

Changing the basis of indexation from RPI to CPI

United Utilities Water
February 2016



United Utilities Water Limited

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Executive summary

Ofwat has published far reaching and forward leaning proposals to begin the transition from RPI based price controls to CPI based price controls at PR19. In support of these proposals it cites a number of key external drivers which it believes demonstrate that that transition is inevitable at some point and, further, is best commenced at PR19.

Ofwat has also recognised that RPI indexation has been an important feature of regulation in the sector to date and that a switch away from it would entail both costs and benefits. It has committed to further work to understand these. It has also committed to seek to manage the transition carefully and has provided important safeguarding commitments to investors and customers that it intends to deliver revenue and value neutrality.

As anticipated in its Water 2020 publication in December, there remains some work to do in order to demonstrate the nature and depth of these commitments. Ofwat has sought input as to how this can be delivered. This paper, and the accompanying research report from KPMG are provided in response to that request.

In our view there are four key insights into investor attitudes which, if addressed, would significantly improve the prospects for a smooth transition in the long term best interests of customers. Furthermore, we believe that it is important to recognise that in the long term, the interests of customers and investors in this matter should be aligned: neither investors nor customers would stand to benefit from an approach which incurred unnecessary costs or damaged trust and confidence in the sector.

- **A fully functioning CPI linked debt market is likely to take many years to emerge.** Experience from the successful use of RPI linked debt suggests this is a prerequisite for efficient use of CPI based financing. Recognising that Ofwat believes some customer legitimacy issues may already be present, we suggest that in the near term a presentational solution towards introducing CPI into bills is adopted. At the same time, we suggest that in order to effectively start the transition towards CPI, Ofwat should issue a clear pre-commitment in 2016 that it will embed its 50:50 RPI:CPI approach as soon as a sufficiently well-functioning CPI based debt market has been developed. The achievement of this state should be measured by reaching an independently verifiable trigger point, based on the degree of issuance of CPI linked debt.
- **We cannot predict with certainty the gap between RPI and CPI.** Because of this, any commitment to revenue and value neutrality needs to make good any difference between the forecast gap and outturn gap. Whilst Ofwat's broad commitment in this area is welcome, the way in which it will be achieved needs to be better exposed. This can be delivered through detailed modelling and commentary as to the proposed mechanism,
- **Demonstration of value and revenue neutrality is difficult.** Having commissioned independent work from KPMG to interpret and apply the approach outlined in Water 2020, it is clear that gaps in understanding or gaps in methodology at this stage are such that there is considerable uncertainty as to whether Ofwat's approach is sufficient to fully deliver the commitments it wants to make. To resolve this, we believe that there should be more explicit sharing of methodologies and models in order to build trust and confidence in the degree of Ofwat's commitments and the practical means through which they will be discharged.
- **The commitments need to be enduring.** In order to be revenue and value neutral, Ofwat's commitments must be observed over the very long term, especially given the expectation that CPI based returns due to investors will be deferred into future periods through the pay as you go mechanism. Achieving confidence that this will be the case is by no means impossible, as evidenced by investors' continued faith in the RCV, and we believe Ofwat can achieve this by expanding on the basis it expects value and revenue neutrality to become an enduring commitment.

We very much welcome Ofwat's commitment to undertake further work on the costs and benefits of the transition and we believe that the long term interests of customers will be best served if this evidence is collated and consulted upon as part of a joint process with other stakeholders over the coming months.

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Background

Since privatisation, the use of indexation has been fundamental to water sector regulation, its financing and the calculation of customer bills. As Ofwat notes in its recent Water 2020 publication, indexation is used in water sector regulation in three principal ways:

- Wholesale revenues are indexed to inflation each year
- The nominal value of the RCV is also indexed to inflation each year
- The estimation of the WACC embeds a view of inflation, which impacts upon returns

The use of indexation in price controls has many advantages and there are good reasons to be confident that it will remain a cornerstone of regulation in the sector.

- From investors' point of view, indexation of prices provides a significant risk mitigant against rising input costs.
- From customers' point of view, it provides some assurance about the efficiencies being demanded from companies and that increases in costs which go beyond general cost increases have been explicitly considered.
- From the regulator's point of view, the use of indexation provides some assurance that the price controls it has set are at least partly able to recalibrate to reflect market conditions during the price control period, without a continual reopening of the price control settlement.

To date, the measure of indexation that has been used for these purposes is RPI. When the RPI-X model of regulation was first developed in the 1980s, RPI was indisputably the main measure of consumer inflation in existence at that time. There was therefore little reason to debate whether it was the most appropriate measure of indexation for regulatory purposes.

Since then there have been a number of developments which have raised new questions about the use of RPI and whether it remains fit for purpose. These issues are well rehearsed in Ofwat's Water 2020 document but include concerns such as:

- The loss of RPI's status as an official statistic
- The views of several commentators (eg: Paul Johnson's review) that the RPI basis of calculation is flawed
- The increased use of CPI as the preferred measure of inflation in the broader economy, in preference to the use of RPI

These and other factors suggest that, in the long term, it is likely that regulators will seek to move towards a model of regulation where the primary means of indexation is based on CPI – or CPIH – rather than RPI. The key question is therefore when to make such movements, at what pace, and how to manage the transition.

Ofwat's proposals

Ofwat's Water 2020 document recognises that transition raises a number of important issues, including the need to maintain investor confidence during the transition for the long term benefit of customers. Importantly, Ofwat also recognises that the transition has the potential to create both costs and benefits.

"... we should move towards implementation of CPI, applying it to both prices and the RCV, but with careful regard to transitional issues."

Ofwat has also made important commitments to revenue and value neutrality, designed to allay investor concerns about the transition. In its December 2015 document Ofwat states

"in implementing a CPI based approach, we will commit to ensuring that the impact of this is neutral to both company (nominal) revenues and customer bills in net present value terms."

In its June 2015 document, Ofwat stated that:

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“the choice of indexation method should not impact on the total (nominal) level of returns earned by investors.”

These are significant statements of intent which should be welcomed.

However, a recent report from NERA has reported that there are significant concerns among investors about how Ofwat will demonstrate that it will deliver on these commitments and, in some cases, whether it is possible to do so. This is also consistent with the views expressed to us by the vast majority of our major debt and equity investors.

The presence of such doubts should not come as a surprise. Indeed, Ofwat itself anticipated that its statements to date may not be sufficient to demonstrate neutrality and that the assumptions being made regarding RPI and CPI are symmetrical. In December, it therefore invited views about how it can best support the credibility of this commitment.

“We see this commitment as being a critical part of our package and understand its importance. We therefore welcome views as to how we can best support the credibility of this commitment.”

This paper is provided in response to that request and, we hope, will provide a constructive contribution towards a better understanding of some of the key issues that need to be resolved in order to commence a successful transition. A successful transition is one which is in the long term interests of customers and which has legitimacy both in the eyes of customers and investors. It is important that any transition to CPI is done in a way which preserves the potential customer benefits of making the change and does not put these unnecessarily at risk.

Alongside our own work on this topic, we commissioned KPMG to identify the different ways in which value may be affected by a transition away from RPI, both positive and negative, and the extent to which Ofwat’s proposals appear likely to mitigate those impacts and hence deliver neutrality. We are publishing the executive summary of that report alongside this document.

We have identified four key insights which help to reveal how Ofwat can demonstrate that it intends to deliver on its commitments of revenue and value neutrality.

Insight 1: A fully functioning CPI-linked debt market will take many years to emerge

Financing in the water industry has benefited from access to a well-established market for RPI-linked corporate debt. Nearly 50% of water industry debt is linked to RPI and, in turn, this debt accounts for approximately half of all corporate debt. KPMG estimate that £24.4bn of RPI linked corporate bonds have been issued since 1999.

In contrast, the current CPI market is embryonic. To date, the issuance of CPI debt has been restricted to three issuances; two of these are from local authorities and one of them from the Church of England Pensions Board. In all three cases these issuances were privately placed and were bought by a single institutional investor, rather than on the syndicated basis through which large issuances are made. The amount of money raised by these bonds totalled £450m.

In order to ensure best execution, it is likely that the issuers of these bonds would have wanted to utilise a syndicated placement if this had been available. Without it, is difficult to estimate how keenly priced these issuances were relative to the alternative of an RPI-linked bond. Certainly, they cannot provide reliable guidance for the pricing of a corporate CPI linked bond. This is because the CEPB bond is a non-standard index linked bond and the local authority backed bonds benefit from high credit ratings (one at AA+ and one at AA2) reflecting the government-backed nature of the issuers.

At times the lack of a CPI market has been described as a “chicken and egg” problem whereby the demand for CPI linked debt will emerge once the supply of CPI debt is made available, whilst the issue of CPI debt will only occur once there is a sufficiently clear demand for the debt to provide certainty that this is cost effective. However, this overlooks that there is an additional key obstacle to development of a corporate CPI-linked debt market: this is the creation of a fully functioning market for government CPI-linked debt, without which the possibility of a readily accessible corporate CPI-linked debt market looks remote.

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The market for government RPI linked debt is what enables buyers and sellers of corporate RPI linked debt to transact. This is because the key variable that interests buyers and sellers in the corporate debt market is the premium being paid relative to gilts. It took nearly twenty years for the market for RPI linked debt to become fully developed whereby there was a full yield curve with sufficient market depth to iron out pricing anomalies. It is possible to envisage that, if it were to switch to issuing government debt indexed by CPI (rather than RPI) then the DMO could accelerate this to, say, 5-10 years. However, such a move is likely to come only after:

- current debates over the use of CPI or CPIH are resolved
- the DMO is convinced that CPI issuance is cost effective
- consultations have been issued and concluded

On this basis it is difficult to envisage an issue of government CPI linked debt before 2018 and a fully functioning market until at least 2023-2028. This may take longer depending upon the period of time that may be taken to settle the ongoing CPI vs CPIH debate, where CPIH may ultimately become the main measure of indexation in the economy; further consultations on this issue are likely to extend the period of time before a fully functioning market based on CPIH will develop.

The reason why this concerns investors is because, absent a fully functioning CPI linked debt market, it is difficult to establish what the reasonable price should be for CPI linked debt. They believe that it will be difficult for Ofwat to estimate and difficult for companies to price. In the absence of any directly observable evidence from active CPI-linked debt markets, there is a particular risk that the additional costs associated with CPI linked debt may be underestimated.¹ Furthermore, investors also believe that the lack of liquidity for CPI-linked debt is likely to mean that accessing CPI debt or CPI/RPI swaps is likely to be at best expensive and inefficient and at worst not available at all. In either circumstance they are concerned that these additional costs will serve to both lower returns and increase customer bills, inconsistent with the primary objectives for making the transition to CPI in the first place.

Given this concern, what is Ofwat to do if it is to demonstrate its commitment to making the transition revenue and value neutral?

Option 1: Delay transition until beyond PR19

The most simple action that could be taken would be to delay transition to CPI until key issues (eg: the CPI vs CPIH debate) and obstacles (eg: the development of a broader CPI market) had been overcome. However, we recognise that this would not be consistent with Ofwat's desire to commence the CPI transition in PR19 and that Ofwat considers that issues of customer legitimacy are likely to dictate that steps must be taken sooner.

Option 2: Flexible transition of indexation of the RCV

One approach which may be capable of winning broad support from companies and investors is the approach outlined by Anglian Water in its contribution to the "marketplace for ideas."² Under this approach, companies would be able to move towards CPI (or CPIH) based financing in line with the development of and availability of the related financial instruments. The advantage of this is that companies will be incentivised to continue minimising the costs of financing, with benefits to customers in both the short and the long term.

However, if Ofwat considers that this approach does not sufficiently commit companies to transition, then it should chart a path which is linked to objective external benchmarks.

¹ In its Water 2020 impact assessment, Ofwat provisionally concluded that in the absence of evidence that costs were higher, there was no impact on financing costs. "There is no evidence that CPI linked debt should be more expensive than RPI linked debt." (page 51 of Water 2020: Regulatory framework for wholesale markets and the 2019 price Appendix 6: Draft impact assessment)

² See, for example, http://www.anglianwater.co.uk/assets/media/CPI_transition_v1.pdf

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Option 3: Index revenues to CPI in the short term, with a clear pre-commitment to index RCV to CPI in future

In their response to Ofwat's June 2015 consultation, Severn Trent and a number of other respondents suggested that Ofwat should adopt an approach whereby revenues would be calculated by RPI but then prices would be expressed in CPI terms. Ofwat recognised a number of factors which could be seen as supportive of this solution:

"...it could be argued to address some of the issues associated with the lack of legitimacy of RPI and would mean that customers have bills presented to them on a more familiar CPI basis. It would also address the transitional issues associated with short-term bill impacts and the need for companies to hedge the difference between RPI and CPI."

However, Ofwat rejected this approach on the basis that

"... price controls would effectively remain RPI based, and so the problems and wider policy context associated with RPI would remain embedded in our approach. The longer-term benefit arising from reduced price volatility would also be lost and the customer legitimacy concerns would be only partly addressed, as there would be pressure to correct for any differences between the forecast and actual difference between RPI and CPI, effectively meaning that prices would grow by RPI over the longer term. It would also not transition to CPI based indexation, as the underlying calculations would still be RPI based."

The analysis of the immaturity of the existing CPI debt market means that making a rapid transition to a CPI based implementation of price controls at this time may not deliver the best customer benefit. This is because it could be expected to increase financing costs (due to an illiquid market) which companies are ill-equipped to manage. But the point made at the outset of this paper remains: the move to CPI is likely to be a matter of when, rather than if.

On this basis it may be desirable for Ofwat to commit instead to a two stage transition towards CPI price controls. As a first step, this would involve a short term approach which used the largely presentational approach advocated by Severn Trent to address the most pressing short term issues of customer legitimacy whilst allowing companies to continue to use the most cost effective basis to raise financing from investors.

However, recognising Ofwat's concerns that this may not be the most durable or desirable long term solution, Ofwat could at the same time pre-commit to moving to its 50:50 RPI/CPI approach when an independently observable trigger is reached. Such a trigger could be based, for example, on a certain % or monetary amount of government or corporate debt having been issued in CPI terms, or some other metric which would give confidence to investors that incentives to move the financing basis of the companies towards CPI, in line with the new customer presentation of prices, would happen only once a suitably deep market had evolved.

This switch does not have to be any more distant than the development of a reasonably liquid CPI debt market. It could potentially occur mid-price review if the relevant conditions were reached, meaning that if an active CPI debt market did evolve during AMP7 then implementation could commence within the next five year period.

In our view this approach is capable of adoption by Ofwat because it would recognise the need to:

- act to deliver customer legitimacy in the short term, by presenting bills in CPI terms
- continue to facilitate RPI-linked financing approaches whilst this provides the most efficient approach, and best value for customers, in the run up to the development of the CPI market
- incentivise companies to seek efficient CPI based financing as soon as possible, as this would best prepare companies for when the trigger point had been reached, and the transition to 50:50 RPI/CPI occurs
- ensure that a transition to the long term use of CPI is commenced as early as practicable, in line with the Johnson report, and potentially as early as during AMP7, depending upon the development of a CPI market

This approach would also be most in line with one of the key regulatory precedents which Ofwat cites, whereby the CAA first took steps towards a transition by using the more presentational approach for the 2011-14 price control and then took steps afterwards to embed the CPI basis more firmly in underlying price control calculations.

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Option 4: Consider the varying costs and benefits of a 50:50, 33:67 or 25:75 approach

In the event that Ofwat considers that this type of precommitment remains insufficient, then it should consider carefully whether a 50:50 RPI:CPI approach at PR19 is appropriate or whether, given the likely state of market development of the relevant financial instruments, a 33:67 or 25:75 split may represent the most appropriate starting point for transition.

Insight 2: We cannot predict with certainty the gap between RPI and CPI

Moody's recent report "UK Transition to CPI: Redefining real" based its analysis on the long term "wedge" between RPI and CPI being 1.3%. This is consistent with a Bank of England estimate published in 2014. The Office of Budget responsibility has most recently estimated the wedge at 1%. A number of other estimates are also available.

However, all these estimates are, by their nature uncertain. Whatever estimate Ofwat uses to estimate the gap in a future price control, it is highly unlikely to be correct. Incorrect estimation of the wedge would mean that revenue and value neutrality would not be achieved.

Ofwat has recognised this issue and has set out a broad commitment to address it. In its December document, Ofwat proposes:

"a true up to correct for any deviation of the actual RPI/CPI differential from that forecast at the start of the regulatory period (for the RPI linked part of the RCV)."

Again, a commitment to truing up any differences between the outturn RPI/CPI differential and the *ex ante* assumed differential is something that should be welcomed. However, there is little information published to date on how such a true-up would be achieved and what is meant by the apparent reference to only the RPI linked part of the RCV.

In order to demonstrate how it can deliver this commitment, Ofwat should:

- set out detailed calculations which show how the true-up would work and how this can be delivered on an NPV neutral basis. This should include explicit confirmation of when the true-up would be made and how and when companies would be expected to either repay or receive any variation this implies for company revenues and customer bills.

By delivering these into the public domain and seeking feedback from stakeholders, Ofwat will have greater certainty that its revenue and value neutral aims have been achieved. This is because its approach will either be validated or challenged by stakeholders, giving Ofwat a chance to reconsider its approach if necessary, in order to deliver a workable commitment.

Insight 3: Demonstration of revenue and value neutrality is difficult

Key to establishing the broader credibility of a commitment to revenue and value neutrality is a clear exposition of the mechanics through which this will be achieved. We recognise that this is not straightforward and believe it is not necessarily something that should be attempted by Ofwat alone; indeed, it is more likely that confidence can be built in Ofwat's commitments through a more iterative process which ensures that both investors and the regulator have a full understanding of the depth of the commitment and how that will translate in practice when it comes to delivering neutrality.

We therefore recommend that:

- a full exposition of the modelled approach proposed by Ofwat should be shared as soon as possible in order that comments can be received in good time for Ofwat's conclusion on the approach to be taken at PR19. To demonstrate why this is necessary, it is important to recognise that absent such exposition, a range of different interpretations of Ofwat's commitments are likely to emerge.

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We asked KPMG to undertake modelling, based on the approach set out in Ofwat's December document of a 50:50 RPI:CPI approach to indexation. Their conclusion was that whilst, as they interpreted what was written, Ofwat's proposed approach does indeed provide very substantial mitigation against (unintended) losses for investors as a result of the transition, some elements of the approach are unclear or undocumented. Depending upon the assumptions used to fill this gap (whether a gap in understanding or a gap in methodology) it was possible to interpret the approach as putting a material amount of value at risk (in the order of 1.8% of RCV, equivalent to c.£2 on the average customer bill.) This arose because of unresolved issues such as the treatment of new totex additions to the RCV, how they were indexed and the timing of any true up adjustment.³ Without clarity on these points, it is likely that investors will begin to factor in a worst-case scenario into their estimation of risk

We do not believe that such an outcome is what Ofwat intends, as this would be contrary to the overarching approach set out in its commitments to revenue and value neutrality. Nevertheless, such results help explain why – and evidence that – there remains a gap between Ofwat's intentions as expressed through its commitments and investors' interpretation of them. We are providing the details of this modelling to Ofwat in order that there is visibility of the range of interpretations that can be made and we hope that this could assist a process whereby more explicit models of the mechanisms Ofwat intends to use can be shared with stakeholders.

Insight 4: Commitments need to be enduring

Finally, whatever modelling approach is used, it is clear that Ofwat's commitments to neutrality must be enduring into the very long term if they are to deliver what is intended. Investors are well aware of the risk that in the future, regulators may feel less bound to commitments that were made in the past, no matter how well intentioned and strongly held they were at the time.

Ofwat, like other regulators in the United Kingdom, has a strong track record of maintaining regulatory promises over the long term and of eschewing short term opportunistic behaviour, instead recognising the value in maintaining trust and confidence in the long term. This is one of the reasons why investors have to date been able to put their faith in mechanisms such as the RCV, whereby the achievement of returns on today's cashflows is only recouped over the very long term.

The move to a CPI based regime would, other things being equal, mean higher returns being paid to investors in the short term and (assuming a successful transition) a smaller portion of return being paid in the long term. However, at the same time as wanting investors to switch towards a CPI-based regime, Ofwat is also asking investors to defer to a later date the returns which would accompany it. The mechanism through which this is expected to be achieved is the "Pay as you go" lever which can be applied to reprofile returns into the future in order to reduce customer bills in the short term.

Little is said in Water 2020 about the longevity of Ofwat's commitment to revenue and value neutrality as a result of the switch from RPI to CPI. However, it is clear that to achieve neutrality, the commitment must persist into the very long term. Without clear statements about the duration of its commitment, investors may be concerned that, particularly given the technical nature of the transition and the proposed deferment of returns into the longer term, it may be all too tempting for a future regulator to overlook the commitments made today.

Rightly, Ofwat will recognise that today's administration cannot fetter the discretion of future administrations that have yet to come. However, as confidence in the RCV demonstrates, it is possible for the regulator to provide sufficient comfort to investors such that they can have confidence in the long term approach to regulation without going so far as to bind the hands of future regulators.

We therefore consider that:

- it is important that Ofwat consider what further assurances it can give, or commitments it could make, to provide comfort that investors can expect value and revenue neutrality to endure.

³ . Other potential costs of transition increased the amount of value at risk further to nearly 5%, based on KPMG's analysis. See [the appendix to this report](#).

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- One approach to this could be to insert some form of commitment into company licences. However, recognising the trend away from building specific price control arrangements in licences in the interests of providing future regulatory flexibility, it may be that some other policy document may be preferred.

Next steps

We believe that the next few months will be crucial in ensuring that a way can be found to take this issue forward which is in the long term interests of customers whilst also acting swiftly to address legitimacy concerns for customers and investors in the short term. We are confident that, over the long term, the interests of customers and investors are aligned and that what is required is to navigate the short term path with skill.

Companies stand ready to help provide such evidence and information as may be needed to help deliver this outcome. We hope that this contribution, and the associated KPMG report, contribute towards this.

We note in Ofwat's December consultation that it is undertaking further work on the costs and benefits of transition before making its final decision. We strongly support the need for this work. Whilst it may be difficult to develop precise costs and benefits for all effects, there is a clear sense that a number of material costs have yet to be identified by Ofwat in its draft impact assessment.

"We acknowledge the importance of obtaining a thorough understanding of the costs and benefits before making a final decision on moving from RPI to CPI indexation. We intend to undertake further work and stakeholder engagement on the costs and benefits of moving from RPI to CPI. This will include an assessment of the relationship between water company costs and RPI and CPI, the impact of a change in volatility on water company costs and the cost of equity and the impact of a move on water company debt and hedging costs."

Delivering this analysis in a robust and transparent way will be essential to delivering a result which is in the long term interests of customers and building confidence among investors that this is the case.

It is therefore our view that the collation of this evidence, the undertaking of this work, and the stakeholder engagement around it should be a joint endeavour with customer, investor and industry stakeholders. In particular, an approach where the work is undertaken with a high degree of separation from stakeholders and is only fully exposed alongside a final decision should be avoided. Instead, we would urge Ofwat to publish such evidence well in advance of making a final decision on the approach to indexation at PR19, such that it can benefit from further insights and suggestions from stakeholders in the interests of achieving the best final outcome.



cutting through complexity

The Impact of a Change in Indexation on the Water Sector

Prepared for United Utilities
09 February 2016

Important notice

This report has been prepared under a private contract dated 12 November 2015 with United Utilities Group plc ('the Beneficiary).

The information in the report is in part based upon publicly available information and reflects prevailing conditions and our views as of this date, all of which are accordingly subject to change. In preparing the report, we have relied upon and assumed, without independent verification, the accuracy and completeness of any information available from public sources. References to financial information relate to indicative information that has been prepared solely for illustrative purposes only. Nothing in this report constitutes a valuation or legal advice.

The information contained herein is of a general nature and is not intended to address the circumstances of any particular individual or entity. Although we endeavour to provide accurate and timely information, there can be no guarantee that such information is accurate as of the date it is received or that it will continue to be accurate in the future.

At the request of the Beneficiary we have agreed that the Beneficiary may publish this report on its website, in order to facilitate demonstration by the Beneficiary that a study into the matters reported has been performed by KPMG LLP for the Beneficiary.

Publication of this report does not in any way or on any basis affect or add to or extend KPMG LLP's duties and responsibilities to the Beneficiary or give rise to any duty or responsibility being accepted or assumed by or imposed on KPMG LLP to any party except the Beneficiary. To the fullest extent permitted by law, KPMG LLP does not assume any responsibility and will not accept any liability in respect of this Report any party other than the Beneficiary.

The address of KPMG LLP is 15 Canada Square, Canary Wharf, London, E14 5GL.

1. Summary of the report

1.1 Summary of main findings

KPMG has been commissioned by United Utilities to carry out an analysis of the potential costs and benefits of a switch to CPI indexation in the water sector. The aim of this report is to assess the impact of the potential change on companies and the benefits and costs to customers.

In order to consider the proposed change, it is important, first, to understand the central role that indexation plays in the overall regulatory framework in the water sector and across all regulated utilities.

RPI indexation has been a key value driver for investors and hence an important consideration in all investment decisions. It has also played a key role in ensuring a very low cost of capital which water customers benefit from. Any change to indexation is likely to be viewed as a change to one of the most fundamental investment drivers in the industry.

RPI indexation and the corresponding RPI index-linked debt are directly linked to water companies' current debt financing strategies. Therefore, any analysis of the impact of the change in indexation to a form of CPI has to consider how a market for CPI index-linked corporate debt could develop in the future. This would include the quantum and pricing of CPI-linked financing that could be available for companies to raise debt funding as well as to profile their payments over time and to match their assets and liabilities.

From the customer perspective, the application of an index, which is generally expected to increase more slowly than RPI, would result in lower bills, all other things being constant. However, this relationship might not hold, at least in the short to medium term, because of the key linkages between the form of indexation and the cost of capital, financing strategies, risk, mitigation measures and, ultimately, bill levels. These linkages imply that the consequences of the change could have a significant feedback effect on future tariffs for customers.

It is important to consider carefully whether a potential change to indexation could lead to customer benefits that could be realised in practice over a reasonable timeframe. The choice around the timing of the implementation is a significant aspect of the proposed reform, given current conditions in debt markets and potential limited availability of CPI-linked debt, as well as remaining uncertainty about the future role of CPI or its variants in the wider economic and policy context.

From the customer perspective, a change to the CPI index might provide a closer 'match' to true underlying inflation and the dynamics of costs in the wider customer basket, as recognised by Ofwat in its impact assessment. At the same time, one has to be mindful of the fact that many costs in the industry, including financing costs, are still linked to RPI.

The change to CPI could also reduce variation in tariffs for customers, if CPI, or one of its variants, translates into less variability in prices. However, this impact has to be considered in the context of the likely implications not just for revenues but also for the volatility of equity cash flows, which will depend, in turn, on the availability of CPI-linked debt and asset-liability matching. The change to CPI also needs to be considered from the perspective of companies' risk exposure, including, in particular, systematic risk, which will depend on the correlation between CPI and market returns.

The overarching question is whether the potential benefits to customers could be realised or whether they would be offset by the costs of the change, where such costs might be passed on to customers in the form of specific mitigation mechanisms, higher required returns, costs of implementation, and a change in the risk of companies' financial profile.

In order to determine the overall impact on customer bills, it is important to quantify (to the extent possible) the full potential impact of the proposed change on companies and, by implication, customers. This is the overall objective of this report.

In general, the costs of the change are likely to be higher the earlier the change is implemented, and this report highlights that the water companies are currently ill-equipped to minimise these costs due to undeveloped corporate CPI-linked markets and limitations on their ability to re-profile cash flows over time.

Difficulties in minimising costs would be amplified by the lack of CPI-linked sovereign debt market at present, the maturity profile of existing RPI-linked debt raised to match RPI indexation, and the continuing uncertainty about the role that CPI will ultimately play in wider Government policy.

Potential impact of the change in indexation—dimensions of impact

Ofwat has already recognised that the proposed change could have a significant negative impact on companies' revenues due to the historically observed and forecast difference between RPI and CPI.

The regulator has proposed a mechanism that is aimed at providing mitigation for this aspect of the change and make it value-neutral. Therefore, the potential impact on companies and its potential consequences are recognised by Ofwat, even if the details of the mitigation mechanism are not yet fully developed.

In addition to the revenue deficit arising from the difference in the mean expected levels of RPI and CPI in the future, there are also several other effects that need to be considered to ascertain whether they could further increase or decrease the costs of the change to CPI indexation. Together with the impact on the expected revenue deficit, these can be grouped into five categories:

- 1) **The impact on the revenue deficit arising from the difference in the mean expected levels of RPI and CPI in the future**, as mentioned above;
- 2) **Additional value at risk resulting from likely deviations from the mean expected differential between RPI and CPI**, which could put further cash flows at risk;
- 3) **An impact on the variability of cash flows due to a change in the revenue profile and hence on risk, with potential implications for systematic risk** and the overall WACC.
- 4) **A change in the cost of debt financing due to potential changes in spreads on index-linked debt driven by future liquidity** in the index-linked market; and
- 5) **A further impact on the cost of debt (with potential implications for the cost of equity) due to potential impacts on financeability** as a result of a different profile of cash flows.

These five effects are partly inter-dependent (for example, any potential revenue deficit and bill re-profiling could also impact financeability), but are also additive—i.e. they can be summed up to determine the cumulative effect.

Potential impact of the change in indexation—mitigation scenarios

In order to quantify each of the above effects as well as their cumulative impact, we have modelled a hypothetical water company over the next 30 years (including terminal value) under different assumptions about (a) potential forms of mitigation, (b) future evolution of CPI and RPI, and (c) potential financing strategies that water companies might adopt from 2020 onwards. We have also considered the impact of potential revenue re-profiling on financeability and customer bills.

The adopted approach to estimating these effects ensures that there is no overlap between them, i.e. no double-counting, although some effects, such as the size of the revenue deficit will have second order effects on the other dimensions, e.g. on financeability.

Ofwat's proposals for mitigation, as outlined in the Water 2020 consultation published in December 2015, could be interpreted in several different ways. In order to understand the impact of the change in indexation with mitigation and associated potential risks, it is important to consider uncertainty about how exactly the proposals for mitigation might be applied at PR19 and how they could evolve over time. This uncertainty is reflected in several mitigation scenarios we consider and underscores the critical importance for all details to be clarified up front.

We consider potential risks to value from a change in indexation under different interpretations of Ofwat's proposed mitigation mechanisms. Overall we focus on 4 main cases:

- **Water 2020 Case:** In the base case ('Water 2020' Case), we assume that indexation is introduced progressively in line with additions to Totex—i.e. all additions are indexed to CPI—and that the rate of return is kept constant during each regulatory period (starting at 50/50 based on CPI- and RPI-stripped nominal rate of return). Indexation of the RCV starts at 50/50 RPI and CPI, and the share of CPI indexation progressively increases over time as Totex additions occur to the CPI portion. We also assume that the allowed return is uplifted (all other things being constant) at

each price control in line with the ratio of CPI and RPI indexation at the end of the previous AMP in all future price controls.

- **Water 2020 ‘Fog’ Case:** Even if the approach to mitigation is clearly specified, the regulator might be unable to provide the long term commitment to future regulatory treatment of mitigation beyond the first AMP period—in particular: (i) the rate at which CPI will be introduced in the future, (ii) the adjustments to the allowed return as a result of a change in indexation, and (iii) the application of a true up in case of deviations from the expected CPI-RPI gap.

In order to estimate the potential impact of this uncertainty we consider a ‘Water 2020 Fog’ Case where there is progressive introduction of CPI, as in the base case, but the allowed return is only adjusted during the first 3 price controls. This is equivalent to assuming that the nominal allowed return would not increase after the first 3 AMPs, all other factors being constant. This illustrates the uncertainty around what in future would be the counterfactual rate of return in the absence of the change, which we refer to as the ‘fog’.

We have also examined a downside case, where the extent of mitigation is reduced earlier than AMP 3. Inevitably, the impacts are great the earlier mitigation is reduced or removed.

- **Upside Case:** Ofwat’s proposals could be also interpreted as a mix of RPI/CPI indexation that is updated for annual changes and applied throughout each AMP, including to all Totex additions, and corresponding annual uplifts to the allowed rate of return in all future AMPs. This would broadly ensure value-neutrality in terms of the first dimension discussed above—i.e. the revenue deficit impact—subject to clarification of the details of how the mitigation mechanism would be applied exactly. This approach is not stated explicitly in Ofwat’s consultation and would result in certain incentives on companies that would have to be carefully considered (e.g. an incentive to continue to issue RPI-linked debt to part finance new assets to ensure asset-liability matching). It would also require a long-term regulatory commitment.
- **Unmitigated Case:** For comparison, we also consider the potential impact of the five effects listed above in the case of no mitigation, where revenues are indexed to CPI but there is no corresponding uplift in the allowed return. While this is not a scenario that would be expected to occur, it provides a useful *benchmark* to fully understand the potential cumulative impact that would need to be mitigated through different regulatory measures and corporate actions.

Potential impact of the change in indexation under different scenarios—results

The analysis shows that under our interpretation of Ofwat’s proposals in the base case (the ‘Water 2020 Case’), the potential value loss from the first effect (i.e. the expected revenue deficit) would be significantly reduced compared with no mitigation, but would still leave a part of the overall impact on value unmitigated due to potential imperfections in the mitigation mechanism—equivalent to c1.8% of the opening RCV.

In addition to the revenue deficit, other major effects could include the additional value at risk from potential deviations in the RPI-CPI gap from the expected mean differential equal to between 0.3% and 2.2% of RCV at risk (this assumes that the true-up mechanism described by Ofwat is only applied during the first AMP). There is also a potential increase in the cost of capital due to liquidity premia on future index-linked debt (not addressed by Ofwat), which could increase the cost of the change in indexation by another c1.7% of RCV (or c10 bps in the WACC).

The analysis also shows that the benefits from reduced cash flow volatility would depend on the availability of CPI-linked debt and could actually result in disbenefits if liquidity in this new market is not available and companies have to issue nominal debt partly to replace RPI index-linked debt. Moreover, the benefits from reduced cash flow variability might be offset by greater correlation of equity cashflows with market returns, so the overall impact on systematic risk might be close to nil.

The potential impact on financeability significantly depends on the assumptions made. There is a potential negative impact on interest coverage assuming companies start issuing CPI-linked debt to ensure asset-liability matching. This could lead to a deterioration in the credit positions and a corresponding increase in the cost of financing. At the same time there is likely to be a positive impact on the FFO to Net debt, but this will depend on whether the revenues under mitigation are not re-profiled to avoid an increase in customer bills.

Cumulatively, these effects could result in an expected loss of around 4-5% of RCV with additional 0 to 2% of RCV at risk, as summarised in the table below.

Summary of the overall impact of the change in indexation in the Water 2020 Case

| Type of impact | Comments | Impact as % of opening RCV (approximated) |
|---|---|--|
| Revenue deficit | Impact on revenues as a result of expected RPI-CPI gap and imperfections in the mitigation mechanism | -1.8% |
| Additional value at risk | Cash flows at risk of between £5m and £52m depending on assumed magnitude of potential deviations from the expected RPI-CPI gap | 0.3% to 2.2% |
| Cost of debt | Increase in the cost of IL debt by c30 bps due to low liquidity and corresponding increase in the WACC by c10 bps | -1.9% |
| Cash flow volatility and systematic risk | Decrease in cash flow volatility subject to asset-liability matching and liquidity in IL debt market; potential impact on systematic risk | Nil or a small increase in beta |
| Financeability | Decrease in AICR by c0.10x, equivalent to c6bps increase in the WACC, impact on FFO/Net depends on assumptions | Nil to -1.2% |
| Total expected impact plus value at risk | Equivalent uplift to the allowed rate of return of 24-42 bps | -3.7% to -4.9% impact on RCV plus additional 0.3% to 2.2% of value at risk |

The sensitivity analysis carried out shows that the impact could change significantly depending on how exactly the proposed mitigation mechanism is applied at future price controls and for how long. This means that the proposed mitigation mechanism in and of itself is necessarily associated with significant regulatory risk given the long-term impact of the potential change.

The cumulative negative impact would increase if it is assumed that mitigation is not applied in all future periods. In the Water 2020 Fog Case, when it is assumed that mitigation will last only three AMPs—i.e. that the allowed rate of return is updated twice after 2020—there is an additional c1% negative impact on RCV. This reflects the uncertainty about whether the proposed mitigation would apply consistently in all future AMPs.

In the Upside Case of perfect revenue mitigation, the revenue deficit would be fully eliminated if the allowed rate of return is progressively uplifted in line with a growing proportion of CPI indexation in each year in all future regulatory periods. The second 'additional value at risk' effect could be also fully mitigated, if the true-up mechanism proposed by Ofwat is applied at the end of all future regulatory periods. Mitigation aimed at remedying the first effect by uplifting the allowed rate of return would also have a positive (mitigating) impact on the other effects mentioned above, in particular financeability, but would not eliminate the cost of low liquidity in the CPI IL debt market.

For comparison, in the case without any mitigation, the analysis indicates that, cumulatively, these five effects could equate to as much as 25-28% decrease in the opening RCV, plus additional value at risk of between 0.5% and 3.5% of the opening RCV. While this is *not* the expected impact given that Ofwat has outlined plans for mitigation measures, this case is useful to consider as a benchmark for any potential level of mitigation. The summary of all impacts without any mitigation is presented in the table below.

Summary of the overall impact of the change in indexation in the Unmitigated Case

| Type of impact | Comments | Impact as % of opening RCV (approximated) |
|---|---|--|
| Revenue deficit | Impact on revenues as a result of expected RPI-CPI gap and no mitigation mechanism | -23.1% |
| Additional value at risk | Cash flows at risk of between £9m and £81m depending on assumed magnitude of potential deviations from the expected RPI-CPI gap | 0.5% to 3.5% |
| Cost of debt | Increase in the cost of IL debt by c30 bps due to low liquidity and corresponding increase in the WACC by c10bps | -1.7% |
| Cash flow volatility and systematic risk | Decrease in cash flow volatility subject to asset-liability matching and liquidity in IL debt market; potential impact on systematic risk | Nil or a small increase in beta |
| Financeability | Decrease in AICR by c0.46x, equivalent to c20bps increase in the WACC, impact on FFO/Net depends on assumptions | Nil to -3% |
| Total expected impact plus value at risk | Equivalent uplift to the allowed rate of return of 180-200 bps | -24.8% to -27.8% impact on RCV plus additional 0.5% to 3.5% of value at risk |

Each of these impacts could be greater or smaller than estimated if more or less aggressive assumptions are made about the expected RPI-CPI differential (implying a greater or smaller revenue deficit), the company's financial profile (which could exacerbate the impact on financeability and the cost of debt), or the variability of the RPI-CPI gap (the value at risk could double in size in certain circumstances).

Finally, it should be noted that the list of potential impacts outlined above is not exhaustive—other potential effects might include:

- The risk associated with a further increase in the complexity of the regulatory framework, given the need for a sophisticated mitigation mechanism;
- A potential negative impact on liquidity in the existing RPI index linked market as a necessary consequence of a progressive development of the CPI-linked market, which could be triggered by the change; and
- A potential risk to how the stability of the overall regulatory framework is perceived by investors, given the significance of this change in the regime.

These other risks are harder to quantify and might not crystallise in the most transparent manner, but could still have an impact in the longer term and therefore have to be taken into account when considering the overall impact of a change in indexation.

Potential impact on customer bills

Full mitigation to make companies value-neutral would imply that there would be significant increases in bill levels. The estimated increase in average annual bills for AMP 7 in the fully mitigated Upside Case scenario is around 4%. Presentationally, real terms bill increases would look higher under CPI than RPI. Bill increases at this level would reverse the majority of the reductions achieved in the PR14 review.

Ofwat has also stated that it would make customers neutral to a change in indexation. The regulator has suggested that companies can achieve this by reducing their PAYG rates. In order to completely remove the 3.3% increase in average annual bills over AMP 7 implied by proposed mitigation, there would have to be a reduction in PAYG by over 5 percentage points. Although the decrease in PAYG would apply to AMP 7 in the first place, PAYG rates may also need to be adjusted to reduce bill increases for AMP 8, and AMP 9 to return them to the levels expected under RPI indexation.

In addition to removing the initial bill increases, such an adjustment could help smooth bills generally and reduce potential inter-generational equity issues. However, this would push allowed revenues into the RCV to be drawn down in later AMPs, which might put some of this value at risk if there is any uncertainty about future recovery of these revenues.

All approaches to revenue re-profiling, if fully robust and representing long-term policy commitments, could achieve value-neutrality, but cannot eliminate the fundamental trade-off between the negative impact on cash flows and financeability on the one hand, and an increase in tariffs as a result of mitigation on the other hand.

1.2 Summary of the report

The central role of indexation in the overall regulatory framework and availability of private funding

Investors seek mitigation for inflation in all markets to realise required nominal returns, which include a real return component as well as mitigation for inflation. Investors must reasonably expect to earn a return combining both of these components in order to be willing (and able, given their own sources of capital) to finance their activities. Continuing to support this expectation is an integral part of maintaining sector's financeability.

Indexation of revenues is used in the regulation of monopolies to approximate the conditions of a competitive market, but it compensates investors for outturn inflation with a lag and does not compensate them for inflation risk, i.e. companies still bear the risk of variations in returns due to varying levels of inflation. On the other side of this equation, customers also pay more or less depending on outturn inflation.

RPI indexation has been a well-established part of the regulatory framework in water and in other regulated sectors since privatisation. It is generally used to index allowed revenues and to derive nominal allowed returns from the real rates of return set by the regulator.

Indexation is also used by regulators as a means of protecting the interests of customers and incentivising efficiency, where it is used to set an efficient price path that does not increase tariffs above the inflation level (everything else being constant).

Indexation of allowed costs provides allowances for cost inflation and is combined with real price effects and efficiency challenges to set efficient operating costs for regulated companies. A number of different inflation indices (including RPI) have been used to estimate expected changes in future costs. In practice, many supply contracts include RPI indexation clauses, so indexation is important to ensure that companies can effectively procure the necessary goods and services to service their customers.

Companies have responded to the long-standing application of RPI indexation in the regulatory framework and the opportunity to manage inflation risks by matching the profiles of their revenues and liabilities. In particular, index-linked debt has become a key part of UK regulated utilities' long-term financing and is a key risk management tool that allows companies to achieve a low cost of financing, which is then reflected in the low allowed rates of return.

Given the longstanding use of RPI as a fundamental component of the regulatory framework and its specification in the water company licences, current investors have committed capital to the sector in the expectation that RPI indexation would continue in the future. A change in the status quo would therefore necessarily be seen as a change in the regulatory contract that investors have relied upon.

This means that the change in indexation policy is important for ensuring investor confidence in the overall stability of the regulatory framework, especially if it is implemented ahead of the development of a liquid market for CPI-linked debt, with mitigation which might be subject to change in the future, and before the uncertainty around the issue of which form of CPI will become the general measure of inflation is resolved.

Drivers to move away from RPI indexation market and uncertainty about future measures of inflation

There has been considerable dissatisfaction with RPI as the general measure of inflation for some time and the Government has been progressively moving away from RPI for a range of purposes. CPI became the measure of inflation that the Bank of England targeted in 2003. In 2010, the Government introduced a new statutory requirement that CPI would be the measure of price inflation for the purposes of indexing benefits in occupational pension schemes.

The RPI index lost its status as an official national statistic in 2013, as the formula that is used to calculate it was deemed not to meet international standards. However, the ONS will continue to publish RPI in its current form in the future as a result of the large volume of financial contracts linked to RPI, the continuing issuance of Government debt linked to RPI, and RPI-indexed pension benefits.

In 2015, the Johnson Report commissioned by the UK Statistics Authority recommended that the Government as well as sector regulators should work towards ending the use of RPI. However, there is still uncertainty over whether CPI or CPIH (or some other measure) will become the Government's preferred measure of general inflation in the future. Even when this choice is finally resolved, the Debt Management Office (DMO) will still have to re-consult on the issuance of CPI-linked debt and be persuaded that adequate demand for such debt existed before recommending that the Government should start issuing CPI-linked gilts.

Sector regulators have also begun to index some revenue building blocks by CPI, although these changes are still in their early stages and are on a limited scale. In all these cases, comparability with the circumstances in water is limited—not least given the importance of the RPI-linked debt market to the water sector, as a result of which the costs and benefits of a change in indexation for water customers are necessarily different to other regulated utilities.

To date, there has been no case of a regulator changing the indexation of revenue and RAB on a major control to CPI where the regulated company has a large stock of RPI-linked debt.

Development of the RPI index-linked debt and its implications for a future CPI-linked market

Evidence from other index-linked markets shows that it takes a long time as well as strong, consistent commitment from issuers and investors to build significant volume, liquidity and depth in an index-linked debt market. Even if the UK Government were to start issuing CPI-linked debt today (it currently has no plans to do so), it would most likely take a long time to build a deep and liquid sovereign CPI-indexed debt market.

There was almost a 20-year gap between the first RPI-linked Gilt issued in 1981 and the achievement of sufficient market depth and a regular pattern of annual issuances in relatively large volumes for RPI-linked gilts. RPI-linked debt now represents approximately 20-25% of total outstanding and new sovereign debt issued, so any change could only come slowly in line with the need and to avoid additional costs of servicing public debt.

Over time, the maturity of RPI-linked Gilts has also increased considerably to meet pension fund demand for long-dated bonds, but this process has been slow and required continuous issuance over many years to build a full yield curve. The longest dated RPI-linked Gilts (recently issued) now have a maturity of more than 50 years.

The size of the pool of outstanding bonds and their long maturities mean that the characteristics of the UK sovereign index-linked debt market can only change slowly. As a result of these factors and the prevalence of long-term contractual obligations linked to RPI, the RPI IL Gilt market is likely to continue to operate for many decades to come and will remain the main IL debt market even if the Government starts issuing some debt linked to other indices in the near future.

On the companies' side, the market for corporate RPI-linked debt has emerged slowly and with a lag following the development of the sovereign index-linked market. There was a gap of approximately 18 years between the first RPI-linked Gilt and the first UK corporate RPI-linked bond.

This suggests that if the CPI-linked debt market follows a similar path to the RPI-linked debt market, a well-functioning and liquid CPI market, as well as the corresponding market for derivatives, would be unlikely to develop quickly or before an active underlying market in Gilts has been operating for some time.

The water companies are notably large issuers of index-linked debt accounting for nearly 50% of the outstanding corporate index-linked debt. All water company IL debt is indexed using RPI. Water companies are also large users of inflation hedges, including RPI swaps and derivatives. The market in derivatives is an important additional tool for companies to manage risk and match revenues and liabilities. Overall, the RPI-linked debt market is particularly important for the water sector.

The development of a strong and liquid underlying IL debt market can be seen as a pre-condition for the development of efficiently priced derivatives linked to a particular inflation index, since only a liquid market could provide robust and informative benchmark yields and confidence on pricing.

Historically, the IL corporate debt market in the UK has also been subject to external shocks and has not always remained liquid, posing a challenge for companies seeking indexation hedges. In particular, the corporate issuance of IL debt has fallen significantly during and since the financial crisis

as a result of several factors, including investor constraints on required credit ratings, depressed market liquidity, variations in demand, and real yields turning negative, which made RPI-linked debt less attractive.

This means that to some extent companies already face a challenge of ensuring at least partial asset-liability matching, even under RPI indexation.

In the US, a corporate IL debt market preceded the development of a sovereign market, but remained relatively small. Moreover, nearly two decades after the first issuance of Treasury Index-Linked Securities (TIPS), the market for corporate IL debt is now virtually non-existent in the US.

It is also unusual for any government to issue bonds linked to more than one inflation index, and such dual issuance would necessarily negatively impact liquidity. In France, the government issues bonds linked to two different indices, one a domestic inflation index and one a harmonised Eurozone index. However this has not supported the development of a corresponding liquid corporate IL debt market.

Similarly, issuances of US Dollar- and Euro-denominated index-linked bonds by non-sovereign entities virtually came to a halt in 2009. For a period of decades following a switch to CPI-linked debt issuance, RPI and CPI Gilt markets would need to operate side by side in the UK and this would most likely reduce liquidity and limit demand in both markets

Overall, the evidence from other jurisdictions suggests that there is no guarantee that a liquid and accessible corporate debt market for index-linked bonds will develop, even following the development of an IL sovereign debt market. While the UK benefits from highly developed financial markets, which should facilitate financial innovation to progress the development of a new CPI-IL market if there is a sufficient demand and supply, it would still take a long time to build a substantial volume and coverage of different maturities.

Potential development of the CPI-linked debt market and implications for companies' financing

Most demand for IL bonds in the UK remains RPI-driven, though signs are emerging that demand for CPI bonds may be developing.

Much of the demand for index-linked debt comes from pension funds and insurance companies, which have liabilities directly linked to inflation. Pension funds are slowly but steadily switching to CPI as the preferred index for valuing benefits, although many of their liabilities are still contractually linked to RPI. This is particularly the case for defined benefit schemes, and, in any event, pension funds may not have the discretion to move to CPI—in many cases, the trustees of existing schemes may not give consent to a change as it would not be in the interests of their beneficiaries.

The amount of IL debt owned by pension funds compared to their inflation-indexed liabilities suggests that they are significantly under-hedged. As a result, there might be some pent-up demand for IL debt in the future, and, in particular, for CPI-linked debt, given progressive switching by pension funds to CPI-linked liabilities. Recently there have been signs that demand from pension funds for CPI gilts may be building up, but the extent of this build-up is still unclear.

In the meantime, demand for RPI-linked debt has continued, whereas demand for CPI-linked debt has been very limited. The Government so far has not issued any CPI-linked debt and we understand that the DMO has no immediate plans to do so. The DMO consulted on issuing CPI-linked debt in 2011/12, but decided not to issue any such debt as there was considerable uncertainty about the potential demand and impact on pricing.

More generally, the DMO's choices about sovereign debt issuance are driven by its overarching aim to minimise long term public funding costs and it is thus likely to be concerned about fragmentation of demand in the existing IL market leading to increased costs. The DMO would be also expected to consult on this issue again in the future before going ahead with a switch.

As the longest dated index-linked Gilt does not mature until 2068, even if a different index were to be applied to future issues from today onwards, the existing stock of RPI-linked Gilts could only be reduced slowly. This means that the RPI-linked Gilt market is likely to remain large and liquid for many decades to come, and that the CPI-linked market would need to co-exist with the RPI-linked market for some time, which could affect liquidity.

The pace at which a deep and liquid sovereign market in CPI-linked debt could develop would be necessarily slow. The corporate market for CPI-linked debt is currently non-existent. Only two public

sector agencies and the Church of England have issued CPI-linked bonds to date, and these were private placements in relatively small volumes; there appears to be no market for public issuances at present.

Interviews with banks active in the IL market and corporate treasurers conducted for this report indicate that a well-functioning corporate CPI-based market is unlikely to develop fully until there is a more complete pricing benchmark over the full yield curve from sovereign CPI index-linked debt that can underpin pricing.

The slow development of the CPI-linked debt market would have significant consequences for the ability of water companies to match revenues and liabilities in the event of a change in the indexation of revenues. This could reduce, or potentially even reverse, the assumed benefits from reduced volatility in cash flows as a result of more limited asset-liability matching and might increase the overall cost of debt.

Overall, any change to indexation will pose challenges to corporate financial management as it will generate a material change in the level and profile of cash flows available for debt servicing. Such a change will also introduce additional uncertainty.

Quantifying the impact of a switch to CPI indexation

In the absence of robust and carefully constructed long-term mitigation mechanisms, a change to CPI could have a significant negative impact on water companies in terms of revenues, risk and financeability. The costs of such a change would have to be largely passed on to customers and could imply higher bills and/or a weaker financial profile for the sector, including an increased risk of financial distress, unless a 'water-tight' mitigation policy is in place.

The analysis of the quantitative impact of a change to CPI indexation from 2020 onwards has been conducted through comparison of, on the one hand, the 'do nothing' *factual* case of continued RPI indexation (the 'RPI case') to, on the other hand, several *counterfactual* cases reflecting different potential mitigation mechanisms.

Ofwat's Water 2020 consultation is not clear about which mitigation mechanism will be actually applied, over what period of time, or how it might change in the future. The purpose of considering different scenarios is therefore to ensure that the policy that is eventually adopted could be designed to be fully value-neutral.

1. The first counterfactual case—the Water 2020 Case—reflects how we interpret Ofwat's December 2015 proposals assuming progressive, phased introduction of CPI indexation and a blended, constant rate of return applied in each control period, based on returns calculated by deflating nominal returns by RPI and CPI in proportions reflecting the share of CPI and RPI indexation at the end of the previous AMP.

2. The second counterfactual case—the Water 2020 Fog Case—reflects the uncertainty about future mitigation. In this case, we assume that there are no further increases in the allowed rate of return after 2030, everything else being constant. This illustrates the uncertainty around what would be the counterfactual rate of return in the absence of the change, which we refer to as the 'fog'.

3. The third counterfactual case—the Upside Case—assumes that the revenue deficit impact is fully remedied with progressive increases in the allowed returns in all future periods. This is designed to consider the impact of mitigation on bills as well as any additional remaining risks, even if the revenue impact is fully mitigated.

4. The fourth counterfactual case—the Unmitigated Case—reflects the full unmitigated impact of a potential change in indexation. It is designed to provide a *benchmark* for considering potential remedies, taking into account the full impact of a change in the long-term. While this is not a scenario that would be expected to occur, it provides a useful point of comparison to fully understand the potential cumulative impact that would need to be mitigated through different regulatory measures and corporate actions.

In this summary we only discuss the key results for selected counterfactual cases focusing on the 'Water 2020 Case' and the 'Unmitigated Case'. The 'Water 2020 Fog' Case generally implies a more

negative impact than the Water 2020 Case. In terms of the Upside Case, we highlight where any potential negative impact is not eliminated in this case, and consider its impact on customer bills.

The analysis of the impact of the change is based on a 30 year model of a hypothetical water company, which broadly reflects the characteristics of an average company in the sector in terms of size, growth and financing strategy (based on the notional level of gearing), as well as PR14 regulatory determinations.

An important assumption in the analysis is that the RPI-based allowed return would be the same in all cases, although if there were to be a change in methodology for determining the underlying allowed rate of return this cannot be guaranteed.

Impact on value due to decrease in expected future revenues

We measure, first, the impact of a change in revenue based on the expected difference between RPI and CPI. This does not take into account any impact on the cost of financing or any changes in risk, which are discussed separately further below.

In the absence of mitigation and assuming a 1.3% RPI to CPI delta forecast by the Bank of England, the revenue deficit would imply a value loss of approximately 23% of RCV, if the impact is measured in terms of enterprise value (assumed equal to the opening RCV). This estimate includes the full impact on net cash flows over a 30 year period as well as on the terminal value driven by different rates of RCV growth in difference cases.

Our interpretation of the approach outlined by Ofwat in Water 2020 (the 'Water 2020 Case') mitigates most of this impact, but there still remains an unmitigated loss of future revenues equal to 1.8% of the opening RCV.

The main reason for the remaining gap is that while CPI is progressively introduced in each year, (as Totex additions would be indexed by CPI, even though opening RCV is indexed 50/50 by RPI and CPI) there is no corresponding increase in the allowed rate of return except for the 'catch up' at the time of the price control. This would imply that the contribution of RPI indexation decreases over time, but the allowed returns do not rise in line with the change in indexation.

Ofwat has not indicated any rebalancing of the allowed returns in future AMPs. However, it would be necessary to change the weighting of the RPI-stripped and CPI-stripped returns in proportion to the changes in the weighting of indices applied to RCV at future control periods as well as year by year, if CPI is progressively introduced over time, to ensure value-neutrality.

Ofwat has also stated that an additional change in the proportion of CPI indexation could be introduced in response to changes in company debt response strategies that result in the issuing of CPI debt. However, the loss in enterprise value would occur regardless of the company debt strategy.

The regulator has not been clear about how it would implement the change at future price controls after 2020. The Water 2020 Fog Case illustrates one potential interpretation of this uncertainty—namely, that there is no step up in the allowed return after the third price control. This would imply a further loss of approximately 1% of opening RCV.

If the decrease in revenue is measured in terms of equity value, the impact modelled is amplified. In case of no mitigation, as much as 47% of equity value would be lost under the 1.3% differential. The impact on equity value is about twice greater in money terms than the impact on enterprise value, as there is no corresponding impact on costs and the reduced cash flows impact equity directly.

In the Water 2020 Case, the negative impact on equity is significantly reduced. However, as in the case of the impact on enterprise value, the proposed mitigation might be interpreted in a way that does not mitigate the full extent of the impact on equity.

The impact of the expected revenue deficit on equity value will also vary depending on the assumed corporate response strategy (e.g. type of debt the company would be able to issue in the future). Our analysis considers three potential response strategies: (1) assuming no change in the company's financing strategy (i.e. the same mix of RPI IL debt and nominal debt); (2) replacing RPI-linked debt with CPI-linked debt; and (3) replacing IL debt with nominal debt.

Issuing CPI-linked debt or issuing nominal debt further decreases equity value because the hypothetical company would have to pay higher interest costs (the nominal cost of debt is assumed to

be the same in all scenarios, so the real interest rate component of the CPI-linked debt is higher) and this is not fully offset by the NPV of the lower outstanding debt at the end of modelled period (the balance is lower because CPI-linked debt accretes more slowly).

Therefore, the best response strategy to minimise the negative impact of reduced revenues appears to be not to change the corporate financing strategy at all, i.e. to continue to issue RPI-linked debt. However, this would not ensure asset-liability matching, which would result in additional variability in equity cash flows, as discussed further below.

The negative impact on revenue deficit is fully remedied in the Upside Case assuming that the proposed mitigation mechanism is designed to be fully value-neutral and also assuming that there is no risk that it can be changed at future price controls.

Impact of the change to CPI indexation on value at risk

In addition to a permanent decrease in revenue from the expected difference between RPI and CPI discussed above, there is also significant *additional value at risk* created by the possibility of a larger gap between RPI and CPI materialising in the future over and above the mean expected difference.

By definition, if the potential variations around the mean expected difference between RPI and CPI are assumed to be either positive or negative, the impact on value could be also either positive or negative, but variations still represent additional risk. It is important to emphasise that in this context the value at risk does not measure the expected loss, but a potential loss that could occur due to deviations from the mean.

It is possible to estimate the magnitude of the additional value at risk resulting from a possible shock to the RPI-CPI differential by considering the potential additional cash flow shortfall or surplus that would result from a deviation from the mean expected RPI-CPI differential. The underlying assumption is that current investors' expectations are set in line with the expected RPI.

Owat has stated that it will apply a true-up mechanism for any deviations in the RPI-CPI from the expected differential reflected in the allowed returns, after the first period. Therefore, the analysis assumes that there is no risk from RPI-CPI deviations during the first AMP, but no such mechanism is in place after the first AMP. It is not intended to represent what *would* happen, but is carried out to illustrate the importance of long term commitments from Owat.

Given potential fluctuations over time, we analyse an illustrative scenario where every shock to the RPI-CPI differential is followed by an immediate counter-shock of equal size in the opposite direction. The value lost or gained during the first shock can in fact never be offset, and increases over time due to the effect of interest compounding.

Additional value at risk is minimised in the Water 2020 Case, if such deviations from the mean RPI-CPI difference are assumed to be only one year long and shocks are alternating as described above—this puts an additional c0.3% of the opening RCV at risk.

However, historically, some deviations from the mean difference between the RPI and CPI have been considerably greater than that, occurring for up to three years and amounting to up to 2.8 times one standard deviation in any given year. If it is assumed that shocks last two years and that the RPI-CPI gap could increase to two standard deviations, then the value at risk increases to over 1% of the opening RCV.

If the assumption that each shock is followed by a counter shock is relaxed and the company faces only a one-off shock of two standard deviations lasting two years then the value at risk increases to over 2% of opening RCV.

These scenarios assume that the shock occurs early after AMP 7 (i.e. in AMP 8) as the true-up proposed by Owat should eliminate this affect at least in AMP 7. Hence there is a compounding effect from the initial shortfall throughout the rest of the modelled period (i.e. company's revenues are on a permanently lower trajectory). This highlights the importance of examining impacts over the long-term when dealing with compounding interest effects.

This additional value at risk is mitigated under the mechanisms considered by Owat. For comparison, if there is a one-off negative shock equal to two standard deviation that lasts two years, the value at risk in the Unmitigated Case increases to c3.5% of RCV in NPV terms.

The reason for the difference is that without mitigation the hypothetical company would be exposed to the full impact of the deviation in the RPI-CPI gap, whereas in the Water 2020 Case the company is exposed only partly, as it is generally less exposed to CPI indexation and therefore less exposed to a shock in the RPI-CPI gap.

Finally, if the true-up to correct for any deviation of the actual RPI/CPI differential from that forecast, as proposed by Ofwat, is applied in all future price controls with certainty, and if it is NPV neutral, then this additional value at risk can be eliminated in its entirety.

Impact on the variability of cash flows and systematic risk

Both RPI and CPI are unpredictable and volatile, so the delta between them varies over time. This has implications for the variability of cash flows, which is one of the key determinants of risk.

RPI has experienced more volatility than CPI since the latter was introduced as a measure of inflation. At the same time, RPI has been notably more volatile than CPI in the period that includes the financial crisis. The mean difference between RPI and CPI over the past 20 years has been 0.7%, with a standard deviation of 1.2%. The maximum deviations from the mean were +2.6% and -2.7%.

A switch to CPI indexation could significantly *reduce* the variability of cash flows to equity due to indexation—c. 21% of the overall variability of cash flows due to indexation could be eliminated with a switch to CPI indexation—but only if the company can replace RPI IL debt with CPI IL debt. If it cannot, the gain is negligible, which underscores the importance of asset-liability matching and that the extent to which this potential benefit can be realised crucially depends on the development of the CPI-linked debt market.

There is a risk that, after the switch to CPI indexation, companies might not be able to issue a sufficient amount of either CPI-linked or RPI-linked debt due to limited liquidity in the IL debt market overall. If companies have to replace IL debt with nominal debt, then the change would result in a significant *increase* in the volatility of equity cash flows due to indexation by as much as c27%.

In the Water 2020 Case, companies would benefit from a switch to CPI indexation even if they cannot issue CPI debt, but the gain would be much smaller than in the case of a switch to CPI indexation without mitigation (11% compared with 21%). This is because mitigation would still partly expose companies to RPI volatility. Also, in this case, the risk of an increase in volatility due to unavailability of IL debt would *increase*.

Furthermore, any potential gains from the reduced variability of cash flows under CPI indexation might not translate into reduced systematic risk because CPI appears to be more closely correlated with the overall market returns than RPI (although this result depends on the period tested). This means that the impact of the change in indexation on systematic risk is likely to be nil.

Finally, if after the switch to CPI indexation, there is a deterioration in liquidity in the overall IL debt market *and* there is also limited liquidity in the new CPI-linked debt market such that the company has to issue more nominal debt, then volatility of cash flows will *increase* and, assuming CPI is more closely correlated with the market than RPI, there is actually a potential *increase* (albeit small) in systematic risk and hence potentially a small increase in the beta.

Overall, on balance, we conclude that the gain from the potential reduced variability of cash flows can only be realised in the presence of an accessible, liquid CPI-linked market and is unlikely to translate into a reduction or an increase in systematic risk.

Impact on credit metrics and financeability

If the expected reduction in revenue (excluding any impact of additional deviations from the mean) is unmitigated, or if such mitigation leads to re-profiling of cash flows over time compared with the status quo, there could be also a negative impact on the company's financeability due to deterioration in credit metrics.

An indicative analysis of the potential impact of a change in indexation on financeability is carried out by considering the impact of the change in revenues on the AICR and the FFO/Net debt ratios, which represent two key credit metrics used by the ratings agencies.

When testing financeability the assumptions about the level of debt and gearing are important and even small changes in assumed leverage can have a significant impact on the results. We test two

scenarios—one assuming a constant level of gearing and another one assuming a constant debt balance of the hypothetical company.

In the case without any mitigation, the impact of the change in indexation is a decrease in the *average* AICR over the period by -0.46x assuming that the company issues CPI debt and -0.19x assuming it issues RPI-linked debt. For companies that are highly geared, this impact would be magnified. The impact is negative under constant leverage and constant debt balance assumptions.

In the Water 2020 Case, the impact is either positive or significantly reduced because revenues are significantly higher than in the Unmitigated Case. In fact, the impact on AICR is on average *positive* (+0.22x), if the company issues RPI-linked debt, because there is a significant improvement in the metrics early in the period. The impact on financeability is also positive in the Upside Case of full revenue mitigation.

However, if under the Water 2020 Case CPI-linked debt is issued (which is assumed to have a higher ongoing debt service cost), then there is an average *negative* impact on the AICR of -0.10x. In this case, we estimate that this impact on financeability could potentially translate into up to +c6bps increase in the WACC due to slightly increased cost of debt.

Our financeability analysis also considers the impact of the change in indexation on the FFO/Net debt. Even in the absence of mitigation, the impact on the average FFO/Net debt is *positive*, but small, if a constant level of gearing is assumed. In the Water 2020 Case, FFO/Net debt improves further by c1.5%.

However, if it is the level of debt that is kept constant rather than gearing, then the impact on FFO/Net debt turns *negative* in the Unmitigated Case. If a constant debt balance is assumed in the Water 2020 Case, the impact is practically nil.

We conclude that, in the absence of full mitigation, there could be a negative impact on financeability and hence an increase in the cost of debt mainly based on the partial analysis of AICR dynamics. The impact on FFO/Net debt critically depends on the assumption about the level of gearing, and it could be either negative or positive.

It is important to emphasise that our analysis only considers the impact on financeability with reference to changes in certain credit ratios. To the extent that the credit ratings agencies considered a change in indexation (and/or any mitigation measures implemented) detrimental to the business risk assessment of the water sector, then the ratings impact could be greater than what is implied in our analysis, as the required credit metrics for a given level of rating would likely be materially tightened in such circumstances

Overall, we conclude that the impact of the change in indexation on financeability is likely to be either nil or marginally negative, and could translate into an increase in the WACC of between 0 and 20 bps in the case without mitigation, and between 0 and 6 bps in the Water 2020 Case.

Impact on the cost of debt due to slow development of the CPI index-linked debt market

The analysis of how a CPI debt market could develop suggests that there will be an additional cost associated with issuing CPI-linked debt compared with the current cost of debt. This additional cost can be measured as an increase in spreads due to low liquidity, limited depth, and idiosyncratic pricing in this market.

The analysis of the RPI and CPI debt markets is used in the report to develop scenarios for the possible volume and pricing of a UK corporate market in CPI-linked debt. There is considerable uncertainty about the pace and depth at which the CPI market could develop, but directionally, the impact could be an increase in the cost of debt until a liquid CPI market is available. The experience from the RPI market is that this transitional period could take up to two decades.

The estimated additional liquidity risk premium on CPI debt could be approximately 30 bps compared with RPI debt (or 60 bps compared with nominal debt given the existing IL debt premium over nominal debt of c30 bps), which would have to be added to the future cost of debt.

This premium would only have a limited additional impact on the WACC initially, due to limited expected issuance of CPI-linked debt. The impact might grow over time as the stock of CPI-linked debt increases. At the same time, the liquidity premium in the CPI-linked market might *decrease* over

time, but the premia on the RPI-linked debt might *increase* as liquidity in the RPI market decreases. This would be still relevant to the extent that any new investments are not fully linked to CPI.

Overall, we estimate that, on average, the change could increase the WACC by c10bps over the entire period modelled, which is equivalent to approximately 2% of the opening RCV. This impact is not mitigated by Ofwat's proposals and would actually increase marginally in the Water 2020 Case due to the timing of cash flows and type of debt likely to be issued.

Impact on customer bills

Customers could derive certain benefits from a change to a CPI based index, all other things being constant. These benefits relate to the index being less volatile, more representative of general inflation (although this will depend on the choice of the exact index to be used) and increasing at a lower rate than RPI. The lower rate of increase would aid affordability, if there is no mitigation, all else being equal.

A full change to CPI, without any mitigation, would appear to benefit customers through lower bills over the short-term, as CPI would accrue more slowly than RPI. However, a change without mitigation would mean that companies would have to absorb a very large negative impact on cash flows and a corresponding deterioration in value, as well as the costs of the other effects identified above.

In this case, companies and investors would inevitably respond, with an adverse impact on customer service. For example, credit ratios and credit ratings could be significantly affected and the necessary cost savings would impact maintenance and capital expenditure. The asset health of the water network could deteriorate. Investor confidence in the sector would also likely deteriorate, as would the financial health of the water companies. All of these consequences would be to the detriment of customers.

Ofwat has, as an inherent part of its duty to protect customers, a financeability duty to avoid these consequences, as companies with weak financial strength and increased risk of financial distress are not in customers' interests. As a result, Ofwat has acknowledged that it will put forward a change to regulatory indexation without mitigating the impact both on companies and on customers.

Our analysis considered the potential impact of the change in indexation and Ofwat mitigation in the Water 2020 Case on customer bills relative to the factual case of the status quo. The results, based on an average annual bill profile by AMP, show a 3.3% increase in bills in AMP 7 (2020-2025), a 2.4% increase in AMP 8, a 1.4% increase in AMP 9, relative to the status quo. Thereafter bills would be lower in the Water 2020 Case for all future AMPs, all other things being equal. Presentationally, the bill increase in real terms would be larger under CPI than RPI.

It is not clear how customers would perceive an increase in average annual bills and whether, in their view, the bill increases in the early periods are more than outweighed by the benefits of a change in indexation.

In addition, Ofwat has stated that it would make companies value-neutral to a change in indexation, which would require full mitigation, as discussed above. This would imply that there would be further increases in bill levels above those identified in the Water 2020 Case to fully mitigate the impact of a change. The estimated increase in average annual bills for AMP 7 under the fully mitigated Upside Case scenario (including mitigation of the increase in the WACC) would be around 4.3%.

Ofwat has also stated that it would make customers neutral to a change in indexation. It has suggested that companies can achieve this by reducing their PAYG rates.

To completely remove the 3.3% increase in average annual bills over AMP 7 implied by mitigation as modelled in the Water 2020 Case, a reduction of over 5.4% would be needed in PAYG in AMP 7. In addition to removing initial bill increases, such an adjustment could help smooth bills generally and reduce potential inter-generational equity issues but would postpone recovery of value into the future. Although the 5.4% decrease in PAYG would apply to AMP 7, PAYG rates may also need to be adjusted to reduce bill increases for AMP 8 and 9, which would shift the impact on bills further into the future.

Moreover, the change in PAYG would have to be greater in the case of full mitigation, a reduction of over 7% in AMP 7. This would have a consequent impact on financeability compared with effects

analysed earlier in the case without mitigation, and could unwind the benefits of mitigation over the initial period, putting more revenue at risk later on.

Both the CMA and credit agencies have expressed concern about the excessive use of PAYG rates to mitigate financeability issues and may also raise concerns over its use for this purpose. Indeed, with PAYG being used for a number of purposes in the revenue building blocks, the transparency of this metric and its components might be lost.

There are other ways in which revenues can be re-profiled. Regulatory precedents exist for creating revenue smoothing adjustments, where that adjustment is a standalone part of the regulatory framework that allows customers and other stakeholders to understand it in a very transparent way.

These approaches, if fully robust and representing long-term policy commitments, could achieve value-neutrality but cannot eliminate the fundamental trade-off between the negative impact on cash flows and financeability on the one hand, and an increase in tariffs on the other hand.

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