

ADJUSTING BASELINE RETURNS FOR ANTICIPATED OUTPERFORMANCE

An assessment of Ofgem's proposals

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EXECUTIVE SUMMARY

Ofgem currently proposes to make a downward adjustment of 50 bps to the allowed cost of equity for GD2/T2 to reflect its expectations that companies will outperform the targets that it sets at these price control reviews. It bases this proposal on arguments made by Mason, Pickford and Wright (MPW), a subset of the authors of the recent UKRN report on the cost of capital; and on its own analysis of historic outperformance.

Related to this, Ofgem has departed from well-understood and longstanding regulatory practice, in that its proposals do not “aim up”¹ within the range it has identified for the allowed return on equity. Ofgem provides no justification for this, notwithstanding that MPW themselves advise that there is a compelling case to aim up.

The ENA has asked us to prepare an independent expert report appraising Ofgem’s proposals. Our conclusions can be summarised as follows.

Aiming up

The required return on equity for a future price control period cannot be known with certainty, but only estimated with (often significant) uncertainty. Since regulators will ultimately need to select a point estimate in the presence of this uncertainty, two risks arise - that the chosen point estimate may prove to be too high, or that it may prove to be too low.

Regulatory best practice is to take explicit account of the likelihood of making either of these errors and the consequences of each. The reasons for aiming up have been repeatedly articulated by regulators, including the CMA and are well summarised as follows.

“Given the uncertainties in cost of capital estimates, we considered the cost of setting an allowed WACC that was too high or too low. If the WACC is set too high then the airports’ shareholders will be over-rewarded and customers will pay more than they should. However, we consider it a necessary cost to airport users of ensuring that there are sufficient incentives to invest, because if the WACC is set too low, there may be underinvestment from BAA or potentially costly financial distress...Given the significance to customers of timely investment at Heathrow and Gatwick, we have given particular weight to the cost of setting the allowed WACC too low. Most importantly, we note that it is difficult for a regulator to reduce the risks of underinvestment within a regulatory period.”²

¹ “Aiming up” is the regulatory practice of setting cost of capital allowances towards the higher end of a regulator’s determined range, due to inherent uncertainty around the true value. Aiming up is rational since it recognises that setting allowances too low may lead to a failure to invest, and that this causes a greater reduction in overall societal welfare than setting allowances too high.

² Competition Commission, A report on the economic regulation of the London airports companies (Heathrow Airport Ltd and Gatwick Airport Ltd), September 2007. See page 49. , https://webarchive.nationalarchives.gov.uk/20111202214947/http://www.competition-commission.org.uk/rep_pub/reports/2007/fulltext/532.pdf.

Simply, aiming up is justified by recognising that underinvestment arising from setting allowed returns too low leads to much more material harm to consumers than the modest harm that arises from setting the number too high. The CMA has relied on this reasoning on many occasions in the past, as have numerous other regulators.

This regulatory best practice, exemplified by a number of CMA decisions, is supported by academic research, which has found that aiming up well above the central estimate is likely to minimise the expected losses to society from misestimating the regulated business's true cost of capital.

The recent UKRN report also supported aiming up. While we take issue with aspects of MPW's review of regulatory precedent, their analysis (particularly the CMA precedent) still supports aiming up, albeit to a lesser extent than it should. In addition, MPW's stylised model to calibrate the appropriate level of aiming up supports aiming up, although flaws in their analysis leads them to markedly underestimate the extent of optimal aiming up. More weight should be placed on the Dobbs' (2011) model³, of which the MPW model is a somewhat inferior, cut-down version; and relevant regulatory precedent including from the CMA.

We conclude that should Ofgem decide to persist with its proposal, then this will lead it to set the cost of capital too low. Ofgem should revisit its decision on aiming up in view of longstanding regulatory best practice and the lessons from academic work.

Lowering the baseline in anticipation of outperformance

Ofgem bases its proposed 50 bps adjustment to the allowed cost of equity on the theoretical arguments made by MPW in the recent UKRN report; and on its own analysis of historic outperformance.

As far as the theoretical foundations Ofgem relies upon are concerned, these are deeply flawed. MPW's conclusions arise from the impossible premise that the outcomes of a general equilibrium framework that assumes perfect competition and efficient capital markets can and should be found where the assumptions of perfect competition do not hold (i.e. in the case of a monopoly and its regulation). Having assumed away the logical inconsistency of this premise, MPW then recommend that regulators should put in place a mechanism to force close convergence between allowed return and expected return (RAR and RER in their notation), whilst at the same time assuming that no other consequences will arise from such a mechanism.

MPW's recommendation boils down to promoting the achievement of allocative efficiency above all else. Allocative efficiency is achieved when prices are set in line with costs. It can then be shown that all parties exposed to those prices will take economically efficient short run decisions. To achieve allocative efficiency in a regulatory context however requires the regulator to reset prices whenever underlying costs move in order that prices can match cost. This is where the

³ Dobbs, 2011, Modelling Welfare loss Asymmetries Arising from Uncertainty in the Regulatory Cost of Finance, <https://www.staff.ncl.ac.uk/i.m.dobbs/Files/Welfare%20loss%20JRegE.pdf>

problem arises. If this prescription is adopted, it results in a price control with ostensibly no incentive for productive and dynamic efficiency. Whenever a company identifies a way of reducing cost, it is rapidly confiscated by a regulator focussed on allocative efficiency. One would have essentially created a regulatory regime that closely resembles cost plus regulation, a model that is known to lead to poor outcomes for consumers.

in making their recommendation around RER and RAR, clearly focused on achieving better allocative efficiency, MPW fail to consider these wider implications of forcing convergence, which can be readily inferred from the extensive body of regulatory theory and practice. This wider perspective confirms that it is impossible to simultaneously satisfy allocative, productive and dynamic efficiency, and that forcing allocative efficiency at the expense of productive and dynamic efficiency is unambiguously detrimental to customers' interests.

Ofgem's proposal to adopt an adjustment to allowed returns in anticipation of expected outperformance is clearly inspired by MPW's prescriptions. Its proposal gives rise to the same unintended consequences which are discussed in more detail below.

Turning to the out-performance data that Ofgem has used to justify and calibrate its adjustment, this is selective and leads Ofgem to draw incorrect conclusions. Ofgem claims that there is an inherent and systematic informational advantage which means that operators have been able to systematically outperform targets, which both renders this adjustment necessary, and also enables its calibration.

However, the data it uses to support this contention largely relates to the first generation of RIIO price controls, and the last set of pre-RIIO controls. This data did indeed reveal significant out-performance, but this varies strongly from sector to sector. If the data is extended further back in time, it becomes possible to gain some richer insights. For example, at DPCR4, it is clear that the core cost and output targets were set at challenging levels that many companies could not meet. Even more starkly, at the gas distribution price control period ending in March 2007, companies overspent their allowances by £864m, with companies bearing 31% of the value of the overspend.

This fuller dataset allows us to obtain a more rounded view of outperformance. Simply, Ofgem's limited analysis conflates Ofgem's own competence at price control reviews, genuine forecasting error, and the underlying level of efficiency outperformance that could genuinely not have been foreseen.

First, it is clear (as Ofgem's own analysis makes clear), that the energy networks have outperformed the UK economy by around 1% per year in the 30 years since privatisation. This is a significant achievement and is due to the mutually supporting pillars of a clear incentive-based model combined with a stable approach to assessing the financing requirements of the businesses. It is crucial for customers' interests that productivity is encouraged and not inhibited by poorly designed regulation.

Second, it is clear that the outperformance against target has been most in evidence since the Great Financial Crisis (GFC). The GFC has led to a range of knock on effects for the global economy and for the UK economy in particular, and created a genuine difficulty for regulators in forecasting certain elements of the

price control such as the cost of debt and RPEs. Ofgem is already addressing these issues through other mechanisms.

Thirdly, however, despite the improvements made to regulatory design at RIIO-1 – in particular the competition for business plans that reversed the burden of proof on the operators - it is well understood by most stakeholders that Ofgem did not implement its proposals effectively and this has also been a driver of outperformance.

The overwhelming conclusions from history are that:

- Price controls can and have been calibrated more symmetrically;
- Outperformance varies significantly across sectors and over time and is therefore not a one-way bet;
- Outperformance is influenced by the efficiency performance of the operators, which in turn is driven by quality of the incentive regime applied by the regulator, and in the UK this has yielded significant benefits;
- Outperformance is also heavily influenced by both genuine uncertainty and the quality of the diligence undertaken by the regulator; and so
- Consequently, the analysis that Ofgem has undertaken is selective and leads to it to draw conclusions that cannot be supported. Ofgem's analysis is insufficiently robust to be the basis for the existence of the ER vs AR adjustment and cannot support reliable calibration.

Moreover, Ofgem makes no allowance for the fact that the scope for outperformance is likely to be quite different in the RIIO-2 period than the RIIO-1 period, due to its proposals in respect of:

- Tightened calibration of incentives through price control deliverables and license obligations;
- Greater use of uncertainty mechanisms and indexation;
- Price control duration reduced from 8 years to 5 years;
- Dynamic target setting;
- Lower incentive rates; and
- Introduction of Return Adjustment Mechanisms (RAMs).

Even a subset of these proposed changes, if not all are eventually implemented, coupled with learning by doing within Ofgem in respect of the established parameters of the regime, would reduce the scope for future outperformance compared to the recent past. There is no rational basis on which to set an adjustment using historical outperformance in the presence of so much potential change, and if Ofgem does so there will be a material risk that it will over-estimated the adjustment.

Even if Ofgem rejects all these criticisms of their approach, what it has not done (in common with MPW) is properly evaluate the wider consequences of this adjustment – which all point in the direction of harming customers. These customer detriments include:

- Erosion of investor confidence and increased investor risk:
 - The past stability and predictability of the WACC-setting process is the cornerstone of the UK regulatory model, where the focus has been squarely on achieving two highly desirable outcomes: maintaining investor confidence in order to keep investors' true cost of capital of investing in the industry low; and stimulating significant dynamic efficiency improvements (in large part through a predictable approach to remuneration of assets and performance). Ofgem's arbitrary adjustment, for which there is no known precedent or satisfactory conceptual or evidential basis, undermines those benefits.
 - In applying its adjustment to the WACC, which is then applied to the RAV, Ofgem is in effect retrospectively clawing back the value of past investments. This runs counter to established regulatory practice in the UK, and will unquestionably undermine investor perceptions of risk and company behaviour.
- Weakened incentives for efficiency and innovation:
 - In calibrating its downward adjustment by reference to historical outperformance, Ofgem is clearly signalling that future outperformance will affect its future calibrations of the downward adjustment. As a result, companies will enter into a price control period with the knowledge that any incremental outperformance achieved will lead to an incremental worsening of future price controls calibrations. This will dampen incentives for innovation and efficiency to the longer term detriment of customers.
- Distortion of incentives to invest:
 - Ofgem's approach directly impacts on the managerial appraisal of new investment projects. The hurdle rate for operators is given by the actual WACC rather than the downwardly adjusted return that Ofgem would apply. Therefore, for the operator to invest normally it would need to be reassured that each investment project can earn not only the allowed return but also a target level of outperformance associated with that investment. Since outperformance occurs not only at the level of the individual project, but also at the level of collections of projects (across the spatial dimensions of the network and over time), and indeed may be completely unrelated to any particular investment activity at all, then it is highly unlikely that the investment appraisal process would pass projects that would otherwise have been passed without Ofgem's downward adjustment. Investment decisions will be therefore distorted and investment will be discouraged.
- Loss of clarity over price control calibration:
 - The arbitrary and unfounded nature of the adjustment, coupled with its de-linking from the other elements of the price control package undermines stakeholder engagement with the process and likely weakens the effectiveness of the appeal arrangements.

We therefore conclude that not only is Ofgem's proposal without merit, but it carries with it many potential costs to customers. Ofgem's argument that inherent information asymmetries will lead to positive expectations of company

performance during RIIO-2 and that Ofgem should adjust for these is an extremely weak justification for such a distortionary policy for several reasons:

First, information asymmetry and information problems in general are a feature of regulation. This has always been the case and the experience of UK regulation to date across many sectors is that regulators have sought to address this in ways that are aligned with longer term customer interests. Happily, the evidence provided by Pollitt for Ofgem suggests that this approach has been successful, in that customers have benefitted significantly from the application of incentive based regulation to energy network operators, in the form of lower network charges and enhanced quality of service.

Second, Ofgem already has instruments to address information asymmetry. At the last RIIO reviews Ofgem ran what was effectively an “auction for information”. This brought forth – by universal agreement – higher quality and more challenging business plans than previously, on which Ofgem should have been able to set robust targets. That Ofgem’s use of the information revealed by the auction was faulty should not mean that Ofgem should abandon it (as it proposes) and replace it with this distortionary set of proposals. Rather, Ofgem should learn to implement its own policies more effectively.

Thirdly, Ofgem is already proposing to change its treatment of sector-wide variables such as RPEs – these have nothing to do with asymmetry, but the difficulties of forecasting these variables at the last review has contributed to outperformance.

The theory and practice of regulation leads to the very clear conclusion that the costs to the customer of encouraging information revelation and efficiency enhancing effort can be minimised if the regulator is diligent in the calibration of incentives and the setting of targets. It is now well-understood by most stakeholders that in several important areas Ofgem misapplied a basically sound regulatory framework at the RIIO-1 reviews. Ofgem should address these implementation issues rather than invent a new remedy that ignores the underlying issues and creates new problems of its own.

1 INTRODUCTION AND BACKGROUND

In the UKRN paper a number of the authors—Mason, Pickford and Wright (MPW)—argued for a framework that differentiated between expected equity returns (ER) and baseline allowed returns (AR). In essence, MPW suggest adopting some unspecified mechanism to ensure that the gap between ER and AR was kept to some unspecified but low level.

Motivated by the framework presented by MPW, Ofgem currently proposes to make a downward adjustment of 50 bps to the allowed cost of equity for GD2/T2. Ofgem argues that inherent information asymmetries will lead to positive expectations of company performance during RIIO-2 and that Ofgem should adjust for these.

In setting its point estimate for the allowed return on equity, Ofgem also departs from regulatory practice as it has chosen not to aim up within its range of uncertainty. No justification has been provided for this.

The ENA has asked us to prepare an independent expert report appraising Ofgem's proposals.

1.1 Ofgem's proposed approach

In this section we provide an overview of the steps that Ofgem has indicated it will adopt. We also document Ofgem's stated motivation for making this adjustment and various other aspects of the analysis that it has presented to support its view. In doing so, we identify the key issues that must be addressed to assess whether Ofgem's proposed approach is justified, fair and reasonable or not.

We note at this stage that Ofgem has not yet taken any decisions in respect of where to locate its point estimate, it merely consults on this proposal and seeks comment. This is understood, but it does not prevent us from analysing whether the basis given for its proposed approach is reasonable, and whether Ofgem has identified and considered appropriately all the possible consequences of its proposed approach.

1.1.1 Key elements in Ofgem's method

We take as a starting point Ofgem's range for the cost of equity of between 4% and 5% (real, CPI). We offer no comment here on whether this range is justified, but for present purposes take this as a given. Ofgem then decided to fix its point estimate (its '*current working assumption for allowed equity return*') at the very bottom of this range, i.e. 4% CPI.

In reaching this view, Ofgem takes two distinct steps.⁴

- Ofgem selects the midpoint of the range 4% to 5%, i.e. 4.5%.

⁴ Ofgem, RIIO-2 Sector Specific Methodology Annex: Finance, December 2018. Paragraphs 3.165 and 3.166. https://www.ofgem.gov.uk/system/files/docs/2018/12/riio-2_finance_annex.pdf

- Ofgem then deducts a further 50 bps from this midpoint, to reflect the positive expectations of investors around future outperformance on cost and output measures. Hence Ofgem lowers its midpoint estimate of 4.5% to 4.0%.

Each of these steps is distinct and requires its own analysis to determine whether it is reasonable.

1.1.2 Aiming up

Ofgem's position

The first step in Ofgem's method brings us directly to the question of whether regulators should "aim up" when setting allowed returns in the presence of uncertainty. By selecting the midpoint, Ofgem has chosen to not aim up. But it provides no justification at all for this choice beyond a single sentence.

'In the absence of making a distinction between AR and ER, we could select a point estimate by taking the mid-point of the range after applying Step 2 (say 4.5% on a CPIH basis).'⁵

Key questions arising

The question of how to fix a point estimate for the allowed return on equity within some range is not new.

- There is a wide range of regulatory precedent that considers this question, some transparently and explicitly, others less so.
- The question of whether to aim up has also been addressed in academic work.
- Aiming up is also covered in the recent UKRN Cost of Capital paper (although as will become clear, we have substantive concerns over the analysis presented and conclusions reached).⁶

In our view Ofgem has erred by not taking greater care in deciding how to fix its point estimate within the range. Ofgem should have developed a proper framework for deciding where to set its point estimate rather than just plumping for the middle of the range without proper thought. Ofgem's view should have been informed by:

- an explicit understanding of the motivation for aiming up;
- the most relevant regulatory precedent around aiming up; and
- the key conclusions of academic analysis of this question.

We explore these topics in this report.

⁵ Ofgem, RII0-2 Sector Specific Methodology Annex: Finance, December 2018. Paragraph 3.165
https://www.ofgem.gov.uk/system/files/docs/2018/12/riio-2_finance_annex.pdf

⁶ Wright, Burns, Mason, Pickford, Estimating the cost of capital for implementation of price controls by UK Regulators <https://www.ukrn.org.uk/wp-content/uploads/2018/06/2018-CoE-Study.pdf>

1.1.3 Adjusting baseline returns for anticipated outperformance

Ofgem's position

Ofgem has, building off a recommendation by MPW in the UKRN Cost of Capital paper, reached the view that it may be necessary for it to lower its estimate of baseline allowed returns to take account of future outperformance.

Ofgem notes that as a matter of principle expected equity returns (ER) may be different to baseline allowed returns (AR) *'insofar as investors expect (ex-ante) companies to be affected by other financial incentives (positive or negative).'*⁷ Ofgem then concludes that it would be beneficial to draw an explicit distinction between AR and ER as part of its methodology, to allow it scope to adjust for positive or negative investor expectations at RIIO-2.⁸ Ofgem provides no explicit justification for why this is necessary or in the best interests of customers.

Having made this in principle decision to make an ER vs AR adjustment, Ofgem then needed to consider how to set the direction and quantum of this adjustment. Two approaches were identified:

- An explicit forecast of performance 'for example based on the degree of (out- or under-) performance that has materialised historically (on the basis that this will set investor expectations) and/or that is expected in RIIO-2 based on the final framework set at determination'.
- Using regulatory judgement 'taking into account the relative likelihood of out- or under-performance, within the bounds of the cost of equity generally'.

Ofgem proposes to adopt the second of these approaches (i.e. judgement based), noting:⁹

- it's belief that investors will have positive expectations of outperformance, hence a downward adjustment is necessary;
- that using judgement avoids placing too much weight on historical outperformance; and
- that this also reflects the difficulties that would arise in precisely estimating expected outperformance (hence Ofgem avoids the challenging task of actually developing some estimate of future outperformance).

In determining the quantum, Ofgem begins from the midpoint of its range and states:

*'given that we believe investor expectations are positive, the logical consequence would be to select a point estimate in the lower half of this range, i.e. 4.0-4.5% on a CPIH basis. This would imply outperformance up to 50bps of additional equity return.'*¹⁰

⁷ Ofgem, RIIO-2 Sector Specific Methodology Annex: Finance, December 2018. Paragraphs 3.152 https://www.ofgem.gov.uk/system/files/docs/2018/12/riio-2_finance_annex.pdf

⁸ Ibid. Paragraph 3.154

⁹ Ibid. Paragraph 3.162

¹⁰ Ibid. Paragraph 3.165 We also note that Ofgem presents a range of evidence of outperformance in Appendix 4 of its December Finance Annex

On this basis, Ofgem justifies moving from the midpoint of the range, to the bottom, deducting 50 bps from allowed returns.

Ofgem then undertakes two cross checks of this approach.

- Ofgem compares its proposed 50 bps deduction against historical outperformance, which it states falls in the range 200 bps to 300 bps. Ofgem concludes that its adjustment is '*relatively small*' compared to this range.¹¹
- Ofgem then draws further comfort from the fact that even if outperformance does not materialise, then its allowed returns would still (just) be '*within the expected return range supported by the CAPM in step 1 and reinforced by the cross-checks in step 2.*'

Implicit in this second cross check is the view that companies will indeed outperform at RIIO-2, and hence an expectation that outturn returns will be higher than the allowed baseline, e.g. at 4.50% once the financial effect of outperformance is factored in.

Key questions arising

Ofgem's approach in respect of its ER vs AR adjustment is novel, and many issues arise regarding its implementation.

- The recommendation that Ofgem draws on from the UKRN study was controversial and not all authors agreed with it. Ofgem notes in passing the concerns raised by Burns in the UKRN paper (and others elsewhere) with regard to this proposal but fails to do justice to the strength of opposition raised. There is a need then to fully consider MPW's recommendations to ascertain whether the analysis that underpins them was robust and complete.
- Ofgem has not considered the potential negative incentive effects arising from this proposal in order to arrive at a balanced judgement. It is necessary to address those possible detriments to customers.
- Since Ofgem seeks to justify making this ER vs AR adjustment and its size by reference to historical evidence on outperformance, we need to assess whether Ofgem's appraisal of historical outperformance is robust and complete.
- It is also necessary to consider whether historical information is likely to be representative of future outperformance in the light of mooted changes to the RIIO-2 framework. In almost all cases these changes would have the effect of reducing the scope for outperformance.¹²
- Ofgem states that '*information asymmetries inherent in price control regulation*' implying that it would be unable to achieve the same effect by recalibrating other parts of the price control (i.e. it feels unable to address outperformance at source).¹³ We need to assess whether both the evidence of past outperformance (across energy and potentially other sectors), and the

¹¹ Ofgem, RIIO-2 Sector Specific Methodology Annex: Finance, December 2018. Paragraph 3.166 https://www.ofgem.gov.uk/system/files/docs/2018/12/riio-2_finance_annex.pdf

¹² Ofgem acknowledge that this may be the case, and state in paragraph 3.168 that they would revisit their proposal once design work on RIIO-2 is concluded.

¹³ Ibid. Paragraph 3.164.

availability of other instruments support Ofgem's view that there is no other alternative available to it.

- Ofgem draws comfort from the fact that even if there is no outperformance, outturn returns would still be just within its range for the cost of equity. Taking into account our review of optimal aiming up, a topic that Ofgem does not cover at all, we need to consider whether Ofgem is right to take comfort from this observation.
- Finally, Ofgem makes one numerical cross check on the quantum of its adjustment, comparing 50 bps to its appraisal of historical outperformance. It is helpful to consider whether there are other cross checks that Ofgem should make.

We address all of these topics in the sections that follow.

1.2 Report structure

The remainder of this report is split into two sections.

- In Part A, we examine the question of aiming up. We review:
 - regulatory precedent; and
 - academic literature.
- In Part B, we examine Ofgem's proposed adjustment to allowed returns to take account of anticipated outperformance. We review:
 - the merits of the arguments developed to support the need for such an adjustment in section 3; and
 - in section 4 we address the unintended consequences of Ofgem's proposals.

PART A: 'AIMING UP'

2 APPRAISAL OF OFGEM'S APPROACH

Ofgem has departed from longstanding and well-understood regulatory practice, in that its proposals for fixing its point estimate do not “aim up” within the range it has identified for the allowed return on equity. Ofgem provides no justification for this.

In this section we provide our appraisal of Ofgem's proposed approach.

KEY MESSAGES

- Aiming up is an optimal regulatory response to the uncertainty inherent in estimating the cost of equity and the asymmetry of the consequences arising from setting the allowed return too high or too low.
- Aiming up is common practice in UK regulatory regimes.
- The CMA in particular has consistently and transparently aimed up in its decisions.
- The relevant academic literature is supportive of aiming up.
- MPW's model supports aiming up for new investments, whilst its conclusion that there should be a lower rate of return for sunk investments rests upon an unrealistic level of myopia by investors to generate its conclusion and therefore should be disregarded.

Ofgem should revisit its decision on aiming up in the light of recognised regulatory best practice and the lessons from academic work.

2.1 Framework for analysis

Ofgem's proposal sits within the wider decision around where, within some given estimated range for the expected cost of equity, it is reasonable for regulators to set their point estimate. All regulators in the UK have needed to make this decision over numerous price control reviews, which provides a rich source of regulatory precedent to consider¹⁴.

The range within which a point estimate sits arises because it is not possible to observe the true value for the required rate of return with certainty. It is only

¹⁴ On a point of detail, regulators (including the CMA) have often considered the location of their point estimate within a range as a final step in their methodology – that is, they have made this decision when determining the overall allowed rate of return, made up of an allowance for debt and equity. We note, however, that Ofgem's December paper adopts the approach of determining a range for the cost of equity and then seeking to locate a point estimate within that range. All of its working assumptions for the WACC are then derived from this chosen point estimate. Nothing of any significance should be inferred from this slight difference in approach, since it is well understood that the existence of the range for the WACC as a whole in previous regulatory settlements is largely driven by uncertainty in respect of the cost of equity (in contrast the cost of debt is much more readily observed). In the remainder of this paper therefore, wherever we refer to required returns or allowed returns, this should be understood to refer to the underlying cost of equity and/or the allowed cost of equity, rather than the overall WACC, unless otherwise stated.

possible to estimate the true value of the required rate of return, often with considerable uncertainty.

To address this uncertainty, UK regulators typically develop the range of allowed returns by identifying a range of possible values for each component – the risk-free rate, the beta, and the equity risk premium. These ranges for each component are then combined to produce a reasonable range for required returns. This is the approach that Ofgem took to determine its estimated range for the cost of equity. It is also the approach that the CMA has commonly adopted when asked to consider this question during regulatory appeal proceedings.

Having developed the range, the regulator then chooses a point estimate within that range that can enter into the wider allowed revenue calculation for the network operators.

The need to fix a point estimate in the presence of uncertainty gives rise to two potential errors. Either the allowed returns are set above the true required rate of return or allowed returns are set below this required rate.

If allowed returns are above the required rate, then there will be a transfer from consumers to companies as customers will pay more to the network companies than is necessary and investors will earn higher returns than are necessary. It may also create some marginally inefficient price signals, from higher network charges, and may lead to some marginal over investment in the network, although if regulatory arrangements governing expenditure (such as benchmarking) are sufficiently robust any such incentive can be well mitigated.

If, on the other hand, allowed returns are below the true required rate of return, then investors will be unwilling to invest in the asset, and incentives would be undermined and distorted. This can lead to a deterioration of operational performance with material detriments to customers over time.

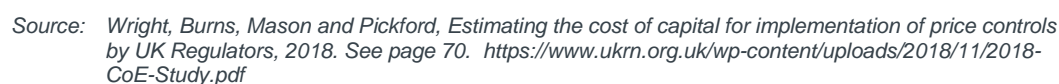
Given the dependence of all parts of the economy on robust energy supplies, the potential disruption to service is considered unambiguously more harmful to customer interests than marginally higher than necessary network charges. This creates a rational preference for regulators to “aim up” when selecting their point estimate for the cost of capital from their estimated range.

Indeed, most regulators have taken the view that the consequences to society of setting allowed returns too low are more material than setting allowed returns too high. As section 2.2 clearly shows, it has hitherto been common regulatory practice for regulators to “aim up” within the reasonable range, when setting the allowed rate of return. This is because the negative consequences to society of setting allowed returns below the cost of equity are likely to be much greater than the negative consequences of setting the allowed returns above the cost of equity.

This rational preference for aiming up is also supported by the academic literature, as discussed in section 2.3.

We note at the outset the UKRN conclusion that the practice of UK regulators has varied substantially across sectors and time, and plot a chart, reproduced below that purports to show this.

Figure 1 UK WACC decisions as presented in the UKRN paper



The ranges used for the RIIO-ED1 price control are an example of the difficulty involved in interpreting ranges without consideration of the decision-making process. In RIIO-ED1, Ofgem published an initial strategy paper estimating an initial range for the cost of equity (post-tax) between 6.0% - 7.2%.¹⁵ In its final draft determination, Ofgem uses a cost of equity of 6%, which might lead one to (falsely)

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conclude that the regulator has ‘aimed down’. However, in its draft and final determinations on the cost of equity, Ofgem explains that it found it necessary to recalculate its range to account for a recent decision of the CMA regarding NIE’s cost of equity. Ofgem’s recalculation resulted in a cost of equity range of 4.03%-6.0%, and its final point estimate of 6% is an upper bound point estimate.¹⁶

To fully understand the approach taken by UK regulators, it is therefore necessary to look into the individual cases in more detail to understand the process of decision making that underlies these point estimates. This is covered in the sections below.

2.2.1 The CMA’s approach

In recent (and historical) price controls, the CMA¹⁷ has implemented a consistent approach for calculating the cost of capital – across sectors and regulators – and has taken the approach of choosing an estimate between the midpoint and upper bound.

The CMA’s approach is a good example of UK precedent for two reasons. Its approach for determining the cost of capital has been particularly transparent. Additionally, its decisions do not involve such substantial time lags, such as those often required between the proposals, draft and final determinations of other regulators in price controls. As already noted, these types of time lags make it more difficult in some cases to fully link estimate ranges provided at one point in the process with the final point estimates used. We also consider the precedent created by CMA decisions particularly relevant as it is the body which settles disputes between regulators and companies.

The CMA’s approach is summarised below:

- The cost of capital is estimated as a weighted average of the cost of debt and the cost of equity. The cost of debt is usually estimated from actual market data. The cost of equity is estimated using the Capital Asset Pricing Model (CAPM).
- The CMA estimates a point estimate (or a range) for each component in the CAPM model, namely: the risk-free rate, the equity risk premium (the difference between the market return and the risk-free rate) and the equity beta.
- Using the estimates of the CAPM parameters usually generates a range of plausible values for cost of equity, and thus the cost of capital.
- The CMA then chooses a point estimate for the cost of capital, within its calculated range of values.
- In almost all cases, the final point estimate chosen by the CMA has been near the upper end of the range (between the midpoint and the top end of the range). The CMA has generally justified this decision by saying that it considers the risks of choosing an estimate that is too low (i.e. underinvestment) are greater than the risks of choosing an estimate that is too high (i.e. over-rewarding

¹⁶ RIIO-ED1, Draft determinations for the slow-track electricity distribution companies Financial issues Supplementary annex to RIIO-ED1 overview paper, July 2014. See page 7.
https://www.ofgem.gov.uk/sites/default/files/docs/2014/07/riio-ed1_draft_determination_financial_issues.pdf.

¹⁷ When referencing the CMA in this section we take the term “CMA” to include its predecessor organisation the Competition Commission which fulfilled the same duties in respect of regulated networks as the CMA does now.

companies). This precedent is explained in the CMA's decision for Heathrow and Gatwick Airport in 2007:

*"Given the uncertainties in cost of capital estimates, we considered the cost of setting an allowed WACC that was too high or too low. If the WACC is set too high then the airports' shareholders will be over-rewarded and customers will pay more than they should. However, we consider it a necessary cost to airport users of ensuring that there are sufficient incentives to invest, because if the WACC is set too low, there may be underinvestment from BAA or potentially costly financial distress... Given the significance to customers of timely investment at Heathrow and Gatwick, we have given particular weight to the cost of setting the allowed WACC too low. Most importantly, we note that it is difficult for a regulator to reduce the risks of underinvestment within a regulatory period."*¹⁸

The CMA has applied this approach across a range of sectors, including airports (Stansted Airport in 2008 and Heathrow and Gatwick in 2007), water (Bristol Water in 2010 and 2015) and energy (NIE in 2014).

As in the 2007 Heathrow and Gatwick decision, the CMA noted its rationale for 'aiming up' in its decision for Stansted:

*"Given the uncertainties surrounding the estimation of the cost of capital, we considered the risk of setting an allowed WACC that was either too high or too low: if the WACC were set too high, the airports' shareholders would be over-rewarded and customers would pay more than they should; but, if the WACC were set too low, there may be under-investment from BAA or potentially costly financial distress. Given the significance to customers of timely investment at Stansted, we concluded that we should give particular weight to the risk of setting the allowed WACC too low. We also recognized that it was difficult to the risk of setting the allowed WACC too low. We also recognized that it was difficult for a regulator to reduce the risks of under-investment within a regulatory period."*¹⁹

The CMA also showed a preference to aim up when setting the cost of capital allowance in its 2010 decision for Bristol Water:

*"We noted that a number of cross-checks indicated that the top of our range would be appropriate. Accordingly, bearing in mind continuing uncertainties in the financial markets, we decided to set the cost of capital at the top end of our range: 5 per cent."*²⁰

Similarly, in justifying its estimated range for the equity risk premium for NIE in 2014, the CMA expressed its preference for aiming up:

¹⁸ Competition Commission, A report on the economic regulation of the London airports companies (Heathrow Airport Ltd and Gatwick Airport Ltd), September 2007. See page 49. , https://webarchive.nationalarchives.gov.uk/20111202214947/http://www.competition-commission.org.uk/rep_pub/reports/2007/fulltext/532.pdf.

¹⁹ Competition Commission, Stansted Airport Ltd Q5 price control review, October 2008. See page 100. https://webarchive.nationalarchives.gov.uk/20140403005019/http://www.competition-commission.org.uk/assets/competitioncommission/docs/pdf/non-inquiry/rep_pub/reports/2008/fulltext/539.pdf.

²⁰ Competition Commission, Bristol Water pls, August 2010. See page 65. https://webarchive.nationalarchives.gov.uk/20111202195428/http://www.competition-commission.org.uk/rep_pub/reports/2010/558Bristol.htm/

“We consider that the appropriate upper limit for the market return is 6.5% per cent. In the context of setting a cost of capital for an efficient license holder, we are less concerned with a lower limit to the expected market return (since we would wish to avoid the license holder’s cost of capital being too low), but in this context we consider 5 per cent an appropriate lower bound figure.”²¹

In its final cost of capital estimate for Bristol Water in 2015, the CMA notes that it strayed from precedent by setting a cost of capital at the mid-point of the range because it considered that it had already made certain prudent upward adjustments in estimating parameters:

“We are aware of the customer welfare arguments for the use of an estimate above the mid-point of any range. In summary, the argument was that, if the WACC were to be too high, customers would pay slightly more, but if the WACC were to be too low, there would be a risk of underinvestment or financial distress, which could result in a greater detriment to customers than the slightly higher costs. Although we generally used the midpoint of our ranges, there were a number of areas in which we made prudent upwards adjustments for Bristol Water relative to observable market evidence...we considered that the risk of underinvestment to the detriment of consumers, of our estimated WACC was lower than the ‘true WACC’, was lower in the case of our determinations than in many precedent situations. This was due to a number of mechanisms in the regulatory framework for Bristol water...”^{22,23}

The CMA also provided four further justifications for why it choose not to aim up in its 2015 determination.²⁴

- The use of a totex approach. The CMA notes that under this approach, RAV additions are determined by total spend rather than decisions around specific investments.
 - This logic seems flawed. If only a proportion of an investment is capitalised into the RAV, incurring and financing that investment would still not be justified in the eyes of the company if the allowed rate of return was below the true cost of capital (absent some other source of outperformance). We address distortion of incentives to invest explicitly in Section 4.3.
- The fact that Bristol Water would be required to carry out appropriate investment through a combination of price control outcomes, ODIs and its statutory duties.
 - Again, this point seems unjustified. It would seem to depend on a failure to invest being perfectly monitorable by the regulator. The framing of the point

²¹ Competition Commission, Northern Ireland Electricity Limited price determination, Final determination, March 2014. See page 29. https://assets.publishing.service.gov.uk/media/535a5768ed915d0fdb000003/NIE_Final_determination.pdf.

²² CMA, Bristol Water plc, October 2015. See pages 333-334. https://assets.publishing.service.gov.uk/media/56279924ed915d194b000001/Bristol_Water_plc_final_determination.pdf.

²³ Examples of prudence built into the estimate of the WACC range included a debt small company premium, an equity beta uplift, and the inclusion of a forward-looking uplift in areas of new debt.

²⁴ Ibid paragraph 10.194.

also seems to suggest that regulatory authorities can legitimately have no regard to their statutory duties (i.e. that companies can be compelled to invest even if such investment is not fairly compensated).

- That the increased role of benchmarking and role of customers was less dependent on companies to identify investment opportunities.
 - As far as we can see, this point has no relevance within the aiming up framework. Regardless of the origin of allowances, companies will still need to invest, and at the time that investment is made allowed returns will either support the decision to invest or they will not.
- That the forward looking totex allowance put forward by the CMA was reasonable.
 - Again, this point seems to us to have no relevance within the aiming up framework.

CMA precedent is summarised in Figure 2 below, and it clearly shows that in all but one of these cases (the Bristol Water case we have just explained) the CMA has individually estimated the parameters of the CAPM model and generated a range of cost of equity (and cost of capital estimates), finally choosing a cost of capital at the upper end of the range.

Figure 2 Summary of CMA cost of capital decisions

%	Heathrow – October 2007	Gatwick – October 2007	Stansted – October 2008	Bristol Water – June 2010	Bristol Water – October 2015	NIE – March 2014
Gearing	60	60	50	60	62.5	45
Cost of debt (pre- tax)	3.6	3.6	3.4 - 3.7	3.9	2.54-2.69 (2.61)	3.1
Cost of equity (post-tax)	4.8 – 7.7	5.0 – 8.4	5.0 – 8.2	3.6 – 6.6	5.45-6.01 (5.73)	3.4 – 5
WACC range	4.8 – 6.4	4.9 – 6.8	5.20-7.54	3.8 - 5	3.63 – 3.93	3.3 – 4.1
WACC figure chosen	6.2	6.5	7.1	5.0	3.78	4.1
Percentile of WACC figure chosen	87.5	84.2	81.2	100	50	100

Source: CMA decision documents

Note: WACC for Stanstead, Heathrow and Gatwick is calculated using pre-tax cost of equity and pre-tax cost of debt. WACC for Bristol (2010 and 2015) and NIE is calculated as the vanilla WACC (pre-tax cost of debt and post-tax cost of equity).

Other UK regulators follow a similar approach to the CMA, often explicitly quoting the CMA's precedent. We summarise their decisions below.

2.2.2 Ofgem's approach

Ofgem has hitherto also followed a similar approach to the CMA. It has typically calculated a range of estimates for the cost of equity by estimating the parameters of the CAPM model. It then chooses a point estimate for the cost of equity, by sense-checking and comparing its estimates against the cost of equity used in previous decisions and estimates derived from alternative approaches.

In its initial strategy document for RIIO-T1, Ofgem proposed an indicative cost of equity range between 6.0%-7.2%. In its later final proposals, it used a cost of equity 7.0% for NGET and 6.8% for NGGT. Ofgem said it had arrived at this estimate by following two steps:

*"...using the Capital Asset Pricing Model (CAPM), taking into account the relative risk analysis, sense-checking against alternative approaches, information from transactions and regulatory precedent."*²⁵

Similarly, in its initial strategy document for RIIO-GD1, Ofgem initially proposed an indicative cost of equity range between 6.0%-7.2%. In its final decision, it proposed a cost of equity of 6.7%.²⁶ Ofgem justified this estimate saying that it has considered regulatory precedent, and cross-checked against its decisions in other sectors, and using alternative approaches:

*"The proposals reflect our view that the GDNs face notably less cash flow risk than the transmission companies will face over the same period under the price control (RIIO-T1). We have also taken into account evidence from the capital asset pricing model (CAPM), regulatory precedents, evidence from transactions and our return on regulatory equity (RoRE) analysis."*²⁷

In its draft and final determination for RIIO-ED1, Ofgem proposed an upper bound point estimate for the cost of equity of 6% from a range of 4.03% - 6.00%. Its calculation of this estimate relied heavily on precedent set by the CMA:

*"Drawing from the CC's analysis in its final determination, we have translated its estimated range for NIE's cost of equity to the DNOs...Our 6.0 per cent estimate for the DNOs is at the top of the range of 4.0 – 6.0 per cent in the table above. This is consistent with the CC's assessment for NIE, which was also at the top of its range."*²⁸

2.2.3 Ofwat's approach

Ofwat has followed the same general approach as the CMA, using CAPM to estimate a range for the cost of equity, based on an estimation of its individual components. When selecting a point estimate from within a range, Ofwat has

²⁵ Ofgem, RIIO-T1: Final Proposals for National Grid Electricity Transmission and National Grid Gas Finance Supporting document, December 2012. See page 23. <https://www.ofgem.gov.uk/ofgem-publications/53602/4riiot1fpfinancedec12.pdf>

²⁶ Ofgem, RIIO-GD1: Final Proposals – Finance and uncertainty supporting document, December 2012. See pages 21-22. <https://www.ofgem.gov.uk/ofgem-publications/48156/3riiogd1fpfinanceanduncertainty.pdf>.

²⁷ Ibid. See pages 11

²⁸ RIIO-ED1, Draft determinations for the slow-track electricity distribution companies Financial issues Supplementary annex to RIIO-ED1 overview paper, July 2014. See page 7. https://www.ofgem.gov.uk/sites/default/files/docs/2014/07/riio-ed1_draft_determination_financial_issues.pdf.

tended to base its decision on historical returns and precedent set by other regulators.

In its initial January 2014 guidance on cost of capital for PR14, following some initial company submissions, Ofwat proposed a cost of equity (post-tax) range of 4.9% - 5.7% and appointee (vanilla) cost of capital range of 3.6% - 3.9%. Ofwat then selected point estimates at the upper bound of this range - a point estimate of 5.65% for the cost of equity and an estimate of 3.85% for the WACC.²⁹ Ofwat notes that the upper bound estimate is driven by its decision to choose a market return at the upper bound of its range. This was justified by cross-checking against historical returns and historical regulatory precedent – including precedent set by CMA, Ofgem, the ORR and CAA.

In Ofwat's later final determination in December 2014, Ofwat used a slightly lower point estimate for the appointee (vanilla) cost of capital of 3.74% (and a wholesale cost of capital of 3.7%).³⁰ However, this cost of capital cannot be directly compared to the range above, as it represented a re-calculation of the cost of capital to account for market developments (a lower cost of debt) and additional regulatory precedent which suggested a lower cost of equity.

In Ofwat's earlier price control from 2010/11-2014/15 (PR09), it determined a cost of capital (vanilla WACC) of 4.5%, which was in the upper bound of the estimated cost of capital range between 2.9% - 5.4%. Ofwat noted that:

*"In its advice Europe Economics provided a 'marked up' range to take account of the asymmetric consequences associated with the risk to customers of setting the cost of capital too low. This mark-up was applied to the overall cost of capital, not individual components."*³¹

In commenting on their point estimate for the cost of equity, Ofwat also said:

*"Our final determination [7.1%, cost of equity post-tax] cost of equity is at the high end of the Europe Economics pre- marked up ranges (3.5% to 7.2%), but we believe that it is necessary to allow the industry to maintain access to finance in difficult economic times. This takes into account general expectations that current economic conditions will continue in the early part of 2010-15 and the need to ensure the cost of equity is sufficient to both keep equity in the sector and attract new equity."*³²

2.2.4 CAA's approach

The Civil Aviation Authority (CAA) has used a similar bottom-up approach for calculating the cost of equity and cost of capital, combined with a judgement about the point estimate of the cost of capital from a range.

²⁹ Ofwat, Setting price controls for 2015-20 – risk and reward guidance, January 2014. See page 24. https://www.ofwat.gov.uk/wp-content/uploads/2015/11/gud_tec20140127riskreward.pdf.

³⁰ Ofwat, Setting price controls for 2015-20 Final price control determination notice: policy chapter A7 – risk and reward, December 2014. See page 42. . https://www.ofwat.gov.uk/wp-content/uploads/2015/10/det_pr20141212riskreward.pdf.

³¹ Ofwat, Future water and sewerage charges 2010-15 : Final determinations. See page 127. https://www.ofwat.gov.uk/wp-content/uploads/2015/11/det_pr09_finallfull.pdf.

³² Ibid. See page 128.

In the Q6 price control (2014/15-2019/20), the CAA first estimated ranges for the individual components of the cost of equity (using the CAPM model) and ranges for the cost of debt, cost of equity and the overall cost of capital. It selects provisional point estimates for the cost of debt and cost of equity from these ranges and uses these point estimates to calculate a provisional cost of capital. It then assesses the resulting cost of capital point estimate against the cost of capital range.

In its final determination for Q6 in February 2014, the CAA decided on a (pre-tax) cost of capital of 5.6% for Heathrow Airport from a range of 4.51%-5.89% (79th percentile of the range) and 5.95% for Gatwick Airport from a range of 4.82% – 6.31% (76th percentile).³³ In setting out its approach to selecting a point estimate from a range, the CAA said:

“The CAA agrees with Europe Economics in respect of two explanations of why it might be appropriate that the point estimate higher than the mid-point: the best estimate might not be the mid-point and the asymmetric costs of getting the point estimate wrong.”

In justifying its selection of a point from within the range, the CAA notes that it ‘aimed up’ since it considered that the total market return was likely to be near the top end of the range suggested by its advisors, PwC, and that this choice would be consistent with the market returns used by other regulators. Additionally, the CAA was also concerned about the cost to customers in terms of underinvestment if the estimate were “wrong”:

“While the magnitude of capex relative to the RAB in Q6 might be lower than Q5, there are some projects at both airports which are critical to passengers for example the completion of Terminal 2 by HAL and common bag drop facilities at check-in and stand re-configuration by GAL.”³⁴

This line of reasoning is also consistent with the CAA's views in its initial proposals for the cost of capital for Q6 in April 2013:

“Though there is no significant planned capex in the RAB-based price cap, the CAA still has to be mindful of setting the allowed WACC too low. Most importantly, it is difficult for a regulator to reduce the risks of underinvestment within a regulatory period. However, if the WACC is set too high, the airports’ shareholders will be over-rewarded and customers will pay more than they should. Taking these factors into account, the CAA concluded that the allowed WACC range should be set in the top half of the range.”³⁵

³³ CAA, Estimating the cost of capital: a technical appendix to the CAA's Final Proposal for economic regulation of Heathrow and Gatwick after April 2014, October 2013, See page 88. <https://publicapps.caa.co.uk/docs/33/CAP1115.pdf>.

³⁴ Ibid. See page 88.

³⁵ CAA, Economic regulation at Stansted from April 2014: initial proposals, April 2013, See page 119. <https://publicapps.caa.co.uk/docs/33/CAP%201030%20Economic%20Regulation%20at%20Stansted%20from%20April%202014%20initial%20proposal.pdf>.

2.2.5 Utility Regulator's approach

The Utility Regulator in Northern Ireland (UR) has also used the CAPM model to estimate the parameters of the cost of equity, and then calculated the individual components of the cost of capital. However, in its most recent decisions, the UR has not estimated or presented ranges for the CAPM parameters or cost of capital components, but rather presented point estimates for the individual CAPM parameters and combined these to get an overall cost of capital.

In its final determination decision for GD17, the UR set a final cost capital estimate of 4.26% for PNGL and 4.32% for FE, and a pre-tax cost of equity of 6.6% for both.³⁶

To arrive at its final cost of equity estimate, the UR has relied heavily on precedent from other regulators, using:

- a risk-free rate of 1.25%, in line with CMA precedent: *"...to be consistent with the estimate that the Competition & Markets Authority (CMA) used in its recent price control determination for Bristol Water"*³⁷;
- An upper bound expected market return of 6.5%, in line with CMA precedent: *"The expected market return has also been considered at length in recent UK price reviews. The CMA, and its predecessor the Competition Commission (CC), have expressed the view that it is untenable to think of a real expected market return of more than 6.5%....Given the clear steer from the CMA/CC on this matter, we also propose to use a value of 6.5%."*³⁸
- An upper bound asset beta of 0.40, which was determined by Ofgem and CMA precedent and the UR's view that the Profile Adjustment feature PNGL and FE's regulatory framework might be associated with some additional risk: *"...the GD17 asset beta should logically sit within the 0.38 to 0.40 range formed by Ofgem's RIIO-GD1/ED1 beta and the CC's estimate of NIE's beta...our initial view is that a cautious approach is appropriate and this therefore warrants placing PNGL and FE at the top of the range that regulators have judged appropriate for low-risk network utility businesses."*^{39 40}

The UR viewed its overall approach as conservative, and hence considered that it had 'aimed up':

*"We have taken a somewhat cautious approach in setting the cost of equity slightly higher than recent UK regulatory decisions e.g.. Ofgem's RIIO ED1."*⁴¹

The UR followed a very similar approach in its final determination for RP6. The UR applied a final estimate of 3.18% for the cost of capital and 4.45% for the cost of

³⁶ UR, Price Control for Northern Ireland's Gas Distribution Networks GD17 Final Determination, September 2016. See page 282. https://www.uregni.gov.uk/sites/uregni/files/media-files/2016-09-15_GD17_Final_Determination_-_final_1.pdf.

³⁷ Ibid. See page 276.

³⁸ Ibid. See page 276.

³⁹ Ibid. See page 278.

⁴⁰ The Profile adjustment is a mechanism which allows prices to be spread across increasing volumes of customers to smooth prices for customers, while the total revenue received by the NI GDNs is the same in net present value terms).

⁴¹ UR, Price Control for Northern Ireland's Gas Distribution Networks GD17 Final Determination, September 2016. See page 23. https://www.uregni.gov.uk/sites/uregni/files/media-files/2016-09-15_GD17_Final_Determination_-_final_1.pdf.

equity. The UR arrived at these estimates by estimating the parameters of the CAPM model and cost of capital, relying heavily on CMA and Ofgem precedent for the levels of its parameter estimates. The UR's cost of equity estimate was based on similar risk-free rate and market return parameters as used by Ofgem in RIIO-ED1. The UR also noted that it believed it was choosing an upper bound estimate in using these parameters:

*"In using the RIIO-ED1 cost of equity calculations as a benchmark for NIE, the UR in its draft determination was assuming that the risk-free rate of return in the RP6 period will be 1.25% and that the expected market return is 6.5% (both figures after RPI inflation). These figures are in line with wider regulatory precedent from recent price control reviews, but the UR continues to take the view that values of 1.25% and 6.5% are very much at the top end of plausible ranged in current market conditions."*⁴²

The asset beta used by the UR was similar to those used in the UK electricity networks, but not as high as the asset beta used in the CMA's 2014 decision for NIE. The UR notes that it considered there was no need to 'aim up' for this particular estimate. This was because it considered the frameworks for NIE and the UK DNOs to be sufficiently similar, and because it had already included a degree of aiming up or "benefit of the doubt" (as stated by the UR) in its decisions on the risk-free rate and expected market return.

The UR notes that its final cost of equity judgement is largely based on Ofgem's precedent and its aim to choose an estimate that is balanced "in the round", meaning that they aim up for some parameters but not all:

*"This determination deliberately positions NIE's allowed return to be no higher than the return that Ofgem gave to the GB electricity distribution networks in its determination at the end of 2014. It also sits below the GD17 costs of equity given our decision in that review to give recognition to the unusual features of the GD17 price control framework. We are content that this is a logical picture to present, when the cost of equity is looked at 'in the round'... The allowed return on equity has to be looked at as a package of inter-linked judgements and we consider that a return on equity of 4.45% is an appropriately balanced assessment, having regard to the full range of arguments that there are for figures both below and above this point estimate."*⁴³

2.3 Review of the academic literature

While the choice of a point estimate for the cost of capital has been much discussed by regulators, there is a relatively small academic literature focusing on the quantitative impacts of choosing a cost of capital from within a range. The consensus view emerging from the literature is that there is a rationale for setting an uplifted allowed return wherever there is the prospect of investment being deferred or not occurring at all. The extent of aiming up varies according to the

⁴² UR, Northern Ireland Electricity Networks Ltd Transmission & Distribution 6th Price Control (RP6) Final determination, June 2017. See page 221. <https://www.uregni.gov.uk/sites/uregni/files/media-files/2017-07-04%20RP6%20FD%20Main%20Report%20%28002%29.pdf>.

⁴³ Ibid. See page 223.

assumed circumstances, for example becoming higher when demand is more inelastic.

2.3.1 Wright, Mason and Miles (2003)

An initial contribution to the literature is a paper by Wright, Mason and Miles (2003) who analyse the impact on welfare (and welfare losses) of setting a price cap that is “too high” or “too low” relative to the welfare-maximising level. Their paper formalises, in the form of a simple one-period model for non-deferrable investment, the trade-offs by regulators that the costs of setting a rate of return that is “too low”, such as over-rewarding companies against the costs of setting a return that is “too low”, such as underinvestment. They conclude:

“[Our analysis shows] that the effective cost of capital estimate that should be used by a regulator will depend on demand and cost conditions, as well as the point estimate and error in cost of capital estimation. Therefore two regulators who share the same point estimate and confidence interval for the costs of capital for their regulated firms will, in general, choose different effective costs of capital for price cap purposes, to reflect the demand and cost characteristics of the firm that they regulate.”⁴⁴

Based on their model, they conclude that the optimal price cap (or allowed rate of return) depends on several factors and is higher when:

- The regulator’s estimate of the cost of capital is higher;
- The deadweight loss from non-operation is higher; and
- Demand is less elastic, and so the deadweight loss from the mark up on price is low.

They also find that greater uncertainty around the actual cost of capital increases the price cap, as long as the dead-weight loss from non-operation is high. If the dead-weight loss from non-operation is low (and conversely the monopoly mark-up causes greater welfare loss), then more uncertainty reduces the optimal price cap the regulator should set.

The authors do not comment explicitly on whether regulators should ‘aim up’ and they do not offer an explicit quantification. However, their findings suggest that if their model were applied to the energy sector, where deadweight losses from non-operation are likely to be high and where demand is typically understood to be highly inelastic even in the long run, the optimal cost of capital is likely to be higher (as compared to cases when non-operation is less important or demand is more elastic).

2.3.2 Dobbs (2011)

A paper by Ian Dobbs (2011) builds on this initial model and is the main contribution to the academic literature on this topic. Dobbs extends the initial work by Wright, Mason and Miles (2003) to considers a multi-period model, and investment that is new (deferrable as well as non-deferable) and also sunk investment. When

⁴⁴ Wright, Mason and Miles, A study into certain aspects of the cost of capital for regulated utilities in the U.K., February 2003, See page 8. <https://www.ofgem.gov.uk/ofgem-publications/50794/2198-jointregscoc.pdf>

considering these types of investment separately (new and sunk), Dobbs finds a strong justification for setting an allowed rate of return that is above the average WACC for investments that are new (non-deferrable or deferrable), but finds that for companies that have **only** sunk investments (with no prospect of future investment) there is not a strong rationale for aiming up. However, whenever companies have a blend of both new and sunk investment, Dobbs finds that substantial aiming up is optimal, even in cases where the proportion of new investment is small. This final result will have the most practical relevance since all GB network companies will have a mix of both new and sunk investment.

This finding is driven by the assumption that the economic welfare function is asymmetric, which implies that welfare losses from setting the allowed rate of return above the optimal level are lower from setting the allowed rate of return below the optimal level. The expected welfare functions are more asymmetric for non-deferrable and deferrable investments (than sunk investments), because in these cases the regulator's chosen allowed rate of return will also affect whether investment is undertaken or not. This suggests that the offsetting welfare gains from encouraging investment are particularly large for some types of investment such as new investment:

*"...because expected economic welfare is an asymmetric function; given the precise value of the optimal AROR [allowed rate of return] is uncertain, for each percentage point the AROR is inadvertently set above the optimum, the welfare loss is less than that which arises from setting an equal number of percentage points too low....the asymmetry in the welfare function for new investment (vis a vis that for sunk investment) is so strong that even if the proportions of potential new investment are quite small, this can still induce a significant uplift in the optimal choice for the AROR compared to the WACC mean."*⁴⁵

Dobbs' paper generally supports aiming up to at least the 75th percentile, even in cases where the proportion of new investment is low. We note that all cases presented by Dobbs in his summary results assume demand far more elastic than is likely to be reasonable for energy demand, implying that Dobbs's findings may provide a highly conservative recommendation about the optimal extent of aiming up in these sectors.

2.3.3 The UKRN report (2018)

Mason analyses the question of aiming up using a simple one period model in Appendix I of the UKRN report. His analysis is split between new investment and sunk investment, before the results are combined into a recommendation for regulators.

For new investment, Mason finds that the optimal point estimate is high in the range for a wide range of parameterisations – the main body of the report summarises Mason's findings that the optimal allowed return routinely lies above the 90th

⁴⁵ Dobbs, 2011, Modelling Welfare loss Asymmetries Arising from Uncertainty in the Regulatory Cost of Finance, See page 33. <https://www.staff.ncl.ac.uk/i.m.dobbs/Files/Welfare%20loss%20JRegE.pdf>

percentile in his model. This is consistent with other attempts to place some empirical estimates into the aiming up framework (such as the Dobbs paper).

For sunk investment, Mason suggests that the rationale for aiming up vanishes and that regulators should select their point estimate in line with their unadjusted expectation of allowed returns (assuming a symmetric distribution within the range, this is in line with the 50th percentile). This comes from observing that:

- sunk investments have already been made, and hence there is no risk that a low WACC may cause an already existing investment not to be made;
- given this, consumer welfare is maximised by setting WACC as low as possible; however
- this would fall foul of regulators' requirement to ensure financeability; so
- balancing these two concerns leads to the optimal choice being to set the point estimate at the midpoint of the range for the WACC; and
- blending together Mason's results for new and sunk investments, weighting each according to the flow of expenditure (load and non-load related capex allowances for RIIO-T1) and the stock of past expenditure (RAV) leads to an optimal aiming up point that is just above the 50th percentile (52% to 58%)

This reasoning however can only be correct if investors are myopic (failing to see beyond the present period). Under Mason's model, an investment expected to be added (or not) in this period would earn an aimed up WACC in the period it was created, but would earn a central WACC in all future periods as it then becomes sunk and earns a lower return. Mason does not explain why investors would fail to foresee this future lowering of rate under this regulatory model, and why they would choose to base their investment appraisal only on the rate available for the investment in the first period, rather than the significantly lower future blended rate.

Additionally, in its unblended form, we note that it echoes the Helm split cost of capital model, an approach that has been extensively debated and rejected explicitly and repeatedly by several regulators in the UK and elsewhere.

We note that Dobbs' approach in his paper is robust to these criticisms. Dobbs considers sunk and new investments separately to understand the optimal approach for each type of investment alone, and then considers results for firms with a blend of new and sunk investments (where his model includes a time dimension such that investor decisions take account of new investment becoming sunk in future periods). Noting that in practice the elasticity of demand for energy is likely to be far lower than the levels assumed in Dobbs' model, our view is that this academic work strongly supports aiming up to a high percentile, broadly in line with past CMA practice.

In summary then MPW's suggestion that regulators should aim up just above the 50th percentile is based on flawed logic and should not be adopted.

PART B: ADJUSTING ALLOWED RETURNS FOR ANTICIPATED OUTPERFORMANCE

Ofgem currently proposes to make a downward adjustment of 50 bps to the allowed cost of equity for GD2/T2 to reflect its expectations that companies will outperform the targets that it sets at these price control reviews. It bases this proposal on the arguments made by Mason, Pickford and Wright (MPW) in the recent UKRN report on the cost of capital; and on its own analysis of past outperformance by companies.

In this second part of our report, we evaluate Ofgem's proposal. We examine:

- The justification for Ofgem's proposed approach, inspired by MPW and based on a range of analysis and assumptions, in section 3; and
- The potential wider consequences of Ofgem's proposal, in respect of the unintended incentive effects that it may create, in section 4.

3 JUSTIFICATION FOR AN ADJUSTMENT

We begin by examining Ofgem's motivation for making an adjustment to baseline returns to take account of anticipated outperformance, along with certain of Ofgem's key assumptions and assertions. We consider:

- the limited literature that exists on this proposal, i.e. the MPW part of the UKRN Cost of Capital paper;
- the historical evidence on outperformance, which forms the basis of the presumed problem that Ofgem seeks to correct;
- an overview of potential changes to RIIO regime at RIIO-2 that may mean that historical levels of performance provide no reliable guide to future outperformance;
- whether Ofgem has better instruments available to it to deal with the inherent information problem associated with regulating monopoly businesses;
- we undertake a cross check on the quantum of Ofgem's proposed adjustment, in order to put the scale of it in context; and
- finally, we comment on Ofgem's view that even if there is no outperformance then the proposed allowed level of returns will still be adequate as it will sit within the range it has identified.

KEY MESSAGES

- We disagree strongly with MPW's recommendation because their model is flawed, they provide no guide on how to implement their proposal, and their assessment of wider impacts is non-existent. Ofgem's proposal, which is inspired by the recommendation put forward by MPW, suffers from similar flaws.
- Historical evidence, considered over a suitable time horizon, shows that outperformance by energy networks has varied widely by sector and that regulation is not a one-way bet.
- Recent historical levels of outperformance are not representative of potential outperformance in RIIO-2 because the changes that Ofgem is considering implementing for RIIO-2 would curtail markedly the scope for outperformance.
- Ofgem's claim that alternative approaches to address the issue of excess outperformance are not feasible is manifestly incorrect given evidence from the water sector and from past energy network price controls, and the lessons to be drawn from the application of their own regulatory framework.
- If considered in terms of the equivalent totex underspend, Ofgem's proposed adjustment is highly material and varies substantially by company and sector. Ofgem has offered no explanation of why this variation across sectors is reasonable and justified.
- Ofgem should take no comfort from staying within the lower bound of its estimate. Our analysis of aiming up makes clear that setting AR at the bottom of the estimated range for the cost of equity makes it highly likely that allowed returns are below the true cost of equity.

3.1 Academic literature and regulatory precedent on ER vs AR

There is very little academic work that addresses the adjustment that Ofgem now proposes to implement for RIIO-2. As far as we are aware, MPW's treatment of this topic in the recent UKRN Cost of Capital paper is the only contribution to the literature. Similarly, we are unaware of any examples of such an adjustment being applied by infrastructure regulators in the UK or elsewhere. Unfortunately, the MPW model is deeply flawed.

MPW's conclusions arise from the impossible premise that the outcomes of a general equilibrium framework that assumes perfect competition and efficient capital markets can and should be found where the assumptions of perfect competition do not hold (i.e. in the case of a monopoly and its regulation). Having assumed away the logical inconsistency of this premise, MPW then recommend that regulators should put in place a mechanism to force close convergence between allowed return and expected return (RAR and RER in their notation), whilst at the same time assuming that no other consequences will arise from such a mechanism.

Unfortunately, MPW fail to consider the wider implications of forcing convergence, which can be readily inferred from the extensive body of regulatory theory and practice. This wider perspective confirms that it is impossible to simultaneously satisfy allocative, productive and dynamic efficiency, and that forcing allocative efficiency at the expense of productive and dynamic efficiency is unambiguously detrimental to customers' interests.

The MPW model is therefore incomplete – it approaches this problem through a very narrow lens, and it does not extend to incorporate the usual moral hazard and adverse selection models found in the regulatory literature, which would be necessary to evaluate the full set of implications associated with their recommendation.

Given its incompleteness, it is not a reliable basis on which to make the adjustment that Ofgem propose. As we discuss in section 4, once the wider implications of this adjustment are brought into consideration, then considerable harm is done to customers through undermining productive and dynamic efficiency. Regulators and policymakers in the UK and elsewhere have been very clear that customers' interests are best served by promoting productive and dynamic efficiency ahead of cost-plus regimes that promote allocative efficiency.

For all these reasons, plus a number of others set out in the Annex, we disagree strongly with MPW's recommendation. Their assessment of how to implement their proposal is non-existent and their assessment of the impacts of implementing it are incomplete. Ofgem's proposal, which is inspired by the recommendation put forward by MPW, suffers from similar flaws.

3.2 Historical evidence on outperformance

In the Finance Annex to its RIIO-2 December Consultation, Ofgem outlined proposals to adjust downwards allowed returns by 50 bps to take account of expected future outperformance. Ofgem characterised this a "relatively small reduction compared to historical outperformance of 200-300 bps".⁴⁶ Ofgem signalled its intent to apply this same blanket reduction in returns to all companies and sectors (noting that the December consultation pertains only to transmission and gas distribution).

Ofgem also set out its view that it lacks the capability to address this outperformance at source, owing to intrinsic asymmetries of information.

This creates a series of propositions that we can test by reference to historical evidence on outperformance.

- Does the evidence support the view that outperformance falls in the range 200-300 bps?
- If so, is the level of outperformance sufficiently common across sectors and companies?
- Does the evidence support the proposition that outperformance is essentially certain and unavoidable?

⁴⁶ Ofgem, RIIO-2 Sector Specific Methodology Annex: Finance, December 2018. Paragraph 3.166. https://www.ofgem.gov.uk/system/files/docs/2018/12/riio-2_finance_annex.pdf

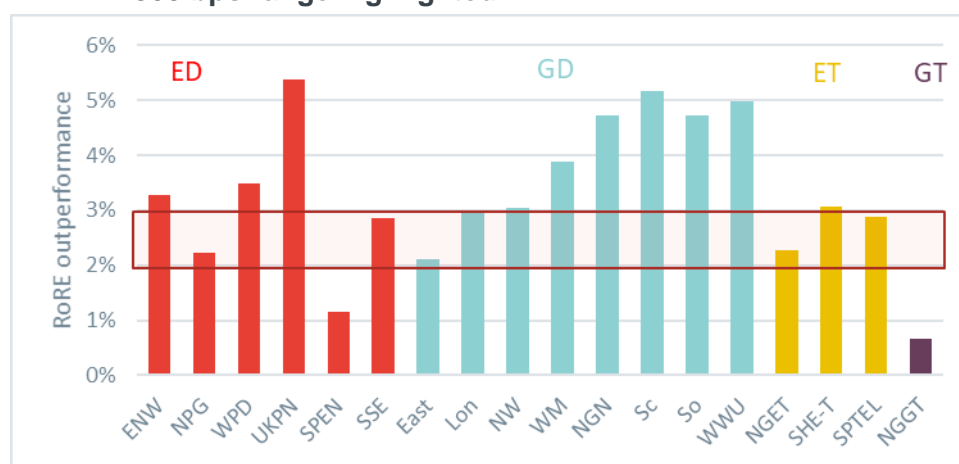
In this section we set out a range of evidence collated from various Ofgem publications that allows us to examine these questions. While in its December document Ofgem presents evidence back just one price control, we go back further, showing outcomes for DPCR4 and for the gas distribution price control that concluded in March 2007.

3.2.1 RIIO-1 performance

Notwithstanding the uncertainty over how companies may perform during the remainder of RIIO-1, companies are presently forecasting strong outperformance over the course of the RIIO-1 period and on average Ofgem's assessment of 200-300 bps may hold. From Figure 3 we can draw out two observations.

- Performance does vary strongly from sector to sector. The evidence does not provide strong support for a “one size fits all” adjustment. For example, NGGT presently forecasts outperformance of just 66 bps.
- Outperformance also arises from a range of different sources across sectors and companies. We observe that Ofgem has signalled an intent to change materially a range of other regulatory arrangements in ways that could affect different sectors in different ways. This may further weaken both the case for an adjustment in the first place, and the validity of a common adjustment.

Figure 3 RIIO-1 8 year forecast RoRE outperformance, 2016/17, with 200-300 bps range highlighted



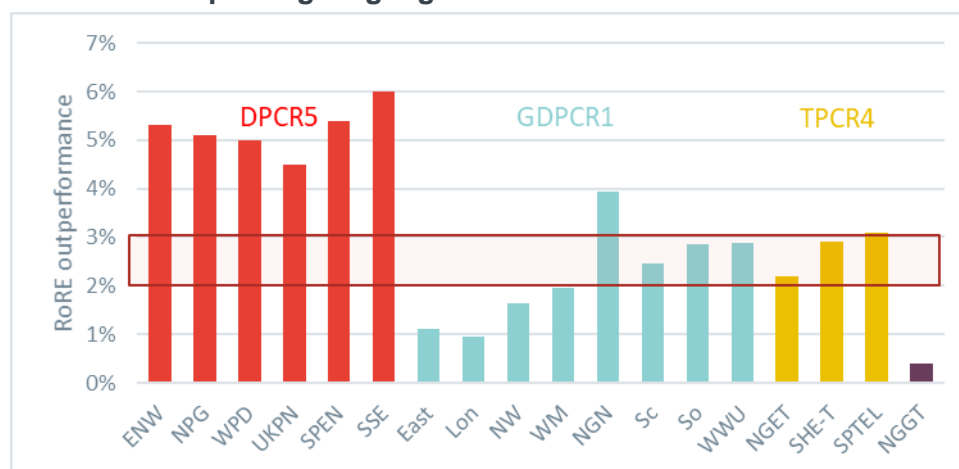
Source: Adapted from Ofgem RIIO-1 2016/17 sector annual reports

Note: Baseline cost of equity is equal to 0%

3.2.2 Pre-RIIO performance

The network companies in general also achieved strong outperformance in the price controls that preceded the introduction of the RIIO framework (i.e. DPCR5, GDPCR1 and TPCR4 and the TPCR4 Roll Over), as can be seen in Figure 4. However, again performance varies strongly from sector to sector and within sector (again we notice the relatively modest outperformance of NGGT for example).

Figure 4 5 year RoRE outperformance DPCR5, GDPCR5, TPCR4 with 200-300 bps range highlighted



Source: Adapted from Ofgem reviews of company performance for DPCR5, GDPCR1, TPCR4

Note: Baseline cost of equity is equal to 0%.

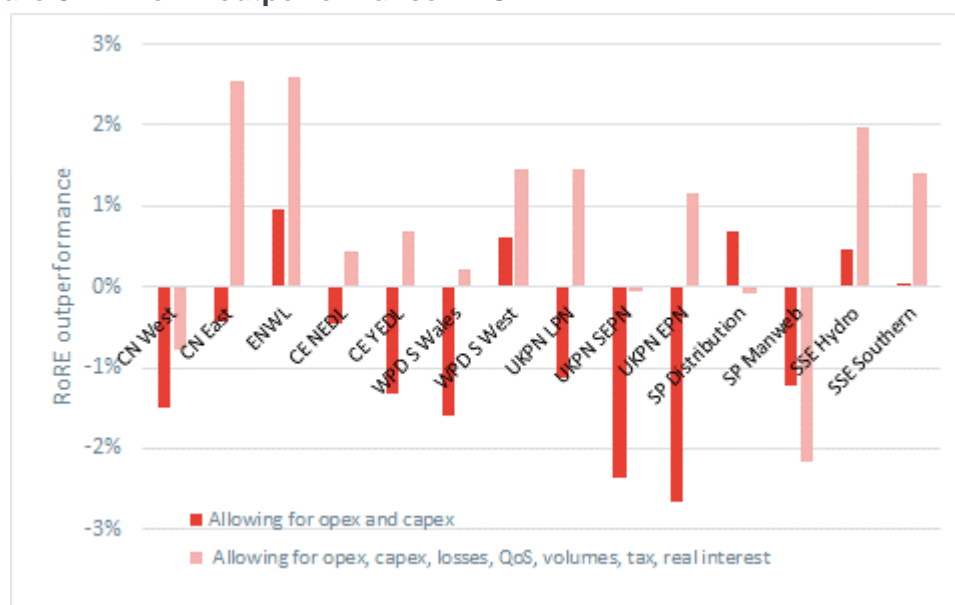
DPCR5 figures are provisional upper bound estimates, subject to Ofgem's closeout process.

NGGT was included in the TPCR4 regime

3.2.3 Evidence from earlier price control periods

However, a quite different picture emerges when one goes back one more price control, at least at the distribution level. Performance at DPCR4 was markedly different to that at later price controls (see Figure 5).

- The highest level of outperformance was approximately 250 bps and the sector average was relatively small, at around 80 bps.
- However, reported outperformance was materially increased for almost all DNOs by non-cost incentives, including the now abolished losses incentives.
 - On this we note that the performance reported below derives from Ofgem's preliminary assessment of RORE at DPCR4 prior to its close out of the losses incentive. The losses close out process resulted in companies returning a further £160m to customers. Headline performance was therefore weaker than is shown in the chart below.
- When non-cost incentive performance is stripped out, this reveals that 9 of the 14 DNOs underperformed on core costs.
- On that measure, the sector average in fact failed to reach the cost of equity allowance and underperformed by around 70 bps.
- There is no sense then in which a fuller analysis of the historical record supports any sense of regulation being a one-way bet. At DPCR4 clearly core cost and output targets were set at challenging levels that many companies were unable to live with.

Figure 5 RoRE outperformance DPCR4

Source: Adapted from Ofgem review of company performance for DPCR4

An even starker case study is provided by the gas distribution price control review that finished 31st March 2007. During this price control period it quickly became apparent that cost allowances were going to prove wholly inadequate to fund the investment needs of the networks. The companies ended up overspending their aggregate allowances of £1,312m by £864m, an overspend of 66%.⁴⁷ This required Ofgem to undertake an extensive exercise to understand the basis of the overspend and to derive a regulatory treatment. After an extended consultation, Ofgem decided that the companies would be exposed to a 31% of the net present value, a substantial hit.⁴⁸ Figure 6 shows Ofgem's treatment of the overspend.

⁴⁷ In 2005/06 prices. See Ofgem, Gas Distribution Price Control Review: Final Proposals, 2007. Page 45 <https://www.ofgem.gov.uk/ofgem-publications/48550/final-proposalspdf>

⁴⁸ Ofgem, Gas Distribution Price Control Review: One year control final proposals, 2006. Paragraph 3.21 <https://www.ofgem.gov.uk/ofgem-publications/48815/16340-one-year-control-final-proposals-document-final.pdf>

Figure 6 Treatment of gas distribution company overspend 2003/04 to 2006/07

Comparison of actual and allowed spend, £ million		
Total allowed capex and non-mains repex	£1,311.7	
Total actual spend	£2,175.9	
Overspend against allowance	£864.2	
As a percentage	66%	
Allocation of overspend	Amount	Allowed recovery?
Related party margins	£21.6	No
DN sales costs	£17.7	No
Under recovery of connections income	£31.1	No
Inefficient spend above allowance	£36.1	No
Efficient overspend	£671.4	Exposed to capital charges for 5 years
Reopener	£86.3	Full recovery
Total	£864.2	

Source: Adapted from Ofgem Gas Distribution Price Control Review: Final Proposals

3.2.4 Insights from the historical data

Returning to the questions outlined at the beginning of this subsection, we conclude:

- While recent evidence from RIIO-1 and its immediate predecessors offer some support to Ofgem's belief that outperformance of 200-300 bps can be expected on average, a fuller inspection of historical outperformance casts significant doubt on the validity of this assumption.
 - Outperformance varies significantly across sectors and over time and is therefore not a one-way bet. Past outperformance tells us that a markedly lower level of outperformance cannot be ruled out, and neither can future underperformance.
- There is a significant dispersion of performance across sectors, which casts doubt on the validity of applying a common adjustment to base returns across all sectors.

Consequently, the analysis that Ofgem has undertaken is selective and misleading, and cannot be the basis for the existence of the adjustment nor its calibration.

It is also of interest to reflect on why there is such a marked difference between current price control outcomes (and for the preceding period) and for those that were in place further back, even though the regulatory frameworks were recognisably similar and incentives for efficiency and innovation were broadly comparable. We believe that two explanations are likely to be important for the differences. The first is that the last two rounds of price controls (RIIO and its

immediate precursor) ran over the period immediately following the Great Financial Crisis (GFC). In contrast, DPCR4 and the price control in which gas distribution companies overspent materially both ran before the GFC, or at least before its full effects were felt.

The GFC unquestionably led to greater difficulty in forecasting the future path of the UK economy, which in turn drive greater uncertainty in regulators' forecasts of generic, sector-wide price control parameters. For example, it has become clear that real wages across the whole economy have grown at a considerably lower rate for far longer than predicted shortly after the GFC. It seems certain that GDPCR1 and DPCR5 will have been set in anticipation of inflationary pressures that did not materialise. Ofgem is already on record as saying that its RPEs for the GD sector were set too generously, with the benefit of hindsight, although it is worth noting that real wages have increased in recent years and the RIIO-1 period is not yet over. Nevertheless, taken together, this may suggest that Ofgem (in line with the vast majority of other forecasters) understandably failed to predict well the full effects of the GFC. Notably, this forecasting error is not the result of asymmetric information.

The second explanation is more relevant to the RIIO-1 controls. The RIIO model significantly increased the complexity of price control regulation in the energy sector, and new innovations were introduced. It is widely recognised that some of those innovations were extremely important and beneficial to customers. For example, the competition for business plans, allied with a reward structure for the quality of those plans, was a significant step to reduce the information asymmetry that Ofgem had been exposed to in the past. There is near universal agreement that the innovation brought forth much more disciplined business plans from the operators. Unfortunately, in the practical implementation of the new RIIO system, Ofgem miscalibrated the regime, embedding higher returns in the sector as a consequence. The lesson for Ofgem from the RIIO experience is to reflect on what it needs to do to remedy the faulty implementation of a basically sound system, rather than discarding it altogether.

3.3 Scope for outperformance at RIIO-2

In its proposals for RIIO-2 Ofgem is also consulting on a range of changes to the price control methodology, which would reduce the scope for outperformance in RIIO-2, compared to RIIO-1. Consequently, forecast outperformance in the RIIO-1 period (or indeed in periods before that) may not provide a reasonable guide to the potential for outperformance in RIIO-2.

Implementing a 50 bps reduction in AR *and* reducing outperformance opportunities, runs the risk of “double counting” the adjustments that might be necessary to bring Ofgem's cost of equity package into balance.

There are several areas in which changes are being contemplated.

- Promised tightened calibration of incentives through more use of price control deliverables and license obligations.
- Greater use of uncertainty mechanisms, including indexation.

- Price control duration reduced from 8 years to 5 years, limiting the forecasting horizon and the scope for more material departures between expectation and outturn.
- Dynamic target setting.
- Lower incentive rates.
- Introduction of Return Adjustment Mechanisms (RAMs).

Each of these proposed changes would individually reduce the scope for outperformance and in combination their impact could be material. We briefly assess the changes Ofgem has proposed and their potential impact on the scope for outperformance in RIIO-2 below⁴⁹.

Increased use of License Obligations and Price Control Deliverables

In RIIO-1, Ofgem enforced minimum standards of service and incentivised companies to deliver service improvements through its output incentive framework. This was comprised of licence obligations (that create minimum standards), price control deliverables (which companies could offer as specific commitments in their business plans) and financial incentives around agreed metrics (i.e. ODIs). For example, GDNs were given shrinkage and leakage targets against which they were measured. If GDN performance was better than the target they received a reward and if they missed the target they faced a penalty.

For RIIO-2, Ofgem is considering making increased use of licence obligations and price control deliverables, and making less use of financial incentives, which clearly reduces the opportunity for outperformance relative to the RIIO-1 framework.

For example, Ofgem has signalled the increased use of price control deliverables for outputs which are directly funded through the price control settlement. These deliverables may also be linked to licence obligations and uncertainty mechanisms (if the outputs are funded up-front) so that funding is returned to consumers where work has not materialised, has been delivered late or delivered to lower standards than expected. This would provide for underspend in certain areas (which would have resulted in outperformance in the past) to be clawed back.

Similarly, if Ofgem concludes that there is no need for further performance improvement in certain areas and some existing ODIs are translated into licence obligations that prescribe minimum standards, then there would be essentially no scope to outperform.

The results of these proposals will depend on how they are implemented and the balance of measures that Ofgem adopts between licence obligations, price control deliverables and ODIs. However, the signal appears to be towards more prescription of specific requirements and weaker financial incentives for outperformance.

⁴⁹ It is worth noting that this is a preliminary view based on Ofgem's consultation document. Ofgem is clear that it has not yet decided how to proceed and precise details of how adjustments may be implemented are not provided. A full appraisal of impacts could only be conducted once final proposals are known in all other areas.

Greater use of uncertainty mechanism and indexation

Since allowed revenues depend on forecasts of company costs, the RIIO-1 framework included some uncertainty mechanisms, which allowed adjustments to be made to network company revenues when there were material changes in cost requirements that were outside the company's control. In addition to these Ofgem is proposing to add a number of specific mechanisms.

- Introducing a cost of equity indexation, with the risk-free rate indexed to government bond yields.
- Implementing a new tax policy which could include a notional tax allowance that could be adjusted during or after the period if allowances materially differ from payments made to HMRC.
- Changing the treatment of Real Price Effects (RPEs), for example, through increased updates to the RPEs allowance during or at the end of the period.
- Introducing a focused 'use-it or lose-it' cyber resilience allowance – under RIIO-GD1 and ED1 companies were provided with ex ante allowances for general resilience work which included cyber costs and was subject to the TIM.

Ofgem is still consulting on how these uncertainty mechanisms will be implemented, so the impact of this package on outperformance scope cannot be quantified. Ofgem's intention is clear, however, which is to reduce the scope for returns to be made in respect of these activities.

Reduced price control duration

For each price control Ofgem must set a number of parameters for the duration of the price control. The longer the price control the greater the forecast error to which these parameters can be subjected. Therefore, reducing the length of the price control should reduce the scope for price control parameters to vary from their forecast values. This applies to both macro factors such as inflation and wage growth as well as micro factors such as the scope for efficiency improvement.

Ofgem is reducing the price control duration from 8 years to 5 years. This should reduce the scope for variation in financial performance of companies from levels forecast by Ofgem.

Dynamic target setting

Ofgem has also proposed that it will introduce dynamic target setting for some incentives. This would involve adjusting targets over the duration of the price control to account for improvements in each company's own and/or sector performance, and so that targets become more stretching over time.

The use of dynamic target setting is conceptually similar to having even shorter price controls. In general, in RIIO-1, targets for outputs or efficiency were set at the start of the price control period. Companies were then free to seek to outperform against these targets over the full length of the price control. Companies could earn financial rewards for outperformance against some targets. At the next price control Ofgem could take new data on output delivery and re-estimate the efficient frontier for costs. Ofgem could then reset price control targets

for the next period. This meant that companies were able to capture the value of outperformance on targets for the duration of the price control.

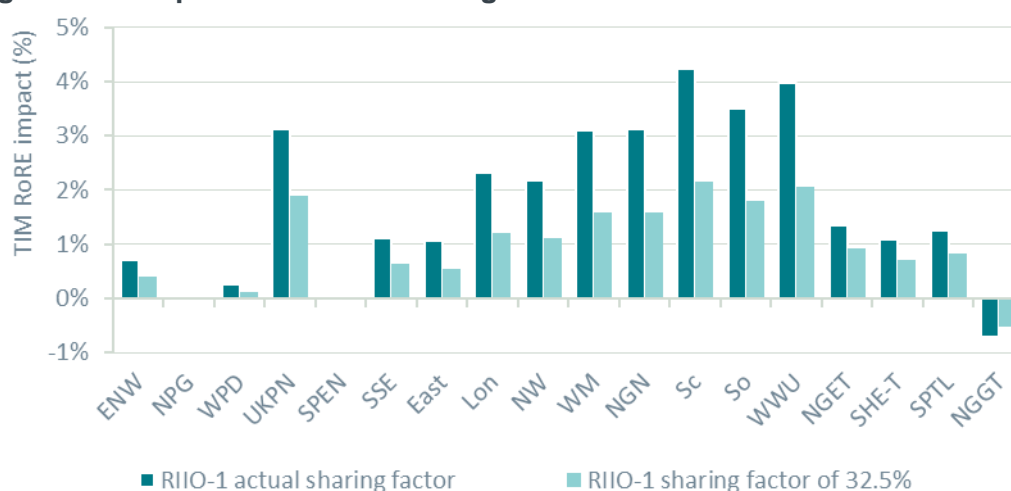
With dynamic target setting Ofgem will reset targets during the price control period. This will effectively mean that companies are not able to capture the benefits of outperformance against a fixed target for as long a period. If companies outperform the target, the target will get tougher. This consequently reduces the scope for outperformance. Note that we do not comment here on whether this change is likely to lead to better outcomes for consumers, we merely observe on its effect on potential outperformance.

Lower incentive rates

Ofgem has proposed to move to a blended sharing factor that is based on the proportion of a company's expenditure that can be considered as a high-confidence baseline and that which won't be considered as a low-confidence baseline. To calculate the blended sharing factor, Ofgem would classify elements of company's proposed totex as "high-confidence baseline" or "low-confidence baseline" depending on Ofgem's confidence on its ability to independently set a baseline cost allowance. The higher the proportion of "high-confidence baseline" in a company's plan (and the more confident Ofgem is that cost allowances are calculated using benchmarks that are outside of company's influence), the higher the sharing factor. The sharing factor (the proportion of over and underspend that a company retains) will be within a range of 15% to 50%. Depending on the view Ofgem takes when it appraises each company's cost base, it seems likely that the effective TIM applied at RIIO-2 will be less than that applied at RIIO-1. This will limit incentives for efficiency and innovation and reduce the scope for outperformance.

Figure 7 below provides an illustration of how this change may substantially curtail the potential for outperformance.

Figure 7 Impact on RoRE of changes to the TIM



Source: Frontier analysis based on RIIO-1 2016/17 sector annual reports

Assuming an average TIM incentive rate at the mid-point of the range Ofgem has suggested would have substantially reduced outperformance returns in RIIO-1 if the same level of totex underspend was achieved. For some of the GDNs such an adjustment would have reduced RoRE by 150bps or more.

RAMs

Lastly, Ofgem is proposing to introduce new Return Adjustment Mechanisms (RAMs) to prevent any returns that are materially higher or lower than expected. RIIO-1 did not have any such mechanisms. These mechanisms would automatically curtail any outperformance (and underperformance) that exceeds the proposed RAMs thresholds of ± 300 bps RoRE.

Ofgem is still considering how this will be implemented, but has indicated that the following two approaches are being considered:

- A sculpted sharing approach would mean that the RoRE or totex of each company would be adjusted when it moves away from a predetermined threshold (which could be based on the individual company's performance or on sector-average performance). These corrective adjustments would be larger, the more performance deviates from the predetermined threshold. This means that companies would share more of their performance with customers, the more they outperform.
- An anchoring approach would mean that when the sector RoRE exceeds a certain level, each company's RoRE would be adjusted so that the sector average is returned back to the threshold level. Ofgem has indicated its current preference is for this approach.
- Compared to Figure 3 above, the threshold of $\pm 3\%$ RoRE, applied against each company's individual total would have limited the outperformance of several companies. Figure 8 shows that at the industry level the $\pm 3\%$ RoRE threshold for RAMs would have limited outperformance in the gas distribution sector.

Figure 8 Sector average (unweighted) outperformance at RIIO-1



Source: Adapted from RIIO-1 2016/17 sector annual reports

Note: Estimates are RIIO-1 8 year forecast RoRE performance at 2016/17

By restricting the range of possible performance, even with a wide range, Ofgem is reducing the scope for average outperformance relative to RIIO-1.

Clearly, Ofgem is contemplating making many changes to the RIIO framework that was applied at RIIO-1. These proposed changes - coupled with learning by doing within Ofgem in respect of the established parameters of the regime – seem highly likely to reduce the scope for future outperformance compared to the recent past, so to base the adjustment solely on history means that, practically, Ofgem has over-estimated the adjustment.

3.4 Ofgem's unwarranted pessimism

Ofgem believes that inherent information asymmetries make it too challenging to forecast the extent of companies' ability to outperform cost of equity allowance.⁵⁰ As a result, the consultation document rules out dealing with this challenge through greater diligence in setting targets at each source of potential outperformance.

The existence of information asymmetries is an extremely weak justification for such a distortionary policy for several reasons.

First, information asymmetry and information problems in general are a feature of regulation. This has always been the case and the experience of UK regulation to date across many sectors is that regulators have sought to address this in ways that are aligned with longer term customer interests. Happily, the evidence provided by Pollitt for Ofgem suggests that this approach has been successful, in that customers have benefitted significantly from the application of incentive based regulation to energy network operators, in the form of lower network charges and enhanced quality of service.

Second, a significant driver of outperformance in the RIIO period has nothing to do with asymmetry at all. As noted in section 3.2.4, this results from the difficulties of forecasting sector wide parameters (such as RPEs) in the period after the GFC. Ofgem is already proposing to change its treatment of sector-wide variables at RIIO-2.

Third, Ofgem already has instruments to address information asymmetry. At the last RIIO reviews Ofgem ran what was effectively an "auction for information". This brought forth – by universal agreement – higher quality and more challenging business plans than previously, on which Ofgem should have been able to set robust targets. That Ofgem's use of the information revealed by the auction was faulty should not mean that Ofgem should abandon it (as it proposes) and replace it with this distortionary set of proposals. Rather, Ofgem should learn to implement its own policies more effectively.

The theory and practice of regulation leads to the very clear conclusion that the costs to the customer of encouraging information revelation and efficiency enhancing effort can be minimised if the regulator is diligent in the calibration of incentives and the setting of targets. It is now well-understood by most stakeholders that in several important areas Ofgem misapplied a basically sound regulatory framework at the RIIO-1 reviews. Ofgem should address these

⁵⁰ Ofgem, RIIO-2 Sector Specific Methodology Annex: Finance, December 2018. Paragraphs 3.162-3.164 https://www.ofgem.gov.uk/system/files/docs/2018/12/riio-2_finance_annex.pdf

implementation issues rather than invent a new remedy that ignores the underlying issues and creates new problems of its own.

These points are readily supported by the data on outperformance. As section 3.2.3 shows, if we examine the period prior to the GFC and prior to the introduction of unnecessary complexity at RIIO (that overwhelmed Ofgem) it is clear that outperformance was much lower and indeed could be strongly negative. This evidence does not support Ofgem's view that more effective recalibration is somehow impossible.

Looking across to other sectors, Ofgem itself acknowledges that cost of equity performance in the water sector is less skewed in favour of investors,⁵¹ which demonstrates that calibrating regulatory mechanisms with a balance between investor and customer gains is possible.

Figure 9 RoRE outperformance by water companies in 2017/18



Source: Adapted from Ofwat annual monitoring report

Note: Baseline cost of equity is equal to 0%.

Figure 9 shows water company performance in 2017/18 and whilst outperformance tends to be more pronounced than underperformance, it is notable that just half of the companies outperform. This was due to a mixture of gains and losses made across expenditure, financing and service incentives. The distribution of incentive variances was not as one-sided as in some recent Ofgem price controls either. Each of these incentive areas saw some companies lose, and other gain returns.⁵²

Ofgem also cites findings by the National Audit Office, which indicate that companies' performance against cost of equity allowance was mixed between 2010/11 and 2014/15, with 5 of the 18 companies not meeting their allowance.⁵³

Ofwat has been able to achieve this through the use of standard regulatory tools of setting suitable allowances and incentive mechanisms without resorting to the blunt instrument of an AR adjustment. The fact that this range of outcomes has been achieved through calibration at source, challenges Ofgem's view that it is

⁵¹ Ibid. Page 98

⁵² Ofwat, Monitoring financial resilience, 2018. Page 10 <https://www.ofwat.gov.uk/wp-content/uploads/2019/01/Monitoring-financial-resilience-2018-Report-Final.pdf>

⁵³ National Audit Office, The economic regulation of the water sector, 2015. Page 30 <https://www.nao.org.uk/wp-content/uploads/2014/07/The-economic-regulation-of-the-water-sector.pdf>

inherently too challenging to achieve without adjustments at the headline expected returns level.

In summary, Ofgem needs to explicitly recognise that dealing with information asymmetry is part of its job, and it is possible to undertake this task in a way that is aligned to, and supportive of, an incentive based model that benefits customers. It should not discard this framework in favour of arbitrary and distortionary adjustments that will damage customers' interests.

3.5 Assessment of the magnitude of Ofgem's proposed adjustment

Even if there were reasons to believe that network companies could on average expect to outperform regulatory assumptions, and that an adjustment to take account of this was necessary, an ex-ante adjustment of 50 basis points on the RoRE uniformly across companies and sectors would be a blunt instrument to achieve this end. It is unclear why Ofgem considers that it would not be possible to address any concerns at source.

In proposing to make this adjustment, Ofgem undertook one sense check, i.e. comparing its proposed 50 bps adjustment against historical outperformance, as we have set out above. Our concerns with this cross check are set out above.

Given the importance of the change that Ofgem proposes, we consider that Ofgem should have undertaken further cross checks of its approach. Below we set out the outcome of a further cross check on what Ofgem proposes, derived from converting Ofgem's proposed ER vs AR adjustment into the equivalent efficiency "stretch factor" that would need to be applied to totex allowances in order to achieve the same effect.

Due to the different sizes of the RAV, totex and totex incentive rates across different sectors and companies, 50 basis points of RoRE would translate to a wide range of different equivalent totex outperformances, all else being equal. To show this, we take the latest estimates of notional regulated equity, totex, and totex sharing rates from Ofgem's Price Control Financial Model (PCFM), and impute the percentage totex outperformance needed to deliver a 50 basis point post-tax return on equity. Specifically,

- We start by estimating the amount of profit 50 bps equates to, which involves multiplying 0.5% with the regulated equity from the PCFM;
- We then divide this profit by the totex incentive strength ratio (the proportion of out/under-performance that the company keeps) to work out the required totex outperformance; and
- Dividing this by the allowed totex in the year gives us the percentage totex outperformance rate required to deliver Ofgem's target level of reduction.

We start with the gas distribution sector. Figure 10 below shows by what percentage GDNs would have to outperform on totex, all else being equal, in order to earn 50 bps RoRE within each year of the GD1 period.

Figure 10 Implied % totex outperformance of 50 bps RoRE in GD1

Licence	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21
East	2.69%	2.70%	2.71%	2.73%	2.72%	2.49%	2.62%	2.67%
London	2.23%	2.41%	2.27%	2.20%	2.25%	2.01%	2.12%	2.20%
North West	2.52%	2.19%	2.48%	2.80%	2.84%	2.37%	2.43%	2.51%
West Midlands	2.61%	2.75%	2.44%	2.55%	2.80%	2.29%	2.33%	2.44%
Northern	2.35%	2.20%	2.25%	2.34%	2.46%	2.21%	2.24%	2.28%
Scotland	2.79%	2.44%	2.53%	2.52%	2.76%	2.09%	2.35%	2.38%
Southern	2.88%	2.73%	2.76%	2.65%	2.61%	2.28%	2.52%	2.58%
Wales & West	2.36%	2.49%	2.54%	2.58%	2.92%	2.18%	2.22%	2.27%

Source: Totex, Regulated equity, and sharing factors taken from Ofgem latest PCFM., Frontier analysis

This shows that GDNs would have to outperform around 2.5% on totex allowance within GD1, with a totex incentive rate around 60%-65%. Looking forward into RIIO-2, where Ofgem has signalled a potential tightening of the incentive rate (with a range between 15%-50% presently highlighted), the implied percentage totex outperformed required would be even higher. Figure 11 shows the implied percentage totex outperformance required with an illustrative 30% incentive rate.

Figure 11 Implied % totex outperformance of 50 bps RoRE for GDNs with 30% sharing factor

Licence	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21
East	5.65%	5.67%	5.70%	5.74%	5.72%	5.24%	5.51%	5.61%
London	4.68%	5.06%	4.77%	4.62%	4.73%	4.23%	4.45%	4.62%
North West	5.29%	4.61%	5.20%	5.88%	5.96%	4.98%	5.11%	5.27%
West Midlands	5.48%	5.78%	5.13%	5.36%	5.88%	4.82%	4.90%	5.12%
Northern	5.01%	4.70%	4.80%	4.99%	5.25%	4.70%	4.78%	4.87%
Scotland	5.94%	5.18%	5.37%	5.36%	5.87%	4.43%	4.98%	5.05%
Southern	6.11%	5.81%	5.85%	5.63%	5.55%	4.84%	5.35%	5.47%
Wales & West	4.97%	5.23%	5.35%	5.44%	6.15%	4.58%	4.68%	4.79%

Source: Totex and regulated equity taken from Ofgem latest PCFM., Frontier analysis

As the figures above shows, the required totex outperformance required to earn the 50 bps RoRE increases proportionally to the decrease in totex incentive rate.

Next, we move on to examine the gas transmission sector. Figure 12 below shows by what percentage NGGT would have to outperform on totex, all else being equal, in order to earn 50 bps RoRE within each year of the GD1 period.

Figure 12 Implied % totex outperformance of 50 bps RoRE in GT1

Licence	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21
NGGT TO	9.34%	9.69%	9.42%	7.90%	6.18%	8.88%	11.67%	13.11%

Source: Totex, Regulated equity, and sharing factors taken from Ofgem latest PCFM., Frontier analysis

At an incentive strength of 44.36%, the required totex outperformance is significantly higher than for the GDNs as shown in Figure 10. We also note the between-year difference for required outperformance due to the fact that allowed totex itself has significant fluctuations across years. If one assumes a lower totex

incentive strength at GT2 of, say 30%, the issue would be even more exacerbated. Figure 13 below shows the implied totex outperformance required for 0.5% RoRE.

Figure 13 Implied % totex outperformance of 50 bps RoRE for GT with 30% sharing factor

Licence	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21
NGGT TO	13.82%	14.33%	13.93%	11.68%	9.14%	13.13%	17.26%	19.39%

Source: Totex, Regulated equity, and sharing factors taken from Ofgem latest PCFM., Frontier analysis

The figures for the electricity distribution sector is similar to that of the gas distribution sector. Figure 14 below shows the same analysis for ED1.

Figure 14 Implied % totex outperformance of 50 bps RoRE in ED1

Licence	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
ENWL	1.96%	2.32%	2.01%	2.04%	2.06%	2.10%	2.06%	2.16%
NPgN	1.98%	2.06%	2.31%	2.22%	2.27%	2.48%	2.67%	2.73%
NPgY	1.97%	2.33%	2.43%	2.16%	2.31%	2.44%	2.64%	2.60%
WMID	1.66%	1.69%	2.02%	1.99%	1.96%	2.00%	2.06%	2.08%
EMID	1.66%	1.69%	1.98%	2.03%	2.07%	2.05%	1.98%	2.09%
SWALES	1.57%	1.57%	1.83%	1.56%	1.78%	2.01%	2.13%	2.13%
SWEST	1.44%	1.32%	1.59%	1.61%	1.70%	1.76%	1.82%	1.81%
LPN	2.57%	2.42%	2.22%	2.12%	2.10%	2.24%	2.43%	2.59%
SPN	2.86%	2.50%	2.51%	2.22%	2.35%	2.46%	2.49%	2.60%
EPN	2.80%	2.59%	2.42%	2.31%	2.35%	2.47%	2.52%	2.67%
SPD	2.72%	2.53%	2.52%	2.58%	2.67%	2.83%	2.99%	3.07%
SPMW	2.21%	2.18%	2.21%	2.68%	2.73%	2.73%	2.98%	3.33%
SSEH	2.04%	1.82%	1.94%	1.84%	2.14%	2.18%	2.17%	2.26%
SSES	2.32%	2.17%	1.95%	2.07%	2.32%	2.32%	2.28%	2.38%

Source: Totex, Regulated equity, and sharing factors taken from Ofgem latest PCFM., Frontier analysis

Finally, Figure 15 below shows the results for ET1.

Figure 15 Implied % totex outperformance of 50 bps RoRE in ET1

Licence	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21
SHE-Transmission PLC	2.07%	1.31%	1.21%	1.86%	2.45%	4.36%	4.19%	11.52%
SPTL	2.47%	2.45%	2.22%	2.64%	4.15%	5.96%	5.33%	6.70%
NGET TO	3.08%	4.28%	4.13%	4.58%	5.09%	3.22%	4.12%	4.68%

Source: Totex, Regulated equity, and sharing factors taken from Ofgem latest PCFM., Frontier analysis

The figures above show that not only does 50 bps in RoRE represent a significant totex outperformance for most companies on average, but also the required outperformance is not equally distributed across companies and sectors. Ofgem has not presented convincing evidence to support the expectation of outperformance from different companies according to this distribution.

A number of conclusions emerge from this analysis.

- That magnitude of the efficiency stretch target implied by Ofgem's adjustment is material in every case. Had Ofgem sought to apply such a discount at the

time it struck the RIIO-1 price controls, it would have needed to provide a robust evidence base as to why such an adjustment was necessary.

- We are reminded of the blanket adjustment that Ofgem decided to apply to the electricity distribution sector at RIIO-ED1, in order to lower allowances to take account of their view of the future benefits that smart grids might provide (the so-called SGB adjustment). The magnitude of this adjustment was appropriately 2% of totex, at the very low end of the range that we have identified.
- This adjustment was appealed at the CMA by NPg, based on the argument that it was unjustified and disproportionate.
- The CMA found in favour of NPg and quashed this aspect of Ofgem's decision, noting that '*The exercise of regulatory discretion remains bounded and subject to legal principles*'.
- Ofgem will need to consider carefully the nature of this proposed judgement in the light of this precedent.
- The proposed deduction of 50 bps from allowed equity returns gives rise to a different level of challenge across sectors and for each individual company. To make the changes that Ofgem proposes it would need to explain why this dispersion in challenge was reasonable.
- Given Ofgem's signal that it intends to lower the incentive rate applied to totex, the implied efficiency challenge that companies might be faced with at RIIO-2 may increase materially, casting further doubt on the reasonableness of Ofgem's 50 bps ER vs AR adjustment.

Consequently, this 50 bps adjustment would amount to an arbitrary, uneven and unjustified requirement for companies to outperform their price control targets, and in carrying out such an adjustment Ofgem may be considered lacking in respect of the need to have regard to the need to secure that licensees are able to finance their activities.

3.6 Ofgem's false comfort from staying just within the lower end of the range

Ofgem appears to argue that even if it is wrong in its assessment of expected outperformance and in practice the companies earn no additional profits, its proposal is still robust. It draws this conclusion with the belief that ER (which under this assumption would equal AR) would still sit within the range it has identified as reasonable. However, setting the allowed return equal to the lowest point of the estimated range completely ignores the need to "aim up" that has been an intrinsic part of regulatory settlements to date, and which is well-supported by the literature.

As discussed in part A of this report, this would have potentially serious implications for the economy and consumer welfare, a concern captured in full in UK regulatory precedent, particularly that of the CMA and by the most relevant academic work.

Given that Ofgem estimates a range for the cost of equity, it is reasonable to expect that it is more likely than not that the true value for the cost of equity is greater than

the lower bound of the estimated range. Indeed, if the true value for the cost of equity is known to be distributed based on any continuous probability distribution with a lower bound equal to Ofgem's lower bound estimate and then the probability of the allowed returns being set too low if outperformance is expected to be zero is 100%.⁵⁴

Upon examination it is clear that Ofgem's argument that its proposal is robust to scenarios where companies do not expect to earn additional profits has no merit, and should provide no comfort to Ofgem.

⁵⁴ This may be thought of most simply using the uniform distribution with a lower bound equal to the lower end of the cost of equity range estimated by Ofgem, but the logic generalises to all continuous probability distribution functions with a lower bound.

4 POTENTIAL EFFECTS OF OFGEM'S PROPOSALS

A range of unintended and negative consequences would arise from Ofgem's proposal to reduce baseline returns to reflect anticipated outperformance, which we explore in this section. Ofgem has not considered these wider consequences, and should do so if it wishes to implement this proposal.

KEY MESSAGES

Ofgem's proposal would have serious negative consequences for confidence in the sector and for the incentives provided by the regulatory framework.

- The stability and predictability of the process for setting the RAV and allowed returns is the bedrock of investor confidence in UK regulated assets.
- Arbitrary, poorly evidenced adjustments to these two elements of the price control undermine this confidence.
- Ofgem's proposal is tantamount to writing down the RAV, which the CMA has ruled against previously.
- The creation of the expectation that the AR adjustment in future price controls will depend on outperformance in this price control period will undermine incentives for efficiency and innovation. The AR reduction would act as a tax on effort.
- Investment decisions would be distorted by the adjustment. Good value projects which would have passed the hurdle rate absent this adjustment will now not do so.
- The blanket nature of the adjustment is by definition badly targeted, which violates the principles of better regulation that Ofgem should have regard to. It could also frustrate the focused appeal rights within the regulatory framework.

4.1 Erosion of investor confidence and increased investor risk

The creation and maintenance of Investor confidence in regulatory arrangements is a key factor in protecting the long term customer interests. The past stability and predictability of the WACC-setting process is the cornerstone of the UK regulatory model, where the focus has been squarely on achieving two highly desirable outcomes: maintaining investor confidence in order to keep investors' true cost of capital of investing in the industry low; and stimulating significant dynamic efficiency improvements (in large part through a predictable approach to remuneration of assets and performance). Enhanced investor confidence will ultimately benefit customers, as reduced financing costs and a higher level of productivity wash through regulatory processes for customers' ultimate benefit.

Ofgem's proposed arbitrary adjustment to baseline returns has the potential to do material harm to investor confidence, distort managerial behaviour, and so act against the interest of customers.

The slow building of investor confidence

One of the successes of network regulation in the UK to date has been the credibility that has been built up with investors that past investments will be remunerated and that the value of sunk investments will not be expropriated. This credibility reduces the perceived risk of investing in regulated companies with very long asset lives (the well-known problem of regulatory hold up, or the commitment problem), reducing the rate of return that regulators need to offer to attract capital. Credibility also helps to stimulate significant dynamic efficiency improvements - in large part through a predictable approach to remuneration of assets and performance.

This credibility has been built on the foundation of:

- the integrity of the RAV;
- and the stability of returns on the RAV, set through a clear, well understood and well established method.

Credibility has been developed over a long period of time and through multiple regulatory decisions repeatedly demonstrating commitment to these foundational aspects of economic regulation in the UK.

The integrity of the RAV

When the integrity of the RAV has been challenged by regulatory decisions, appeal bodies have stepped in to protect the value of sunk investments from retrospective confiscation. This was demonstrated in the CMA (CC) 2012 determination in the case of Phoenix Natural Gas Limited (PNGL). In this case the Utility Regulator proposed a retrospective TRV (RAV) adjustment relating to outperformance over the period 1996-2006. This was intended to claw back value earned by outperformance for the benefit of customers. On appeal the CC decided in favour of PNGL and that the TRV should not be subject to retrospective adjustments.

In its decision the CC noted that *"the inclusion of outperformance was an important incentive element in a system of risks and rewards that has provided benefits to consumers"*.⁵⁵ The CC also highlighted the impact of decisions about the remuneration of past investments on investor confidence.

"We consider that a reduction in the TRV, with its consequent effect on the expectations of both PNGL and its investors, can have an impact on the perception of regulatory stability and can damage investor confidence in the regulatory framework. We are not able to quantify the effects of a lack of regulatory stability, but we consider that the qualitative evidence suggests, notwithstanding the statutory position and the right of appeal, that such an effect exists and that it is

⁵⁵ Competition Commission, Phoenix Natural Gas Limited price determination, 2012. Paragraph 23 https://assets.publishing.service.gov.uk/media/551948b8e5274a142b000186/phoenix_natural_gas_limited_price_determination.pdf

not so small that it can be disregarded. Any increase in the cost of capital would feed through into relatively higher prices to customers.”⁵⁶

A stable process to set returns to investors

The process for UK regulators estimating the cost of equity and setting returns for investors is well established and has been based on slow moving precedent. The general process is to:

- Estimate the cost of debt
 - this can be benchmarked and based on the debt market indices
- Set the notional gearing
- Estimate the parameters for calculating the cost of equity
 - the risk-free rate;
 - the equity risk premium;
 - an asset beta; and
 - a debt beta (often zero).
- Calculate the cost of equity

This broad process has been followed for regulatory decisions in the UK for over 30 years and in respect of each parameter regulators have tended to respect precedent and evolve their decisions slowly over time as new information emerges. Investors are then given the confidence over current and future methods, that data will be reflected in a measured way and that the future direction of travel will be signalled clearly.

Many of the parameters that inform the calculation of the cost of equity cannot be known with certainty. Instead they are estimated with uncertainty. Regulators have used ranges of values for the input parameters to estimate a range for the cost of equity. This range has then been used to inform the point estimate for the AR within a price control. This has usually included some element of “aiming up” in the final decision, either explicitly or implicitly. Over the last 30 years regulators have not made arbitrary downwards adjustments from the range estimated when setting the AR.

Novel and/or arbitrary adjustments dent investor confidence

In 2012 Ofwat proposed to make license modifications for sewerage and water companies that would have granted it broad discretion over the nature, number and length of price controls to be applied going forwards. These proposals would have greatly reduced the certainty that investors had about the regulatory process and the confidence that they had in Ofwat. Ultimately these proposals were withdrawn following feedback from investors and industry. However, the episode demonstrated the potential for the confidence in the regulatory framework to be severely damaged by proposals which increase regulatory risks.

⁵⁶ Competition Commission, Phoenix Natural Gas Limited price determination, 2012. Paragraph 33 https://assets.publishing.service.gov.uk/media/551948b8e5274a142b000186/phoenix_natural_gas_limited_price_determination.pdf

In response to Ofwat's proposals Moody's credit rating agency issued a note stating:

*"The apparent direction and scale of proposed changes raise questions as to the continued stability and predictability of the regulatory environment, which is a key factor in Moody's rating methodology for water companies. The regime for England and Wales is currently scored at Aaa, reflecting our assessment of the regulatory regime as independent and well established, with a more than 20-year track record of being predictable, stable and transparent. Moody's will review its scoring for this sub-factor in light of the changes introduced or likely to be introduced by the government and Ofwat."*⁵⁷

In a similar vein Fitch credit ratings agency issued a note stating:

*"Situations where at some distant point in the future a material adjustment of RAV or prospective tariffs through the regulator takes place without any previous indication would be viewed negatively by Fitch, and may result in an amendment to prevailing ratio guidelines to adequately capture the risk profile of the sector."*⁵⁸

Ofgem is now proposing to make a downward adjustment to the AR. The proposal risks reducing investor confidence in the Ofgem regime that has been built up over a number of years and regulatory decisions.

The proposal is akin to expropriation of sunk investments

As we have described, the RAV and the AR on the RAV are the foundation of regulatory stability that has been built up in the UK. It is ultimately the combination of these two factors that determine returns to investors. The funds that flow to investors can be equally diminished by a retrospective reduction in RAV and by an arbitrary downward adjustment to the AR earned on the RAV.

In applying its adjustment to the WACC, which is then applied to the RAV, Ofgem is in effect retrospectively clawing back the value of past investments. This runs counter to established regulatory practice in the UK, and will unquestionably undermine investor perceptions of risk and company behaviour.

Ofgem's arbitrary adjustment to baseline returns will dent investor confidence

There is no known regulatory precedent for the adjustment to baseline returns that Ofgem has signalled it is minded to make. The level of the adjustment is arbitrary. The conceptual and evidential basis for the proposal is not sufficient to justify such a departure from established regulatory practice in such a critical part of the regulatory settlement.

We anticipate therefore that this proposal will lead to a material erosion of investor confidence. Initial reaction from Moody's supports this view:

⁵⁷ Moody's, 29 February 2012, 'UK Water Companies: Ofwat's Future Price Limits and White Paper Increase Sector's Credit Risk'

⁵⁸ Fitch Ratings, 4 May 2012, 'Future Price Limits for the UK Water Sector'

*'we would regard it, if reflected in final determinations, as a credit negative divergence from established regulatory practice.'*⁵⁹

4.2 Weakened incentives for efficiency and innovation

Ofgem intends to calibrate its adjustment to allowed returns by reference to evidence on recent outperformance. For example, it says that it will continue to evaluate its policy in this area and explicitly says that this will include assessing 'additional information on company outperformance (some of which we have recently received via the RFPR process)'.

Quite clearly, under Ofgem's proposal, if a company outperforms by some additional increment in a regulatory period then it must now expect AR in subsequent periods to be reduced by some related quantum (i.e. for a greater wedge to be applied at the next price control). This effectively introduces a penalty for outperformance in the current period that must be paid in the next period. This is akin to a further sharing factor on outperformance in addition to the ones already envisaged, and so will weaken operators' incentives to improve performance.

The damage this proposal will do should not be taken lightly: strong incentives have encouraged the operators to outperform the UK economy's productivity performance by 30% since privatisation. This performance has fed directly into customers' bills and improved standards of service.

By signalling that current and future outperformance will affect its future calibrations of the downward adjustment Ofgem weakens incentives and so compromises future productive and dynamic efficiency to the longer term detriment of customers.

Moreover, that Ofgem (following MPW) has given no consideration of the efficiency consequences of this proposal, is astonishing in itself for an economic regulator.

4.3 Distortion of incentives to invest

The headline allowed return is a critical input to operational level decisions made by company management, since it is a key input to project appraisal and investment planning.

When undertaking cost and benefit analysis (CBA), companies will typically assess the potential return of the project or programme against their internal hurdle rates. If the return expected from the project is less than the hurdle rate, then it would typically be rejected. The hurdle rates used in such CBA templates will be based on the company (or shareholder) view of the required level of return (or cost of equity in particular), sometimes with adjustments for headroom to account for failed projects.

⁵⁹ Moody's, 14 February 2019, 'Credit quality likely to weaken in RIIO-GD2 regulator period'

Given this framework, it is clear that Ofgem's proposal has the potential to distort managerial incentives to undertake specific investments *even if* Ofgem's wider regulatory framework would ensure that in the round overall returns are adequate.

If the baseline allowed return on equity is set below the true cost of equity, as currently implied of Ofgem's proposed methodology, then no specific project CBA would be expected to pass unless undertaking that project also brings some further benefit from outperformance against incentives (e.g. cost outperformance, or outperformance on some output category that is subject to a financial incentive) in order to top up the inadequate returns from Ofgem's low baseline to at least the hurdle rate.

However, outperformance occurs not only at the level of the individual project, but also at the level of collections of projects (across the spatial dimensions of the network and over time), and indeed may be completely unrelated to an particular investment activity at all. Consequently, it is highly unlikely that the investment appraisal process would pass projects that would otherwise have been passed without Ofgem's downward adjustment. Investment decisions will be therefore distorted and investment will be likely to be discouraged.

This distortion of incentives to invest is a variant of the aiming up question as analysed in the Dobbs model. In the Dobbs model the appraisal of whether to invest or not is straightforward as he includes no wider incentives. Here, the investment decision is more complex, but the fundamental risk is the same, i.e. that certain needed investments are not financially viable when assessed on their own merit, and hence are not delivered, to the detriment of customers.

4.4 Loss of clarity over price control calibration

This adjustment is a blunt tool to address the issue that Ofgem claims to have identified. This gives rise to a range of negative consequences for the clarity of the price control.

- The effective performance levels required of the company are no longer clear.
 - Ofgem will set a wide range of targets as it sets cost allowances and calibrates a wide range of incentives.
 - But in practice under this proposal Ofgem is requiring companies to outperform this range of targets, but would provide:
 - no precision as to where it expects this additional outperformance; or
 - any indication as to why the magnitude of this additional outperformance is justified.
- This loss of clarity is compounded when the scale of the adjustment to AR is set arbitrarily.
- The adjustment is, by definition, not well targeted and so violates the principles of better regulation, which Ofgem must have regard to.
- The arbitrary and unfounded nature of the adjustment, coupled with its de-linking from the other elements of the price control package undermines

stakeholder engagement with the process and likely weakens the effectiveness of the appeal arrangements.

If outperformance is expected, this is best dealt with through other elements of the price control design. In particular, Ofgem should revisit the very mechanisms that are geared to directly address asymmetric information, namely the auction for information that it developed at the RII0-1 reviews and which is capable of being implemented more effectively still. In addition, Ofgem is already considering addressing the sources of outperformance that have nothing to do with asymmetric information, namely the mis-forecasting of sector-wide parameters such as RPEs. Ofgem should avoid using a crude and distortionary mechanism such as this, since it will undermine the opportunity to benefit from the most valuable source of outperformance that has hitherto enormously benefitted customers – efficiency and innovation.

ANNEX A OVERVIEW OF THE MPW MODEL

Introduction

While the main focus of this paper is Ofgem's proposed approach to fixing its point estimate for the allowed return on equity, it is necessary also to address aspects of the recent UKRN paper on the cost of capital (authored by Burns, Mason, Pickford and Wright). That paper provides a reasonably extensive discussion on aiming up, which we review below. As is made clear in the December consultation paper, the UKRN paper provides Ofgem with the inspiration for its proposed approach to adjusting for anticipated outperformance.

The UKRN cost of capital paper is extensive and wide ranging, but for this present paper we focus on only two key topics:

- the basis for aiming up within some range of uncertainty around required returns (which we cover here in Part A); and
- the proposal to explicitly account for anticipated outperformance when determining how to aim up (which we cover in Part B).

In respect of these topics (and indeed several others) the authors of the UKRN paper, were unable to reach an agreement on what recommendations to provide to regulators. As a result, the coverage of aiming up and what is now being calling the ER vs AR calibration within UKRN is contained in two separate sections, one authored by Mason, Pickford and Wright (MPW) (most relevant for this paper Sections 8.2 and 8.3 plus Appendix I), and the other setting out a counter view on ER vs AR authored by Burns (Section 9.3). The discussion in the UKRN paper is made more involved by disagreement over other essentially unrelated topics that we do not need to cover here. Our review of UKRN therefore highlights the key relevant arguments and areas of debate.

In the following subsections we walk through the key elements of MPW's discussion on aiming up and adjusting for expected returns, and offer a detailed rebuttal. In respect of aiming up, we have some important areas of disagreement albeit within a broadly shared and accepted understanding of what the literature tells us, and we disagree with several aspects of how MPW have sought to apply the framework. Our objections to MPW's proposed application of an "informational wedge" (W_I) are profound, indeed absolutely foundational.

Definitions

Before proceeding to a discussion of the arguments, it is necessary to set out the definitions adopted by MPW.

MPW set up a simple framework, starting with CAPM-WACC, which they define as the annual return that lenders and equity investors require in exchange for making finance available to a regulated firm.

It is important to stress that it remains our view that no sensible regulator would contemplate setting allowed returns in line with MPW's CAPM-WACC concept. Burns provides a comprehensive review of these reasons (such as the need to

allow for embedded debts, some lag in resetting values, an adherence to longer run estimates for reasons of consistency and the rational desire to “aim up”). We note that MPW did concede that there may be valid reasons why one should depart from this pure finance concept (the estimation of which may vary daily based on capital market evidence).

In setting a *regulatory WACC* allowance then MPW introduce two further return concepts and two related “wedges”.

First, W_R is defined as the “regulatory wedge”, reflecting the potential to depart from a pure CAPM-WACC⁶⁰ for the regulatory reasons set out above.

MPW then define Regulatory Allowed Return:

RAR is equal to CAPM-WACC plus W_R

In its December paper Ofgem has simply referred to this concept as AR. For the purposes of this report, we assume that Ofgem would agree that the CAPM-WACC benchmark of MPW is rejected, and therefore the main question reduces to whether in setting AR/RAR one should aim up beyond some central estimate.

Second, MPW introduce a second wedge that ‘*captures expected outperformance*’, the informational wedge, W_I , which is the additional expected return derived from beating regulatory targets and hence earning marginal rewards. By adding W_I to RAR, MPW arrives at Regulatory Expected Returns (RER, shortened to ER by Ofgem). Hence MPW defines that:

RER is equal to RAR plus W_I

MPW then signal their view of the likely sign and magnitude of W_I noting that ‘*the informational advantage regulated firms possess will almost certainly result in a positive value of the “informational wedge”*’.

RER is then, in MPW’s proposed approach, what investors in a regulated company expect as compensation for their investment in the firm, over and above baseline allowed returns (RAR), once the investor’s expectations about outperformance across all relevant areas is factored in.

MPW argue that regulators should seek to ‘*set*’ the total expected mark-up over CAPM-WACC, comprised of the two wedges described above, at some predetermined level that they consider adequately achieves the objective of aiming up. Two conclusions flow from this framework:

- that regulators should “aim up”; and

⁶⁰ As far as we understand, MPW regard CAPM-WACC as a current (i.e. reset at a very high frequency) midpoint estimate of WACC, which they regard as the best estimate. Any departure from this they regard as suboptimal. While it is not central to this paper, we disagree strongly for a number of reasons. For example, most regulators will take account of embedded debts in their calculation of WACC. MPW’s framework treats this as being a bit generous to businesses because it might result in an allowance that is above the spot rate (although we note that this is only the case if the coupon on historical issuance are higher than current and forecast). But, if the efficient financing approach is to stagger debt issuance, then the best estimate of WACC should compensate for embedded debt costs, not just spot rates. So setting the allowance at a different level to the spot rate is an attempt to find the best estimate of WACC, not a departure from it. The same applies to aiming up, under which regulators take explicit account of how to balance competing risks in the presence of uncertainty. The choice of where to locate a spot estimate under that framework is an attempt to derive the best WACC, even if it is a departure from some underlying pure finance concept. Viewed in this way, RAR would be the most appropriate view of a regulator’s best estimate of where to set allowed returns, not CAPM-WACC.

- that, in effect, regulators should lower allowed baseline returns to take account of expected outperformance.

Ofgem says little about aiming up, but has essentially indicated an intention to adopt this second proposal.

MPW on aiming up

MPW's "regulatory wedge" W_R , as noted above contains a number of items (e.g. in respect of the treatment of embedded debts within the cost of debt) that are outside the scope of this paper. We do not touch on those here, but focus instead on the question of aiming up on respect of the cost of equity, which is one element of W_R .

We have tried to identify the points made by MPW in their commentary and exhibits, noting that the lack of paragraph numbers makes cross referencing difficult. We begin however, with our key findings.

Conclusions on MPW's treatment of aiming up

While we broadly agree with MPW's description of the rationale for aiming up, we have a number of important concerns over how MPW has chosen to explore and implement this framework.

- MPW's analysis of past regulatory practice on aiming up is too simplistic. The clearest and most relevant precedent from the CMA unambiguously points towards material aiming up being optimal (between the 81st and 100th percentile for ranges that had not already been derived using conservative assumptions).⁶¹
- MPW's simple algebraic model of optimal aiming up suggests that one should aim up materially in respect of new investment, but that for sunk investment one should not aim up, but should set allowed returns in line with expectations.
 - We agree with MPW's assessment of the optimal approach for new investment.
 - We disagree with MPW's assessment of the optimal approach for sunk investment, which implies that no aiming up is necessary. We consider that this result will only hold in a stylised and simple model (which assumes a single shot investment game and myopic investors), but has no relevance to a more realistic appraisal.
 - We disagree with MPW's assessment of the optimal approach for aiming up when one considers a company that may have a blend of sunk and new investments, for similar reasons.
- Our view is that the analysis presented by Dobbs demonstrates that for a company with a blend of new and sunk investment, even a small proportion of new investment implies that one should aim up materially, broadly in the range adopted by the CMA in the past.

⁶¹ See Figure 2 and note that conservative assumptions were built into the estimated range of the WACC in the Bristol Water 2015 decision

Existing UK practice on aiming up

MPW undertook a review of regulatory precedent in respect of aiming up. Their analysis was summarised in Figure 8.1 on page 70 of the UKRN paper (already reproduced in this report as Figure 1, which MPW say shows two main things:

- *‘That there is considerable variation across regulators as to where in the range the RAR is set.’*
- *‘For any particular regulator, there is considerable variation across decisions as to where in the range RAR is set.’*

In our review of regulatory precedent, we have already set out our key points in respect of MPW’s analysis.

- MPW’s analysis may be understood to imply that UK regulators do not, or do not all, aim up. However, in our view, it is unsafe to draw this conclusion.
 - Some regulators are completely transparent and explicit in how they approach aiming up. For example, as we set out in section 2.2.1 the CMA and its predecessors have tended to provide a range for each equity parameters, a resulting attenuated range for the cost of equity formed by combining parameter estimates, and then an explicit discussion of where to set the point estimate within that range. This makes it straightforward to understand the CMA’s approach and views, not least because the CMA has often added a specific text commentary to its numerical approach.
 - This is not, however, the case for all offices. Some, e.g. the UR in Northern Ireland, analyse a wide body of information for each parameter but will then choose a single point estimate for each. As a result one will not always see within a regulatory decision a range for the cost of equity. Similarly, there is not always a direct and explicit discussion of aiming up.
- But our view is that this does not imply that the logic that underpins the aiming up framework has been totally ignored, just that such judgements have been subsumed into the parameter by parameter choices made instead. To understand UR’s recent approach to aiming up, one might need to then to read all of the commentary around their decisions and make inferences.

We have also pointed out errors in MPW’s analysis in certain regards, notably with how it captures Ofgem’s 2014 decision on allowed returns for RIIO-ED1.

In considering what conclusions to draw from UK regulatory precedent, we would focus on the CMA for two reasons.

- As noted above, the CMA has tended to provide a highly transparent treatment of its approach to aiming up.
- The CMA is the supra-regulator for Ofgem and hence its approach should be highly relevant in guiding Ofgem’s determinations.

On this basis, the most important and readily translatable regulatory precedent supports explicit aiming up somewhere between the 80th and 100th percentile.

The theoretical framework for assessing aiming up

MPW's description of the theoretical justification for aiming up and the associated trade-offs is fine as far as it goes, but it fails to motivate with clarity the key elements of the framework.

- The purpose of aiming up is to minimise the risk that investors might be undercompensated by inadvertently setting too low an allowance, when the required rate is not known with certainty, but only within a range.
- The key idea is that investors see in advance the allowed rate of return set in the price control, and then is able to decide whether they wish to invest or not.
- If the regulator's estimate is set too low, then some future investment may not be made, in which case there may potentially arise a large future welfare loss.
- In contrast, if the regulator's estimate is set too high, then there is a transfer from customers to producers and the potential for other welfare losses (e.g. excess investment, although other regulatory arrangements are likely to limit the scope for such losses to occur).

A rational regulator should choose explicitly how to strike this balance cognisant of the consequences of each type of error, and it is here that there seems to be some consensus over the importance of these consequences.

This framework is hinted at by MPW, but not set out explicitly, leaving a general sense that aiming up is somehow a poorly justified generosity towards the company, rather than a rational choice in the face of uncertainty that takes explicit account of societal welfare.

We do however find that the quotes deployed by MPW from past CC reports and elsewhere are helpful in illustrating the asymmetric consequences of the "too high" and "too low" errors.

On a point of detail, MPW notes that *'Dobbs's approach requires demand to be elastic, which is at odds with the empirical evidence for a number of regulated sectors'*. We find this sentence unclear. Demand for energy is elastic, i.e. it is not perfectly inelastic, even if it is understood to be highly inelastic even in the long run. This would not prevent one from applying Dobbs' model to energy networks, but would influence one's findings. As Dobbs notes in his paper *'a lower percentile should be chosen the more elastic demand is likely to be'*. To rephrase, in the presence of highly inelastic demand one should expect a high level of optimal aiming up. In this light, Dobbs' results appear to provide strong support to aiming up to a high percentile.

MPW's guidance on aiming up

Mason analyses this question using a simple one period model in Appendix I of the UKRN report. Analysis is split between new investment and sunk investment, before the results are combined into a recommendation for regulators.

For new investment, Mason finds that the optimal point estimate is high in the range for a wide range of parameterisations. In the main body of the report MPW summarises Mason's findings for new investment, that the optimal RAR routinely

lies above the 90th percentile. This is entirely logical, and consistent with other attempts to place some empirical rigour into the aiming up framework (such as the Dobbs paper).

For sunk investment, Mason suggests that the rationale for aiming up vanishes and that regulators should select their point estimate in line with their unadjusted expectation of allowed returns (assuming a symmetric distribution within the range, this is in line with the 50th percentile). This comes from observing that:

- sunk investments have already been made, and hence there is no risk that a low WACC may cause an already existing investment not to be made;
- given this, consumer welfare is maximised by setting WACC as low as possible; however
- this would fall foul of regulators' requirement to ensure financeability; and
- balancing these two concerns leads to the optimal choice being to set the point estimate at expected WACC.

This reasoning however can only be correct if investors are myopic (failing to see beyond the present period). Under Mason's model, an investment expected to be added (or not) in this period would earn an aimed up WACC in the period it was created, but would earn a central WACC in all future periods as it then becomes sunk and earns a lower return. Mason does not explain why investors would fail to foresee this future lowering of rate under this regulatory model, and why they would choose to base their investment appraisal only on the spot rate, rather than the manifestly lower future blended rate. In fact, committing to only ever setting a central WACC for sunk investment must affect the business case for new investment, and if adopted would inevitably lead to a suboptimally low level of investment.

By similar reasoning, MPW's proposed blending of their proposed aiming up for new and sunk investments is also fundamentally flawed. MPW propose to blend together Mason's results for new and sunk investments, weighting each according to the flow of expenditure (load and non-load related capex allowances for RIIO-T1) and the stock of past expenditure (RAV). Since RAV is relatively large compared to the stock, MPW concludes that the optimal aiming up point is just above the 50th percentile (52% to 58%).

First and foremost, their blended estimate is wrong as their analysis of how to treat sunk investment is flawed.

Furthermore, regulators in UK set only one value for allowed returns, not two separate values for new and sunk investments. If regulators were in fact to aim up only to the 52-58th percentiles, then based on Mason's findings this would result in a significant expected cost to consumers and society arising from the risk that the number is in fact too low to bring forward new investment. This would clearly not be in customers' interests.

MPW may then object and suggest that regulators should set two levels of allowed return, one for sunk investment one for new in order to target each effectively. They could then "aim up" extensively (e.g. to the 90th percentile) for new investment, and set a central level of returns for sunk investment.

This prescription would be flawed too. Firstly, it would fail to work for the reasons set out above, i.e. that investors are not myopic and would take investment appraisals based on reasonable expectations of the future, not just on spot rates. Secondly, we also note that a two speed approach to setting allowed returns would also move towards the Helm split cost of capital model, an approach that has been extensively debated and rejected explicitly and repeatedly by several regulators in the UK and elsewhere.

We note that Dobbs' approach in his paper is robust to this criticism. Dobbs considers sunk and new investments separately to understand the optimal approach for each type of investment alone, and then considers results for firms with a blend of new and sunk investments (where his model includes a time dimension such that investor decisions take account of new investment becoming sunk in future periods). Noting that in practice the elasticity of demand for energy is likely to be far lower than the levels assumed in Dobbs' model, our view is that this academic work strongly supports aiming up to a high percentile, broadly in line with past CMA practice.

In summary then MPW's suggestion that regulators should aim up just above the 50th percentile is based on flawed logic and should not be adopted.

The choice of welfare measure

A topic that arises in Appendix I of the UKRN report is whether the aiming up framework should take account of only consumer welfare, or whether total welfare including producer surplus should also be included.

We recognise the considerations that leads Mason to conclude that a regulator should focus primarily on consumer welfare, given for example GEMA's principal objective. We note that even on this basis Mason finds that the optimal level of aiming up is high, as discussed above.

However, we consider that there is a case to be made for taking account of overall social welfare, including producer surplus. As MPW itself argues, consumer welfare in the short run can always be improved by lowering prices. However, low prices need to be sustainable, and in the long term a sustainable outcome can only be secured if returns to investors are adequate. This suggests that the welfare of producers should also have weight in a regulators deliberations. GEMA's own powers and duties reflect the benefit of securing long run investor confidence. GEMA's duties include the requirement to protect present and future consumers and without sufficient investment by operators the welfare of future consumers will be diminished. GEMA's duties also require the regulator to have regard to the need to secure that efficient operators can finance their functions.

If producer surplus is also accounted for in one's appraisal of aiming up, then as a matter of logic this must lead to a higher overall level of aiming up. This follows because the harm arising from higher than necessary allowed returns would be at least partially offset by a higher level of producer surplus that would otherwise be ignored.

MPW on ER vs AR

Following on from their analysis of aiming up, MPW proceeds directly to a strong recommendation as to the relationship between ER and AR.

‘Recommendation 1: regulators should set explicit numerical target values for both W_R and W_I , such that the sum of the two wedges should be equal to the desired “aiming up” wedge. These values would be periodically revisited at low frequency (probably in the light of information emerging over the course of a full price control period), but they would be constant at higher frequency.’

MPW then expands over how this might be done over a number of paragraphs of text which are discursive, but which clearly plant the ideas that Ofgem has subsequently adopted in its December paper. As was noted by Burns in his response to MPW’s proposals, MPW offers no practical guidance on exactly how W_I (or W_I and W_R combined)⁶² should be “set”, but it is clear that they seek a method through which a clear relationship could be established between RER and RAR, and through which this relationship would be updated at each price control in the light of experience.

The problems with this approach are many and profound, which can be summarised as:

- W_R and W_I are wedges covering entirely separate concepts (the first deals with optimal aiming up, the second is arrived at as a result of the calibration of a raft of cost targets and outputs that should be set on the basis of what is optimal on a case-by-case basis) and there is no necessity or benefit from seeking to ensure that they are artificially limited or codetermined.
 - As Burns noted in his response to MPW on this topic, it is difficult to understand how a regulator can sensibly prescribe some level for W_I . The extent of this wedge will arise as an outturn of a complex process of determining the regulatory framework and waiting to see how management teams, incentivised by their shareholders subsequently respond in the face of considerable uncertainty.
 - The desire to limit the extent of W_I may also lead to decisions that weaken incentives, and decisions as to whether this is sensible should be taken on their own merit (taking into account both the short run cost to customers of outperformance payments and the scope for future savings to benefit customers in the long run) rather than because an arbitrary target for W_I has been determined.
- MPW fails to even consider the possibility that their prescription – to adjust away expected outperformance – may change profoundly the incentives for outperformance.
 - By linking the future recalibration of MPW’s wedges to outturn evidence, a feedback loop is created. If outperformance is higher than intended, then

⁶² The information wedge and regulatory wedge, respectively. See Annex A for more details on the MPW approach.

presumably MPW's approach argues for a more aggressive recalibration at the next price control review. This creates a disincentive to seek efficiency improvements that MPW (and Ofgem) do not consider at all. Indeed, it is clear that MPW have entirely ignored the extensive body of literature that forms the discipline of regulatory economics, and have approached this issue through a narrow lens of financial economic theory with little or no appreciation of the wider impact of their partial assessment.

- MPW fails to even consider the possibility that regulatory arrangements may change and hence that historical outperformance may provide little evidence on future outperformance. This is a further reason why the adjustment may be miscalculated.
- MPW do not consider the increase in risk arising from the introduction of an adjustment to an absolutely core part of the regulatory framework, and the harm that this may do investor confidence. If the regulator is willing to make an arbitrary adjustment to such a core parameter on the basis of a flawed model and unreliable evidence, the question investors will ask is "where next?".
- MPW also do not consider that better alternatives may exist if the intent is to restore credibility and legitimacy to the regulatory settlement. Ofgem has the scope to address excess returns at source:
 - by conducting sound analysis to inform its calibration of cost and outputs;
 - creating the right conditions for pseudo-competition between companies (e.g. through its benchmarking); and
 - creating a framework that strongly encourages information revelation at price controls.

For all of these reasons, we do not believe that the MPW model provides any conceptual basis for Ofgem's adjustment.

