation of nominal and inflation-linked allowances	• The approach would seek to remove any mismatch error around cashflows through adopting specific proportions of nominal and inflation-linked cashflows.

	• However, it is unclear the extent to which investors actively seek to get exposure to some inflation risk (as long as this risk is reflected in the allowed return) and the drivers of the proportions of index-linked exposure. • In practice, adjustments may be challenging to do accurately and places an additional regulatory burden on regulators to understand debt financing and derivative structures, with less comparable and more complex results
Full switch to CPIH indexation	• The move to CPIH indexation in full would be consistent with Ofwat's move from RPI to CPIH indexation, albeit following a transition in PR19. • The approach would reduce complexity, improve financeability (through increased cashflows in PR24) and potentially increase the amount of CPIH-linked debt being issued (helping to reduce any mismatch in future price controls). • However, the approach has potential to increase (not reduce) mismatch risk in the short-term and any approach needs to be consistent with the logic that Ofwat has set out around the 50% RPI, 50% CPIH RCV indexation in PR19. • The approach to financeability would need to be justified and not considered to be opportunistic.

Conclusions

An approach that moves away from full inflation indexation would appear disproportionate for the level of potential variance faced by companies and their investors. We do not see justification at this point for Ofwat departing from its current approach. However, before confirming that position, Ofwat could choose to investigate the scale of the issue (for example, looking at the proportion of revenues impacted) and whether there are structural factors that force company decisions on whether to issue nominal or index-linked debt, implying that the choice is out of company control and strengthening the case for adopting such an approach. This would be most likely if Ofwat agrees with the sentiment of stakeholders that policy is not having its intended consequence.

The discussion around RPI and CPI indexation for PR19 suggested that companies had concerns around indexing the RCV to the (lower) CPI measure. Since a nominal WACC would entail no indexation it is not clear that there would be support for such an approach. The WACC for water companies is based on measured betas for listed companies. To the extent that any residual inflation risk increases companies' cost of capital, this should be captured.

With respect to the transition to a fully CPIH indexed approach, Ofwat should consider the implications from an inflation risk perspective of making this change and weigh that against future benefits. Comparing any RPI-linked exposure in water to energy would be useful, given the approach to full CPIH indexation has been accepted for regulated energy networks.

7.2.6. Issue 6: Gearing Outperformance Sharing Mechanism (GOSM)

Summary of issue

- **Use of suitable risk mechanisms:** Discussion of the mechanism by the CMA has highlighted that further thinking would be useful here, in particular whether the mechanism suitably deals with harm faced by society in the long-term from more highly geared structures and financial resilience risk.

Context

Motivated by concerns over the financial risk resulting from highly geared structures Ofwat introduced the GOSM for PR19 to adjust returns for gearing rates significantly above its notional gearing assumption. The GOSM works through applying an adjustment where actual gearing exceeds a threshold above Ofwat's notional gearing assumption. The adjustment is based on the difference between the allowed cost of equity and the company's actual cost of debt. The CMA did not utilise the GOSM in its redetermination of the PR19 price control for four appellants.

This situation suggests it is important to consider the approach to gearing and financing risk as part of this work.

The overarching question is whether the interests of customers, companies and society are aligned when it comes to corporate and financial structure choices.

We note that Ofwat has introduced greater transparency and focus on financial resilience, with annual monitoring reports and greater commitments requested from the companies on this matter.

Suggested options

We have identified three different options in relation to the Gearing Outperformance Sharing Mechanism:

- Retention of the GOSM, with greater development of the evidence base to retain this approach[48].
- Restriction of dividend payments, akin to debt covenants in a regulatory context.
- Change the relationship between gearing and the cost of equity in the WACC.

Initial evaluation of suggested options

Option	Evaluation

Retention of the GOSM	• Ofwat's approach takes direct action to disincentivise highly geared and riskier financial structures. However, the approach has been rejected by the CMA as the right tool to address the perceived issue.
	• The key considerations relate to the right method to manage financing risk (examples where actual gearing is above notional gearing are more intuitive to focus upon):
	  • What is the relationship, if any, between gearing and the WACC? Is it appropriate to treat the WACC as insensitive to the actual level of gearing? If not, there may be a rationale for a GOSM as a benefit sharing mechanism.
	  • To what extent do customers face a potential burden or harm as a result of companies' financial resilience? Do existing provisions and safeguards – whether on the company side in the form of debt covenants or on the regulatory side in the form of the Special Administration regime – leave

[48] The two types of evidence that would be valuable include indications that: i) higher gearing enables reductions in the overall WACC that allow companies their cost of capital allowance, and ii) higher levels of gearing leave customers exposed to a material threat of harm, via the impact on credit rating, the incremental probability of financial distress/ insolvency and harms stemming from this.

	customers exposed to a material threat of harm? If so, there may be a rationale for a GOSM as a tool to improve financial resilience
Restriction of dividend payments	• The approach creates an extension of Ofwat's licence-based cash-lock up provision, restricting outflows of cash to the holding company, associated businesses and shareholders. The lock-up could apply to where the levels of gearing are deemed excessive. • Debt covenants may already exist to provide protections of a similar ilk here, with Ofwat restrictions providing further challenges (this may be something that Ofwat chooses to analyse to understand existing protections). • The approach is intrusive and steps beyond current requirements. Any policy should be proportionate to the potential harm and restrictions may limit the appetite of investors to remain in/ enter the sector to the detriment of society. • The method by which a threshold should be set needs to be conscious that not all companies trade at values equivalent to the RCV[49]. An RCV-based threshold may not reflect the additional equity in the business through an existing RCV premium (though this could work in both directions).
Change the relationship between gearing and the cost of equity in the WACC	• Our scope of work on the project does not include discussion of the approach to setting allowances, including the cost of capital. However, if Ofwat identifies an issue from the effects of gearing and believes that the cause relates to how the cost of equity is estimated, an alternative approach would be to revisit the cost of equity and undertake research on whether the Modigliani-Miller theorem holds in practice[50].

Conclusions

The approach we are suggesting broadly involves three steps.

The first step is to conduct additional research to fully understand the potential harm to consumers and the link between gearing and the cost of equity. These are separate issues.

The second step is then to consider what tools are available under the current framework to address the points encountered in that first step. Ofwat has made strides in monitoring and governance of financial resilience, with greater transparency. Could this approach be strengthened further? Changing the calibration of the cost of capital, with notional gearing and de-levering/ re-levering of beta, is another example. The idea of a cash-flow lock-up could represent more significant change.

The third step would be to review alternative approaches that are more 'out of the box'. We expect that there would be a high threshold around the quality and persuasiveness of the evidence base to adopt a substantial and novel mechanism, given the comments of the CMA on the GOSM.

[49] This is not necessarily something that Ofwat needs to consider when focusing on the notional entity.

[50] Market evidence could be valuable here, where investors reveal their preferences. An example would be for an OFTO, with published gearing and required rates of return. This could be contrasted to returns on less highly-geared structures.

7.2.7. Issue 7: Cost of Equity indexation

Summary of issue

- **Appropriate allocation of individual risks:** Our assessment of benefits and costs from given risk allocations (in Part A) highlighted that risks driven by forecast error for the notional company ('mismatch risk') does not generate benefits in the long-term for society and from a risk allocation perspective should be minimised. Movements in the risk-free rate are out of company control and are difficult to forecast accurately, so cost of equity indexation is one method to avoid this.
- **Adherence to best practice principles:** Ofwat has introduced mechanisms to reduce forecasting risk in PR19, including cost of new debt indexation, reconciliations for tax and inflation etc. Indexing the cost of equity would appear to achieve greater adherence to this principle and support consistency across the regulatory framework.

Context

Ofwat currently applies a fixed allowance for the cost of equity. The allowance could instead be updated on an annual basis (applied within-period or end of period) to reflect market evidence. Ofgem introduced cost of equity indexation for the RIIO-2 price controls.

With respect to the mismatch risk element, CEPA's report for Ofwat and the CAA in 2016 highlighted the weak predictive power of market-based forward curves to estimate the risk-free rate (as per **Error! Reference source not found.**). This concept was noted by Ofwat in moving to indexing the cost of new debt. There are differences in how this feeds through into the cost of equity, which we discuss later.

Figure 7.3: Predictive power of forward curves on the risk-free rate

CEPA (2016) Alternative approaches to setting the cost of debt: A report for Ofwat and the CAA.

Suggested options

We present two options around cost of equity indexation:

- Full cost of equity indexation (either through an end of period true-up or annual adjustments).
- Materiality-threshold based adjustment i.e., allowances are adjusted if a particular threshold is met.

We discuss Ofgem's considerations around cost of equity indexation for the RIIO-2 price controls below.

Ofgem considerations around cost of equity indexation

Ofgem's approach generally received support from both companies and consumer representatives[51], and the principle of introducing such a mechanism was not something that was appealed to the CMA following Final Determinations in December 2020 (based on information in the public domain at the time of writing).

Moody's commentary on the introduction of cost of equity indexation did not provide a principle-based view on the mechanism, but noted in February 2019 that the approach was seen as being credit positive given expectation that interest rates would increase above Ofgem's forecast[52].

CEPA advised Ofgem on this issue in a February 2018 report[53]. We identified five assessment criteria around indexation of cost of equity parameters:

- Does the underlying value of the parameter change over time?
- Is the parameter difficult to forecast accurately?
- Is the parameter observable?
- Does a measure exist that is representative for the parameter?
- Is the parameter uncontrollable for the company?

The report concluded that there would not be benefits from indexing beta, given volatility and noise in the beta estimates. The decision around the precise approach to indexing the risk-free rate and TMR involved trade-offs between accuracy and simplicity (Ofgem agreed with this advice in formulating its policy).

There are three key differences in circumstance to note for PR24, relative to the basis for the CEPA report in early 2018:

- Firstly, the transition to a CPIH-indexed approach from RPI inflation indexation has an effect on what is possible, given the limited CPIH-linked debt from the UK Debt Management Office (DMO).
- Secondly, the CMA's PR19 final determination could lead to revisions of the scoring included in the original CEPA report, if Ofwat decides it must make a judgement on the risk-free rate across ILGs, nominal gilts and AAA rated corporate debt[54]. The CMA appeals on the RIIO-2 price controls should provide further evidence for Ofwat to consider around a potential approach to cost of equity indexation.
- Thirdly, the equity beta applied by Ofgem in RIIO-1 had been 0.90-0.95. Ofwat's PR19 notional equity beta was 0.71 (which is consistent with the CMA PR19 Final Report). For an assumed fixed TMR, a lower equity beta leads to a greater change in the cost of equity for a given change in the risk-free rate.

The challenges posed by the first two changes are not insurmountable though:

- On the inflation indexation point, Ofwat currently applies a RPI-CPIH wedge with associated reconciliation mechanism. A similar approach could be utilised with an indexed cost of equity (or risk-free rate) in a mechanistic way for PR24.
- The direct use of ILGs would be easier for indexation, but the CMA has indicated that this may underestimate the risk-free rate. If this underestimation is considered relatively stable over time, a fixed wedge could be applied – a relatively straightforward adjustment to a mechanistic approach.

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[51] See Ofgem (2019) Sector Specific Methodology Decision – Finance Annex, p28.

[52] Moody's (2019) Credit quality likely to weaken in RIIO-GD2 regulatory period, February 2019.

[53] CEPA (2018) Review of cost of capital ranges for Ofgem's RIIO-2 for onshore networks, February 2018.

[54] The scoring that this would impact would be 'Is the parameter observable?' and 'Does a representative measure exist?'

With respect to the equity beta, a 100bps in the RfR would feed through to a 30bps change in the cost of equity, were Ofwat to assume a 0.70 equity beta and a fixed TMR within their cost of equity indexation approach. Based on evidence shown in Figure 7.5, the difference at the end of a five-year period could plausibly be 300bps on the risk-free rate – i.e. 90bps on the cost of equity in this example (or 36bps on the WACC at 60% notional gearing)[55]. If the equity beta was closer to unity, then the size of the benefit decreases.

Ofgem discussed some additional practical challenges around how to apply a cost of indexation approach, for example the averaging period and timing of cashflow adjustments, in their Sector Specific Methodology Consultation Finance Annex (2018) from paragraph 3.34 onwards. This may be useful context for Ofwat to review in arriving at any decision.

Criticisms of the approach as part of the RIIO-2 process include the additional volatility that indexation could lead to, that it was unnecessary for the scale of the risk and that a poorly calibrated approach would have little benefit. We would want to ensure that an adjustment does not simply reflect noise and represents changes in the true cost of equity. Additional research into movements into the cost of equity could be a useful step to achieving this.

Initial evaluation of suggested options

Option	Evaluation
Full indexation	• Full indexation insulates companies from forecasting risk around the risk-free rate, where this the cost of equity is calibrated properly. An end of period true-up would achieve consistency with Ofwat's approach on the cost of new debt and minimise the effect of 'noise' in market evidence. However, companies remain exposed during the price control to changes and the size of the end of period true-up may cause material step changes in bills (absent adjustments). • Indexation of the cost of equity must both reduce any forecasting error and be applied in a way that is proportionate to the extent of risk exposure. The CMA decision on PR19, using AAA rated corporate bonds, could potentially add complication to the approach applied. • As a second-order benefit, there would be a within-period financeability advantage. One of the key credit ratios within Ofwat's financeability assessment is the Adjusted Interest Cover Ratio (AICR). The AICR is closely linked to the relationship between the allowed cost of equity and the actual cost of debt. Having these two parameters move in step could mitigate financing risk. • Where rates are below historical levels and fixed for a five-year period, the sensitivity to upticks in the prevailing cost of debt may be acute, with interest cover ratios currently having more limited headroom.
Materiality threshold adjustment	• An alternative approach would be to only adjust a fixed allowance if outturn evidence diverges materially from expectations. There are practical challenges in setting the level of that threshold and ensuring that appropriate incentive properties remain (e.g., relating to cliff-edge effects around a threshold).

Conclusions

We consider that there would be merit in Ofwat considering the role of cost of equity indexation further in the run-up to PR24. The rationale for considering this would be as per the logic for indexing the cost of new debt i.e. the scope for material differences between today's spot rate/ forward curves and outturn data on the observable risk-free rate.

Engaging with stakeholders would be a useful exercise; we understand that some investors prefer the use of a fixed allowance for stability over the price controls, while others want the protection from risk exposure that cost of equity

[55] If we assume a 20bps difference in the WACC on average over five years, a company with a £5bn RCV would be impacted by £50m over a price control i.e. 0.2% x £5,000m x 5.

indexation potentially provides. The response may boil down to how well the mechanism is calibrated, with potentially further work on the relationship between the risk-free rate and market risk premium being useful.

7.2.8. Issue 8: Connections risk/ DSRA reconciliation

The Developer Services Revenue Adjustment Factor (DSRA) mechanism looks to protect water companies from facing volume risk. The overall number of connections required in a company's area is an externally-driven, uncontrollable risk, and so this treatment appears appropriate. However, the revenue allowance and any adjustments via the DSRA are calculated with reference to the total number of connections, irrespective of who delivers them. This means companies benefit financially where other market participants carry out the work – or, equivalently, are penalised financially where they carry out the work themselves. This may dampen incentives to improve their service to developers.

The use of an average unit cost rate (albeit a company-specific rate) in the DSRA means that companies are exposed to variations in the mix of work undertaken, which may also be considered uncontrollable. The rates are based on companies' forecast mix of work. Provided there are no structural reasons to expect shifts in volume or SLP penetration to be focused on particularly high- or low-cost work, this approach would represent a 'fair bet', and we acknowledge that use of disaggregated rates (which Ofwat did consider for PR19) would be more complex to implement.

Summary of issue

- **Appropriate allocation of individual risks:** Two risks in relation to new connections are (largely) externally-driven and uncontrollable: the overall volume of new connections required and the mix of work. Companies' revenue allowances and any adjustments via the DSRA are calculated with reference to the total number of connections, irrespective of who delivers them, and an average unit cost rate. This may leave companies facing perverse incentives with respect to connection volumes – they will tend to benefit financially where other market participants carry out the work – and exposed to mix of work risk.
- **Use of suitable risk mechanisms:** The DSRA adjusts allowed revenues based on the total number of new connections required using an average unit rate, leaving water companies exposed to variations in unit costs across different types of work. The adjustment does not take into consideration the party carrying out the work, and relies on an assumption that the average cost is representative. The unit cost of the work will vary with single connections vs large developments, and the difficulty of the work required. Incumbents currently bear this risk.

While incumbents are incentivised to deliver efficiency savings (a positive), incumbents are also incentivised to carry out a greater proportion of cheaper/less complex work, and increase the proportion of work conducted by SLPs and NAVs. In considering benefits of allocating risk to companies, we are interested in the behavioural effects driven by bearing risk. The behaviours here are not all linked to incentivising optimal long-term outcomes.

We understand that Ofwat's intention is to facilitate the development of alternative providers of new connections. In order to achieve this, Ofwat has decided that companies should not face strong financial incentives to carry out such work themselves. However, the current approach leaves companies revenue-neutral to the party carrying out new connections work. This means that companies benefit financially if other parties carry out the work. This may dampen incentives to improve their service to developers.

The use of an average unit cost rate (albeit a company-specific rate) in the DSRA means that companies are exposed to variations in the mix of work undertaken. The rates are based on companies' forecast mix of work. Provided there are no structural reasons to expect shifts in volume or SLP penetration to be focused on particularly high- or low-cost work, this approach would represent a 'fair bet', and we acknowledge that use of disaggregated rates (which Ofwat did consider for PR19) would be more complex to implement.

Context

'Developer services' are the activities delivered as a result of new developments and can be broken down into network reinforcement (local and strategic) and site-specific work (new connections, mains and sewer requisition, and diversions). Ofwat introduced the Developer Services Revenue Adjustment (DSRA) mechanism at PR19 to encourage timely and quality new connections. The mechanism will (symmetrically) adjust revenues based on the

difference between outturn and forecast properties connected. The DSRA also protects incumbents from market share risk (i.e., decrease in revenues because of losing work to SLPs/NAVs), which should incentivise incumbents to actively facilitate development of the market. Risk relating to the outturn mix of different work undertaken is not mitigated through the DSRA, given that a single unit cost rate is used within the reconciliation.

The approach taken at PR19 changed from the Final Methodology to Draft Determination (and then Final Determination). The Final Methodology approach had proposed ten bands to apply to reflect the different costs of work. However, the approach was simplified for the Draft Determination with a single unit rate (which was then adopted for the Final Determination). Ofwat noted challenges at the Draft Determination stage around setting accurate costs for different types of work, the administrative burden of any reconciliation and companies not following Ofwat guidance in supporting the development of the reconciliation mechanism.

SLPs are accredited organisations who can design and lay the pipework for a new water main or sewer instead of the incumbent water company and may include the developer itself. NAVs are newly appointed companies by Ofwat that provide water and/or wastewater services to developers and final consumers in an area across England and Wales instead of the local incumbent water and/or wastewater company. If the work is completed by an SLP or the developer, the assets are adopted by the local water company (incumbent water company or NAV) on completion.

Suggested options and conclusions

Ofwat has considered the appropriate regulatory treatment of developer services activity as part of a separate piece of work. The consultation and supporting CEPA report can be found here: https://www.ofwat.gov.uk/regulated-companies/price-review/2024-price-review/pr24-and-beyond-creating-tomorrow-together/.

In the report for Ofwat, CEPA proposed two high-level strategic options to inform Ofwat broader strategy around developer services for PR24, each of which represent different points on the spectrum of relying more or less on 'ex-ante' (i.e., price controls) versus 'ex-post' (i.e., monitoring and enforcement) regulation of developer services.

Option 1. An evolution of the current regulatory approach, where all developer services continue to be price control regulated within the scope of the network plus price control, potentially with a view to a further transition towards more separate regulation or deregulation of developer services at future price controls.

Under this option, the focus for PR24 would be on:

- cost assessment improvements, which could be enabled through enhanced data collection; and/or
- improvements to the design of the existing price control regulatory framework, e.g., targeted changes to the existing volume driver for new connections (the DSRA) tailored to evidence of variation in the unit costs of different types of new development.

Option 2. A more fundamental change in the approach to regulating developer services at PR24 that would be more reliant on 'backstop' regulation of contestable developer services, akin to Ofgem's approach to regulating electricity new connections. Under this option:

- Contestable developer services would be excluded from the network plus price controls but would initially be subject to a capped profit margin (either zero or positive).
- Non-contestable work would be expected to remain within the scope of the wholesale network plus price control.

7.2.9. Issue 9: Accuracy of measuring risk (including covariance)

Summary of issue

In the earlier shallow dives we have considered issues related to individual risks and to the mechanisms that Ofwat employs for allocation. This 'shallow dive' covers risk in the round picking up on the concept of a 'risk budget' and how that is measured and utilised within the regulatory process.

Our framework analysis highlights issues under several themes:

- **Appropriate allocation of individual risks**: Our assessment identifies covariance that impacts on the aggregate risk faced i.e. aggregate risk is not a sum of individual risk. For a driver like weather, this may increase the likelihood of outcomes away from the base case. In order to establish an appropriate risk budget, measurement in the round should take account of covariance.
- **Ensuring suitable company focus**: being able to utilise the concept of a 'risk budget' requires the accurate measurement of risk. When assessing the overall package of risk (e.g. through ex-ante RoRE analysis), the components need to be properly understood and accurately measured. Our review of PR14 outcomes suggests that in practice, covariance (especially around ODIs) may decrease the likelihood of outcomes away from the base case[56].
    - The P90-P10 range was 510bps in PR14 overall, as opposed to the ex-ante estimate of 730bps i.e. this is a narrower outcome than originally expected.
- **Measuring risk exposure**. the review of ex-post outcomes with ex-ante estimates indicates that the distribution of outcomes on a P90-P10 basis may be narrower or broader than expected.

Context

As part of the price control Ofwat employs ex-ante estimation of risk which is shown in RoRE distributions. This includes individual risks and risks in aggregate; on the latter, covariance between individual risks is a key aspect of accurate estimation of risk in totality that is not represented well in the current process. In stakeholder discussions as part of this project, some companies indicated to us that they apply other techniques e.g. Monte Carlo, that narrow the range and give a better indication of likely exposure. If Ofwat were to do something similar, it would have a better sense of the impact of risk on companies and could use the approach within the periodic review to consider how best to target the risk budget.

Suggested options

Our proposed options cover the estimation of risks individually and in aggregate. We have set out below the five types of analysis that might be useful (noting that these are not mutually exclusive):

- Individual risk: Qualitative assessment of relevant risk characteristics (as used in assessing benefits and costs).
    - A developed shared understanding of risk can support in future risk allocations and improve investor confidence in the regime.
- Individual risk: Quantitative analysis of suitable distributions for risks (where possible).
    - Assessing potential impacts and their probability more accurately helps the regulator understand the risk that is being faced and a more precise quantification of those benefits and costs.
- Individual risk: Assessment of historical outcomes (ex-ante versus ex-post).

[56] We understand that this is consistent with companies' forecasts at PR19.

  - Maximising learnings from evidence that Ofwat has available, drawing on other sectors where that would be useful.

- Individual risk: Development of a clear governance process for assessing risk through the regulatory process.
  - Develop a robust approach for how risk will be modelled during the price control process where allowances, targets and risk allocations potentially change.

- Aggregate risk: Qualitative analysis of drivers of risk i.e. identification of shared drivers (for example, weather – as discussed above).
  - Ensuring that estimates of total risk exposure are accurate, helping with the robustness of financeability assessment and in prioritising risk exposure where it delivers greater benefits.

- Aggregate risk: Correlation matrix development.
  - Developing a matrix that can be discussed with stakeholders to provide a transparent and consistent approach to considering correlations in measuring risk.

We note that Ofwat asked companies to provide information at the individual and aggregate levels, with co-variance being relevant to this assessment. As such, our proposals would represent a continuation of that approach and increasing Ofwat's internal capabilities around risk assessment.

Initial evaluation of suggested options & conclusions

Each of the five types of analysis aims to achieve more accurate estimation of risk from an ex-ante perspective. The main consideration for Ofwat is whether the additional complexity and resource burden is worth the greater accuracy and understanding. Ofwat would need to work with the companies to provide a transparent and evidence-based approach to assessing risk.

The following factors can inform an assessment on the value of additional work on estimating risk:

- *Scope of new mechanisms*: if the regulatory regime remains unchanged, the value of historical evidence is stronger and more confidence should be possible in forecasts.
- *Similarity of risks faced over time and across sectors*: historical databases from water and/ or other sectors will provide more insight if the risk is seen to be similar.
- *Inherent asymmetries*: if Ofwat considers that informational asymmetries are material, applying forward-looking assessment to forecast outcomes is challenging and time consuming.
- *Scope for misestimation of extremes*: one potential recommendation is to think more about tail risks through showing values outside of P10 and P90, though we might expect the estimation of these extreme cases to be less certain and not add much value.
- *Non normal distributions*: where there are risks with non-normal distributions, this adds a layer of complexity to assessing risk and presenting the information in an intuitive way.
- *Small sample size*: Ofwat has a number of water companies in the industry to look at evidence for and several price controls. For aspects like totex, the larger sample size may provide more comfort than newer parts of the regulatory framework.
- *Reference to comparators*: we do not recommend linking the range of outcomes mechanistically to a cost of capital, therefore an assessment of risk is more informative and quantifying risk should be proportionate with its use.

The approach should look at the greatest benefits relevant to overall costs. This does not have to cover the entire regulatory regime or all risks necessarily – for example, a review of interlinkages between ODIs would be a useful

step, given scope for overlap and the potential for strong correlations. We understand that for PR19 Ofwat scaled RoRE ranges to reflect the potential for co-variance across ODIs, as an ex-ante assumption that a firm would perform at the P10 or P90 level for all ODIs would not be realistic and provide a misleading view of potential outcomes.

7.2.10. Issue 10: Measurement and presentation of risk

Summary of issue

- **Effective measurement and presentation of risk exposure**. Improvements might be made through (a) measuring and (b) presenting the totality of risks faced, strengthening all stakeholders' understanding of risk exposure and the range of potential outcomes, creating a closer link to policy setting and encouraging the right focus.

Context

The Return on Regulated Equity (RoRE) is often used – by Ofwat and by other regulators – as the basis for presenting the financial impacts of risk[57]. This primarily captures the impact of risks, with probability covered to an extent by the selection of indicative probabilistic benchmarks to produce a RoRE range. For example, the P10 to P90 range is often used as the basis for measuring risk exposure.

Presentation

We are referring here to how Ofwat can best present measurement of risk in discussions with stakeholders and in developing policy. This is separate to accurately measuring risk.

In Part A of the report, we noted six criteria under the topic of presentational value:

- Simple and intuitive visuals.
- Capturing both dimensions of risk (namely impact and frequency).
- Presenting the totality of risks faced.
- Informative for policy-setting (understanding skew and P50 predicted outcomes).
- Comparable across the industry.
- Encourages right focus.

Suggested options

In Part A of this report we set out that one objective in measuring risk is accuracy. A minimum level of accuracy is required before assessing presentational value is relevant. Whilst impact and probability are at least partly captured, we highlighted in Section 5.2 that **non-standard probability distributions** and **correlations between risks** give rise to additional risk measurement challenges.

Options to incorporate these issues into risk analysis and develop Ofwat's RoRE analysis further include:

- Introduction of qualitative and quantitative assessments of probability distributions and risk correlations. As a first step it would be helpful to highlight risks that may be more complex in nature and indicate how this might result in a sub-optimal allocation. This may include statistical or quantitative analysis to inform Ofwat's judgement – for example examining historic patterns of variation in outcomes or analysing relationships between different risks.
- Monte Carlo analysis. Particularly when considering relationships between risks, it may be challenging to establish clear mechanistic analytical solutions. Monte Carlo analysis can be used to understand the range of outcomes that may be produced by the interaction of complex, interrelated variables.

Such analysis is unlikely to be warranted in all cases. However, we understand that, for example, companies do already carry out Monte Carlo analyses in some cases

[57] The impacts of risk are not necessarily financial only; reputational risks can be a key influence in company behaviour.

There will be a number of variants and options available for how Ofwat can present risk, which may build on options to refine measurement of risk. We have developed an illustrative 'straw man' approach that we consider builds on the strengths of two approaches used in the water sector (RoRE and probability density functions) and provides a useful tool for informing policy design.

The approach shows the full range of risks faced and can be used to inform policy making, though the approach does not address the issue with the focus of the selected risk outcome metric being on within price control cashflows. We consider that supplementary tools should be drawn upon in conjunction with RoRE analysis; the two tools that we would recommend (in addition to RoRE or probability density) would be:

- A measure of the long-term viability of the business – moving away from financial returns over a five-year period and linking short-term actions to long-term outcomes in more of a qualitative sense (consistent with information that Ofwat requests from companies at present). This would be for ex-ante and ex-post assessment.
- Financeability or cashflow assessment – still focusing on cashflows, but including modelling of timing impacts and the performance of credit metrics over time.
- Examples of the main concept we have developed (we refer to this as the 'flag chart') are presented in Figure 7.4.

We show the key features of the flag chart in Figure 7.4, including variant options for how this might be presented. Our first variant is akin to a fan chart, whereby the bounds signify uncertainty over the time dimension but shows uncertainty over the probability dimension instead. If Ofwat wished to show the underlying drivers of potential returns, our second variant could be used – this would equate to an array of RoRE charts presented next to one another. The drawback to this variant is that it is challenging to show negative covariance between drivers within the chart.

We consider that any view on skew or asymmetry needs to consider the totality of risk. With the existing ex-ante RoRE approach, P10 and P90 can be informative on potential asymmetry, but it is just a snapshot at one point of the chart which ignores how the risk evolves over probabilities up to that point.

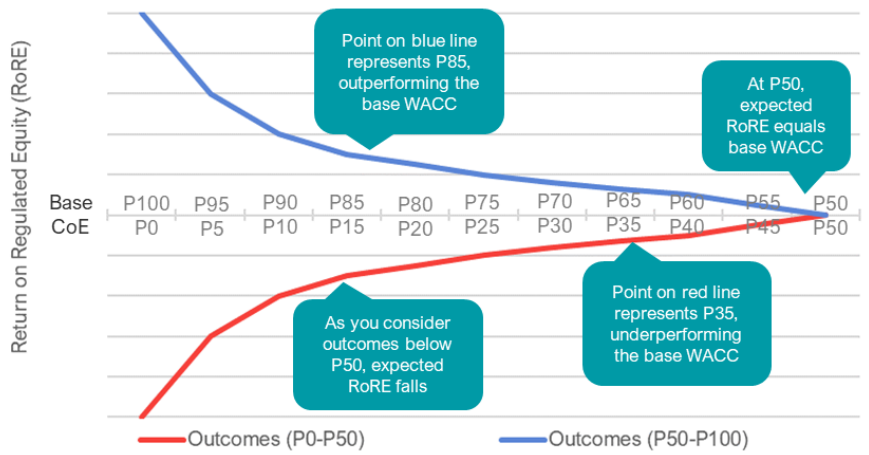
The versions of the chart can be used to visualise the nature of the risks faced by water companies, as a function of the external environment and regulatory policy. A chart that is generally flat throughout with large spikes upwards at the left-hand side of the chart would indicate that tail-risks are very important for the expected value of the firm[58].

The data used to develop the flag chart is similar to the data used for the existing approaches; both the ex-ante RoRE presentation and the probability density function presentation. The underlying requirements are not dissimilar and do not necessarily require Monte Carlo modelling to be undertaken (though such an approach may be worthwhile in accurately capturing the totality of the distribution).

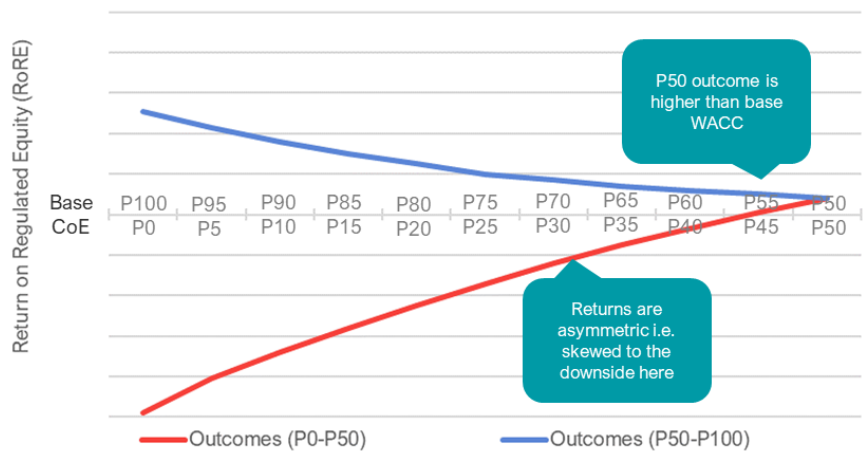
[58] Expected value can be thought of in relation to the area between the base return and each of our outcomes lines.

Figure 7.4: Presentation of flag chart concept

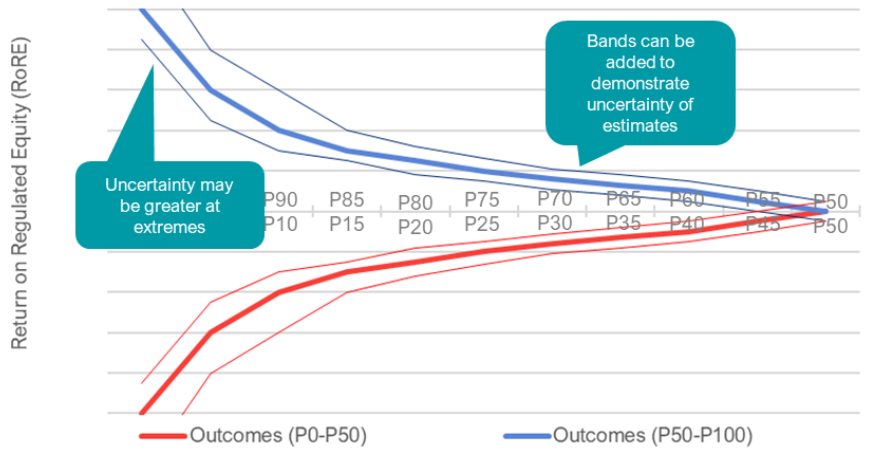
Panel 1: Presentation of basic flag chart concept



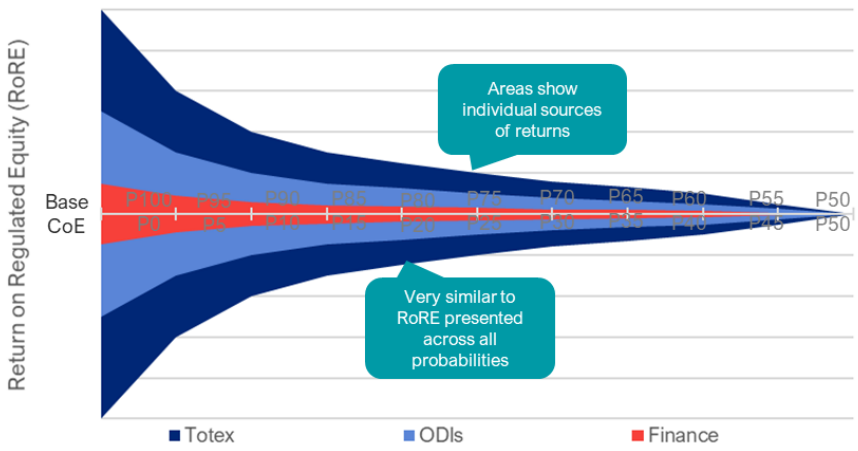
Panel 2: Observing skew and P50 outcomes



Panel 3: Variant showing uncertainty



Panel 4: Variant showing underlying drivers (no covariance)



Relating the presentation of risk to regulatory framework design

One of the key areas of improvement to target from the existing approaches is establishing a clear link between measuring risk and developing policy.

Our proposed presentation of risk is intended to be useful in describing changes in policy, both on an individual basis and at the overall package level. This is through comparative analysis.

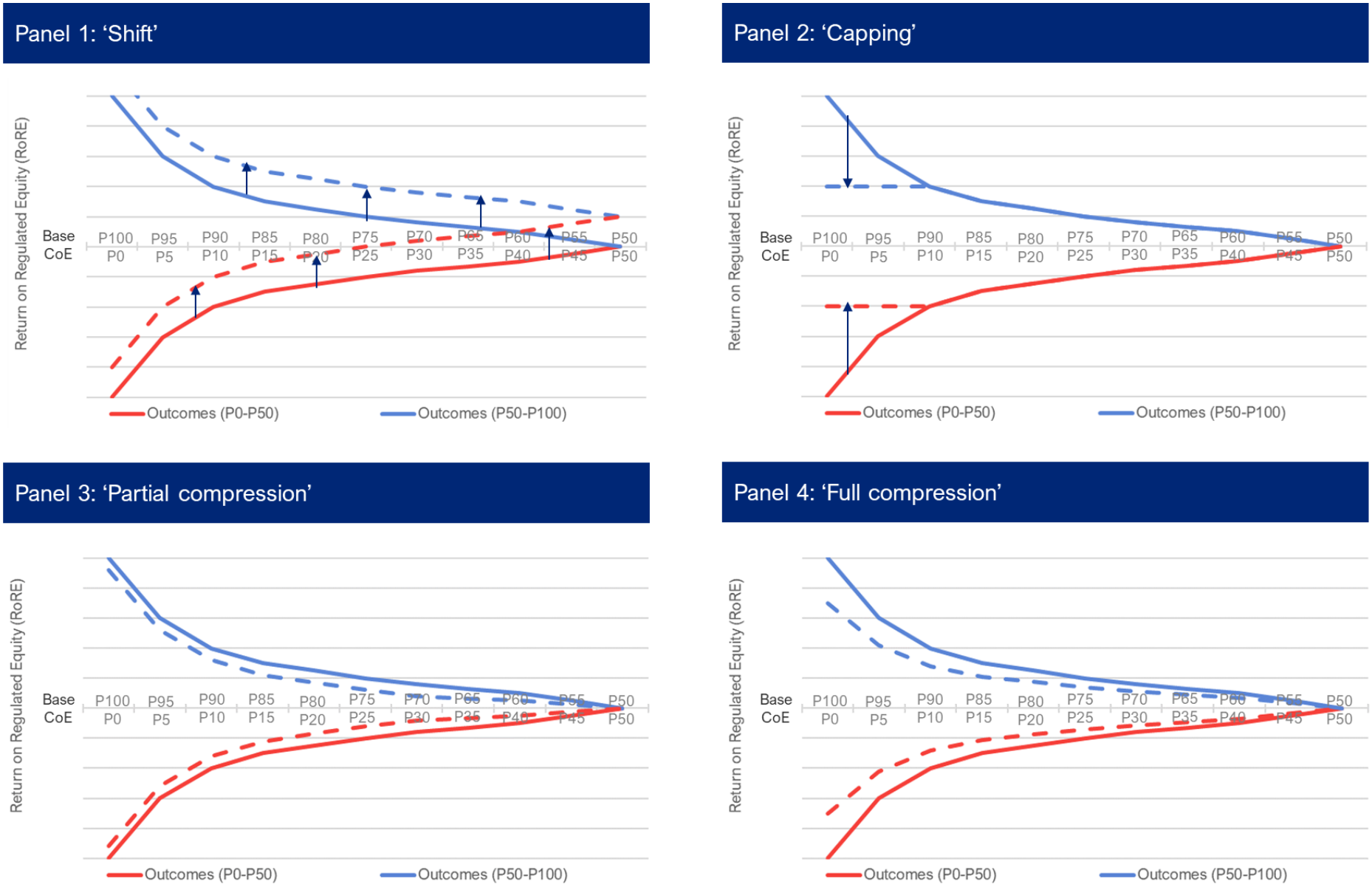
In Figure 7.5, we present four figures demonstrating how changes in risk can be characterised:

- *'Shift'*: where RoRE outcomes move upwards or downwards by a set level – for example, changing the target to deliberately change expected returns[59].
- *'Capping'*: limiting risk beyond a given RoRE outcome.
- *'Partial compression/ expansion'*: where risk outcomes for a given probability are proportionally decreased/ increased over a defined set of outcomes.
- *'Full compression/ expansion'*: where risk outcomes for a given probability are proportionally decreased/ increased across all outcomes.

The policy measures can be used in conjunction with one another. In a landscape that typically involves a high degree of technical complexity, we consider that the above simplifications are useful in a summary context.

[59] During the price control process the regulator may change targets. This does not necessarily represent a shift as the target may be re-calibrating the mechanism to better achieve the original distribution that they were targeting.

Figure 7.5: Demonstrating the impact of policy upon risk outcomes



7.3. Developing the PR24 regulatory regime

We present two strawman options; an 'incremental change' option and a 'fundamental change' option. The results of which are presented in Table 7.2.

The incremental change option highlights that the current regulatory regime has evolved over multiple price controls, with clear rationale around the introduction of individual policy measures and a regulatory framework that is well understood by stakeholders. We do not consider that there are errors in Ofwat's approach that necessitate extreme change; instead there are lessons learnt from recent price controls, new challenges and taking a step back that can inform policy setting for PR24.

The more fundamental change option looks to scale back some of the mechanisms and policy options in order to try to direct the focus of company management to those factors that will best deliver short-term and long-term societal benefits. This approach would likely involve a degree of 'rough justice', but the regulatory framework is likely to be less complex and more targeted.

Both strawmen contain a combination of options that do not necessarily all need to be adopted together and should not be considered recommendations at this early stage. They should be treated as illustrative and an aid to thinking though the direction of travel for PR24.

Table 7.2: Presentation of strawman options

Incremental change option	Fundamental change option
• Similar ODI regime – potentially with grouped ODIs to provide some level of simplification and ODIs based on asset health that extend the time horizon. • Continued evolution to models and process for reconciliation mechanisms; perhaps with a degree of automation to reduce the burden and risk of error. • Re-openers largely or fully unchanged on the basis that they are unlikely to be needed given other protections. • Limited changes to further reduce forecast error (where that remains) – e.g. consider cost of equity indexation. • Retention of RoRE presentation of risk, potentially with some refinements to accuracy of measurement that recognises covariance. • Limited number of new risk-allocation mechanisms and tools for PR24 relative to PR19, limiting any additional complexity.	• Materially reduced number of ODIs, focused on key long-term priorities of society – each ODI has more material revenue at stake, possibly without individual caps and collars. • Introduction of longer term performance obligations that direct greater focus on to issues like asset resilience and environmental commitments. • Reduction in the number of reconciliation mechanisms, with risks shared through sharing factors and re-openers playing a more prominent role in limiting more extreme outcomes; greater forecasting risk faced by companies. • Improved modelling capability to assess risks (individually and in aggregate) – such as Ofwat's own Monte Carlo analysis – supporting the prioritisation of the most important outcomes. Alternative presentation of risk in policy making e.g. flag chart concept.

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