ASSESSING REGULATORS' APPROACH TO SETTING THE TMR – IMPLICATIONS FOR RIIO-3

A report prepared for the Energy Network Association

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Contents

Executive summary

This paper has been commissioned by the Energy Networks Association (ENA) to review and critique Ofgem (and to the extent relevant, other regulators') approaches to setting the total market return (TMR) in the context of determining allowed equity returns.

By reviewing the history of TMR decisions, we have found that the approach taken to date is inconsistent, opaque, and unpredictable. Importantly, regulators have set TMR below the long-run historical average when capital market conditions were accommodative, but are now proposing to set TMR at the historical average when capital market conditions have reversed. It is clear that current capital market conditions have pushed the prevailing approach beyond its limits, and we think a better, corrected approach is needed for RIIO-3 and beyond.

Absent any change, Ofgem's approach sets a TMR that is too low, and hence a cost of equity that is too low, eroding investor confidence at a time when securing investment is paramount. Ofgem should address this issue now for RIIO-3 and adapt its approach in the FDs. This will ultimately serve the long-term and short-term interests of customers.

Background and relevant policy context

Ofgem (and indeed other regulators in the UK) rely on the CAPM model as the primary approach to setting the allowed return on equity. The total market return is a critical parameter within the CAPM model; it can be considered as the forward-looking opportunity cost of investing in the equity market as a whole. The TMR is inherently uncertain: it fluctuates to reflect the demand and supply of capital and risky assets in the capital market at any moment in time.

With this in mind, regulators have hitherto relied on three main approaches to estimate TMR: historical data on realised returns; forward-looking approaches that account for expectations of equity cash flows and growth; and survey evidence on expected TMR. Each of these approaches come with challenges and limitations, and the difficulty of estimating TMR has led to extensive debate on TMR policy.

Regulators have duties, and Ofgem's long-standing statutory objective is to protect the interests of existing and future customers. This is not to be interpreted as lowest cost option and has to ensure the sectors it regulates remains financeable, can deliver on objectives, and can attract and retain investment. Ofgem also has new objectives in relation to supporting the government's policy on Net Zero and Growth, while ensuring that the companies it regulates can finance the costs of their regulated duties and obligations.[1]

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[1] We note these do not encapsulate the full suite of Ofgem's duties but we think that these are the most relevant to the discussion and so have flagged them here.

So, when setting allowed returns, and in particular TMR, Ofgem will need to ensure that the decisions it makes deliver on its objectives, follow evidence, and create a stable, predictable and investable framework. For example, on the one hand: a TMR estimate which is too high would mean customers pay more than necessary. On the other hand, a TMR that is too low risks jeopardising the objective of attracting and retaining sufficient investment to protect primary customer interest of a reliable energy supply, but now also to deliver Net Zero and Growth.

The inception of the 'fixed TMR' approach

In addition to setting TMR levels in a way which supports the various objectives, it is generally agreed that avoiding revenue volatility, and therefore customer bill volatility, is desirable for both investors and customers. But the prevailing TMR fluctuates over time. Given this, regulators have previously stated they will follow a **'through-the-cycle'**[2] approach. This approach involves setting a TMR that is largely 'fixed', estimated based on a very long-term historical average (typically taking the average from 1900 to the present). This approach originates from research conducted by Smithers et. al. in 2003.

Did Ofgem and other regulators actually follow a 'fixed TMR' / through-the-cycle approach?

Our examination of past TMR decisions from 2008 to present reveals that Ofgem and other regulators have found it difficult to do so, especially in light of the economic uncertainty directly following the Global Financial Crisis (GFC) and the Eurozone crisis; and then, the prolonged very low interest rate period that followed.

Taking the recent history of TMR decisions, it is not clear that regulators have in fact adhered to a 'fixed TMR' policy or looked through-the-cycle. Over the last decade since the Global Financial Crisis, the long-run historical average of realised equity return moved less than half a percentage point while TMR decisions have fluctuated by more than two percentage points. In fact, lower TMR estimates from Ofgem and other regulators coincided with lower interest rates, and these were justified by seemingly arcane and technical arguments.

The TMR decisions simply demonstrate that the rigidity of a fixed, through-the-cycle model has necessitated significant departures from the stated TMR policy, with regulators relying on obscure rationales to justify the outcomes. Indeed, this pitfall of the 'fixed TMR' approach has been acknowledged by the UK Regulators Network (UKRN) in its 2023 Guidance, where it states that such an approach could result in a TMR which is 'too low' or 'too high'.

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[2]   See Section 4.2, where we explore the "through-the-cycles" approach in more detail and examine its limitations.

Consequences of the approach taken to date

Issues with the stated through-the-cycle approach

Regulators, including in particular Ofgem, have not consistently applied a 'through-the-cycle' approach to setting the TMR. Regulators themselves have stated that this approach tends to be misaligned with market conditions, overstating TMR in periods of low interest rates,[3] potentially leading to high asset valuation, which can spur public scrutiny and questions about regulatory legitimacy. In contrast, during times of constrained capital markets and higher interest rates, such as the current environment shaped by geopolitical shifts and inflationary pressures, this same long-term averaging can underestimate the returns required to attract capital, risking underinvestment and a loss of investor confidence.

Currently, the need for large-scale infrastructure investment across regulated sectors coincides with a challenging capital market environment. Despite Ofgem raising TMR estimates in the RIIO-3 Draft Determinations (DDs) compared to the Sector Specific Methodology Decision (SSMD), these adjustments still fall short of what many investors consider viable. Holding TMR at historical averages, while evidence shows that the current market levels are higher than historical average, suggests that investors get the lower than long-term average when the market is low and they get the average when the market is high.

In this situation, investors lack a long term incentive to continue to deploy capital. It would be rational to scale back on investments or reduce the ambition of investment plans. New capital risks being deterred altogether, and while the effects of underinvestment may not be immediately visible, they would emerge in the longer term as poorer outcomes for consumers and missed policy targets.

Issues with the lack of transparency and predictability

The 'through-the-cycle' approach was intended to offer a stable, predictable framework for setting allowed returns, which in turn should keep revenues and bills stable and thus build long-term investor confidence.

Our review of historical decisions has shown that while Ofgem (and other regulators) have claimed to follow this principle; in practice, they have relied heavily on opaque judgments to flex the TMR, which erodes the credibility of the stated approach. Consumers are increasingly sceptical of the regulatory system - a trend reflected in growing political scrutiny - while investors express concern over regulatory unpredictability, complexity, and inconsistent outcomes. This uncertainty may ironically drive up the cost of capital, undermining the very goal of maintaining stability.

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[3]   UKRN (2023) Cost of Capital Guidance, page 19-20.

At the heart of the credibility issue is the lack of transparency in how regulators determine the TMR. To illustrate this point with an example, Ofgem's TMR range of 6.8% - 6.9% in the RIIO-3 DDs excludes entirely its TMR range of 6.25% - 6.75% at RIIO-2. We note that there is almost no underlying change in the raw input data on historical long-term realised return data on which Ofgem relies in both price controls. Although this increase coincides with an increase in interest rates, Ofgem has never offered any clarity on this. It chooses to hide behind a myriad of technical arguments, most of which were arguments already debated at RIIO-2 when Ofgem took a different position. Ofgem's RIIO-3 position therefore concurs with the position that networks took at RIIO-2 in that the 6.5% was too low as a long-run average figure.

Despite the stated policy guidance from the UKRN, the evidence shows that the way regulators have applied that policy has been inconsistent and demonstrates that there are issues on how regulators set the TMR while adhering to the relevant duties when setting allowed returns. This has already drawn concern from debt market analysts, such as Moody's, who stress the importance of transparency in regulatory frameworks.[4]

To address this, and support the significant investment required across sectors, the TMR-setting methodology must evolve to offer clarity, consistency, and legitimacy - without relying on opaque, ad hoc reasoning that erodes confidence among both investors and consumers.

Adaptations to the current approach are required for RIIO-3 and beyond

When considering a better way forward, an effective TMR policy should do at least three things:

First, TMR should reflect contemporaneous market data/expectations to some extent. The TMR should reflect prevailing market expectations to some extent, so that it is high enough to support an investable price control package, but not so high that customers unnecessarily over pay.

Second, the estimate should be stable and insulated from short-term fluctuations. A volatile TMR estimate which adjusts unduly with prevailing short-term market expectations would be undesirable. Ideally, TMR decisions should move less than short-term market movements, and be insulated to some extent from business cycles, while still adequately reflecting market expectations.[5]

Finally, the TMR-setting approach should be transparent and predictable. Executing the requirements above in a transparent and predictable way - which limits undue

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[4]   Moody's (2025) Regulated Electric & Gas Networks – Europe, Outlook changed to negative as large investments for energy transition weigh on key credit metrics.

[5]   Our assessment of the volatility of TMR, equity risk premium, and gilt yields reveals that it is gilt yields that best reflect the structural changes in the economy, and therefore can be used as a barometer for market movements that *should* be accounted for in TMR-setting.

regulatory discretion - would provide clarity for customers and investors. This should enhance the credibility of the sector, lowering the cost of capital in the long run.

It is not insurmountable to have a robust, evidence-led and consistent TMR-setting policy which adheres to the objectives and avoids the negative consequences discussed so far. At SSMC, in a report prepared for National Grid,[6] we set out to develop a framework to operationalise the UKRN's Guidance of setting a stable TMR by estimating a (linear) relationship between the market-implied required TMR and gilt yields: the TMR Glider.[7] Following our latest data updates, the relationship estimated by the TMR Glider equation is as follows:[8]

$$Nominal\ TMR = 8.34\% + 0.354 \times (20\ year\ nominal\ gilt\ yield)$$

The Glider meets all the requirements of good TMR policy. It reflects structural changes without passing through short-term volatility of DGM based estimates. This is because the forward-looking TMR is conditioned on the gilt yield. In doing so, it provides a route for TMR to 'flex' and reflect contemporaneous market expectations. It is also transparent and predictable, as all parties can take a view of the direction of travel based on an understanding of economic developments and how they could impact gilt yields.

Conclusions

There is a clear need to fix the way Ofgem sets TMR. The right approach to setting the TMR should reflect contemporaneous market expectations, in a stable, transparent and predictable way.

While we think this issue is an important one that all regulators should consider, it is particularly critical for RIIO-3 given Ofgem's stated ambitions for the sector and the government's Clean Power 2030 objectives. Absent change, Ofgem's approach risks eroding investor confidence at a time when securing investment is paramount. To avoid this, Ofgem must address this issue for RIIO-3 and adapt its approach in the FDs. This will ultimately serve the long-term and short-term interests of customers.

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[6] Frontier Economics (2024) The relationship between total market return and gilt yields, prepared for National Grid Electricity Transmission.

[7] The TMR Glider developed at that stage was intended as a cross-check.

[8] For more detail, see Frontier Economics (2025), 'Updated Cost of Equity Cross-Check Evidence – A report prepared for the Energy Networks Association.

1 Introduction and background context

1.1 Introduction

1.1.1 The energy network sectors are facing their upcoming RIIO-3 price control. Ofgem has already set out its minded-to allowed equity return estimate in its Draft Determinations (DDs) for ET3, GT3 and GD3 which were published on 1st July 2025. We note that the sector consultation for ED3 will follow shortly after, in the Autumn of 2025.

1.1.2 This paper has been commissioned by the Energy Networks Association (ENA) to review the regulatory practice on estimating the total market return (TMR). This is in the context of setting the allowed equity returns for network utility companies in the UK as a response to Ofgem's RIIO-3 Draft Determinations. The objectives of this paper are:

- reflect on the history that led to the development of the current approach that Ofgem and other regulators are using to estimate the TMR;
- identify issues with the current approach and whether it safeguards Ofgem's duties and supports the delivery of policy objectives; and
- provide a recommended approach that addresses issues identified with the current approach (in light of the evidence). In particular, to identify an approach that supports Ofgem's investability objectives for RIIO-3 and beyond.

1.1.3 This paper critiques Ofgem and other regulators' approach to the policy of estimating the TMR. By reviewing the history of TMR decisions, we have found that the approach taken to date is inflexible, inconsistent, opaque, and may contribute to uncharacteristic valuations of network assets. Current capital market conditions have pushed the prevailing approach to its limits, and we think a better approach is now needed.

1.1.4 It is **not** the intention of this paper to recommend or argue for a particular level of the TMR that we consider to be appropriate for RIIO-3.[9] Rather, the focus of this paper is to identify shortcomings in the existing approach, and to recommend an approach which addresses these shortcomings and enhances the transparency and predictability of TMR-setting, to support Ofgem in setting an appropriate TMR at RIIO-3 Final Determinations.

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[9] We address the TMR for RIIO-3 in our latest cross check report. Frontier Economics (2025), 'Updated Cost of Equity Cross-Check Evidence – A report prepared for the Energy Networks Association.

1.2 Background context

1.2.1 Regulators in the UK generally rely on the capital asset pricing model (CAPM) to set the allowed equity return for regulated utilities. The CAPM framework assumes that investors appraise the required premium of any individual investment in excess of the risk-free rate by looking at its beta factor[10] in relation to a fully diversified market portfolio, multiplied by the expected excess return above the risk-free rate of such a portfolio. The sum of the risk-free rate and this expected excess return is referred to as the TMR.

1.2.2 The TMR represents a level of return that investors require in order to invest in a fully diversified market portfolio. It can be considered as the forward-looking opportunity cost for investing in the market portfolio. If the allowed TMR is set any lower than this required rate, then (all else equal) investors would rationally prefer not to invest, as it would require investment at an economic loss. Conversely, if the rate is set higher than this required rate, investors would gain more return than is required for them to invest.

1.2.3 Like the expected return on a bond, the TMR fluctuates over time, reflecting the demand and supply of capital and risky assets in the capital market at any moment in time. However, unlike the yield on a bond, the TMR is not observable. After an investment is made it is possible to measure an actual achieved return, but the expected TMR at the point when the investment is made will never be revealed. This means that the TMR is inherently uncertain and can only be inferred or estimated using assumptions.

1.2.4 Broadly speaking, there are three approaches that can be used to estimate the TMR:

(a) **Historical data** methods rely on estimating TMR by reference to realised return on the total equity market achieved over some historical period. Available returns data (such as that found in the well-known Dimson, Marsh and Staunton publications) goes back to 1900, thereby providing more than 100 years of evidence. In relying on estimates derived from this long series of data, practitioners hope to mitigate any major estimation error. However, it is important to note that historical performance does not guarantee future performance. So, historical data - although observable - cannot predict future returns with certainty. In other words, using historical realised average equity market return data to estimate the TMR requires the significant assumption

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10 The beta factor is a key parameter in the CAPM that quantifies the systematic risk of an asset relative to the overall market. It measures the extent to which the returns of an individual asset move in response to movements in the market portfolio. A beta of 1.0 indicates that the asset's returns are expected to move in line with the market. A beta greater than 1 implies that the asset is more volatile than the market (i.e., it tends to amplify market movements), while a beta less than 1 suggests lower volatility (i.e. it tends to dampen market movements).

that expected future returns are equal to average historical returns. However, the value in the long-term historical data is that it smooths out short-term fluctuations, making the estimate relatively stable despite market movements from one year to the next.

(b) **Forward-looking data** methods, such as the Dividend Growth Model (DGM) typically consider the prevailing price of the equity market at some point in time. This is typically combined with a measure of expected future cashflows (such as dividend), and the researcher derives a discount rate that equates the future stream of cashflows to the prevailing price. This discount rate is therefore a direct estimate of the expected forward looking required TMR at this point in time, based on today's market prices and best view of future earnings. However, the expected cashflow to equity investors cannot be observed directly because different investors could have different beliefs and different dividend forecasts. This means that the forward-looking estimates of TMR embed a degree of uncertainty due to its reliance on assumptions on future equity cash flows. Nevertheless, the advantage is that it can measure short-term market TMR relatively accurately which is something the historical realised return measure cannot do. Through-out this paper, we refer to DGM measures of the TMR when we discuss short-term market conditions.

(c) **Survey evidence**[11] can also be used to cross-check TMR estimates derived from the historical and forward-looking approaches. These surveys collect the expectations of investors, or experts, regarding the required market return. However, survey evidence may contain bias because respondents' views are influenced by their own beliefs, experiences, and market conditions at the time, which can affect the objectivity of their estimates.

1.2.5 What is clear is that there is no easy or straightforward way to estimate the TMR. Each estimation approach comes with its own challenges and limitations. The inherent difficulty in estimating TMR is what has led to the extensive debate on how this parameter should be estimated and set when setting allowed returns for regulated utilities.

1.2.6 In the remainder of this paper, we debate whether the current approach allows regulators to meet their duties in an effective way:

■ Section 2 discusses the policy context for setting the TMR, including regulators' duties and objectives as well as their stated policy positions on estimating the TMR.

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[11] We note that survey evidence would involve respondents stating their TMR expectations; in forming those expectations, survey respondents could be considering historical or forward-looking approaches, a combination of both, or augmenting results from either approach to produce what they believe is a relevant contemporaneous estimate.

- Section 3 examines how the regulatory approach to setting TMR in practice evolved over time.

- Section 4 considers the implications of the current approach, identifying potential risks and harm, and highlighting where changes are necessary.

- Section 5 presents our initial views on the improvements that are needed to address shortcomings identified in the current approach.

2 Policy context for setting the TMR

2.1 Overview of this section

2.1.1 In order to evaluate the suitability of the policy regulators use to set the TMR for price controls, we first set out the regulators' duties that are relevant to this debate. Generally, these duties should guide regulators' decisions, including those on allowed returns and TMR.

2.1.2 As discussed in Section 1.2, estimating the TMR comes with significant challenges. Regardless, regulators must set a TMR to derive a value for the allowed return and must therefore select from the available set of imperfect estimators.

2.1.3 We focus here on Ofgem, providing some examples of the applicable statutory duties, but we note that other utility regulators (e.g. Ofwat) will have similar duties and obligations

2.2 Regulators' duties and powers

2.2.1 Ofgem's long-standing statutory objective has been, and is, to **protect the interests of existing and future customers** where those interests are taken as a whole. It has also paraphrased this as including a requirement to ensure that both sets of customers bear a fair share of the costs required to maintain and reinforce energy networks.[12] This is not to be interpreted as the lowest cost option, not least because customers value quality and clean energy, and has to ensure the sectors it regulates deliver on objectives including attracting investment and financeability. Historically, protecting the interests of customers has been Ofgem's primary responsibility. However, Ofgem now has additional duties in light of decarbonisation challenges.

2.2.2 Ofgem also has a longstanding duty to ensure that the companies that it regulates can finance the costs of their regulated activities and obligations imposed upon them. This can be taken to mean it has a duty to ensure reasonable costs are remunerated, provide for an adequate return on investments, and ensure that this investment can be funded through debt and/or equity (i.e. ensure financeability and investability).[13] Even putting this explicit financing duty to one side, funding reasonable costs (including the cost of capital) while ensuring financeability and investability are necessary for the continued

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[12] https://www.ofgem.gov.uk/our-role-and-responsibilities#:~:text=Who%20we%20are,products%20and%20services%20for%20consumers.

[13] SSMD finance annex footnote 104, which references (section 3A(2)(b) of the Electricity Act 1989 and section 4AA(2)(b) of the Gas Act 1986)

and adequate provision of the essential services which current and future consumers depend on. Hence these conditions can all be seen as necessary to meet the requirements of Ofgem's duties to further its objectives.

2.2.3   Ofgem's new duties include supporting **Net Zero and Growth**.[14]

(a) Ofgem's Net Zero duty

(i)   Historically, Ofgem has had a general statutory duty to protect existing and future consumers' interests by the reduction of greenhouse gases emissions in electricity and gas supply. But its new duties require it to go further.

(ii)   Ofgem's Net Zero duty obliges it to deliver the necessary intervention, unlock investment, accelerate planning, and to build the infrastructure the economy needs to achieve the transition to Net Zero.[15]

(b) Growth duties

(i)   The Growth Duty establishes economic growth as a factor that Ofgem should have regard to in making strategic level decisions, alongside, or, as part of the delivery of their other regulations, duties, and protections as set out in the relevant legislation.[16]

2.2.4   Mechanically, the duty to protect current customers would put downward pressure on the appropriate estimate of the TMR when the capital conditions are accommodative, whereas protecting future customers, ensuring companies are financeable, and supporting Net Zero and Growth, would put upward pressure on the TMR estimate when the capital conditions are tight, all else equal.

2.2.5   To fulfil the relevant duties simultaneously would require setting the TMR to **adequately reflect the prevailing capital market environment** at any given time, so that it is not too high to breach the protection of current customers and not too low to jeopardize investment. Fresh duties should push Ofgem towards the side of estimating a higher TMR range, or setting TMR towards the top end of a plausible range, so as to ensure sufficient investment not only to protect

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[14]   RIIO-3 Sector Specific Methodology Consultation - Overview Document, paragraph 1.4

[15]   The Energy Act 2023 replaced greenhouse gas emission wording with a specific net zero mandate. The mandate means for the first time there is a specific duty directly linking consumers' interests to specific Net Zero targets and Ofgem will play a key role in supporting the UK government to meet its legal obligation to get to net zero by 2050. Please see here: https://www.ofgem.gov.uk/press-release/ofgem-welcomes-proposed-legal-mandate-prioritise-uks-2050-net-zero-target

[16]   The Growth Duty came into statutory effect on 29 March 2017 (as part of the Deregulation Act 2015) and requires regulators to have regard to the desirability of promoting economic growth, alongside the delivery of protections set out in relevant legislation. On 21 May 2024 the Growth Duty was extended to include Ofcom, Ofgem and Ofwat, and the statutory guidance was updated. https://assets.publishing.service.gov.uk/media/66476caebd01f5ed32793e09/final_growth_duty_statutory_guidance_2024.pdf

primary customer interest in the keeping the lights on, but now also to deliver Net Zero and Growth.

2.3 Keeping bills stable and the cost of capital low

2.3.1 The TMR can vary significantly over the short term, driven by short-term market demand and supply of capital and risky assets. Notwithstanding the uncertainties and challenges associated with estimating the TMR accurately, there is consensus among the regulators that allowing the estimates to be too volatile over time has its drawbacks, as it could subject the price control and revenue to short-term volatility (if the TMR and allowed returns are very variable). This would lead to:

■ volatile returns for the companies; and

■ volatile bill levels for customers.

2.3.2 Neither of the above is in the interest of current or future customers. Ofgem[17] therefore have tended to prefer a so-called 'through-the-cycle'[18] approach to setting the TMR, which relies on a very long-term average based on historical data, in order to achieve a level of stability in the allowed returns, which in theory should promote bill stability as well as a lower level of risk for the companies, and a lower cost of capital in the long run.

2.3.3 In the following section, we summarise how Ofgem (and other regulators) have estimated the TMR over the last 10-15 years. In doing so, we can also reflect on how TMR-setting policy has performed, and whether TMR decisions were consistent with regulators' duties.

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[17] And indeed other regulators.

[18] See Section 4.2, where we explore the "through-the-cycles" approach in more detail and examine its limitations.

3 Evolution of the approach taken by Ofgem and other regulators

3.1 Our review of the regulatory approach

3.1.1 In this section, we look back on the range of methods Ofgem (and where relevant, other regulators) have adopted to estimate TMR in recent history. We find that the approaches used to date were heavily influenced by research conducted by Smithers and Co in their 2003 paper on the estimation of the cost of capital.[19] The Smithers research established that the preferred approach was to specify a relatively fixed (or stable) TMR in the CAPM model, rather than a relatively fixed (or stable) Equity Risk Premium (ERP).[20] The Smithers paper recommends the estimation of a long-term average TMR.

3.1.2 As a result of this approach, the CAPM estimated cost of equity for regulated utilities is meant to be relatively stable regardless of risk-free rate fluctuations. When we estimate the TMR directly, any movement in the risk-free rate would be offset by an equally sized movement in the ERP in the opposite direction, albeit with a beta slightly less than one the effect on the cost of equity (CoE) is not entirely offset but significantly dampened. Ofgem has recently started to refer to this approach of estimating a long-term average TMR as the 'through-the-cycle' approach, presumably because the CoE estimate remains relatively stable through an interest rate cycle.

3.1.3 The underlying data that Ofgem claims to rely on for the 'fixed TMR' estimate has long been the Global Investment Returns Yearbook by Dimson, Marsh and Staunton (DMS), which reports relatively stable long-term historical average returns data for the UK. However, we observe that the TMR decisions in past price controls have fluctuated within a much larger range. In the sections that follow, we investigate the extent to which regulators are actually following a 'fixed TMR' approach.

3.1.4 In addition, we look into past decisions to assess any adjustments (both upwards and downwards) that were implemented, and the justification for doing so. We note that it is also common practice for regulators to rely on precedent when

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[19] Smithers & Co Ltd (2003) A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the UK, p. 4 and 49. The embedded risk-free rate in this measure was 2.5%, The Smithers report was unclear on the deflator that was used in this range.

[20] Under a fixed ERP approach, the allowed equity return would move 1-1 with changes in interest rates, all else equal. This is because the equity risk premium is specified separately from the risk-free rate. In other words, the allowed return under the fixed ERP can be mathematically described as: equity return = risk-free rate + Beta x equity risk premium, where the risk-free rate and equity risk premium are estimated separately.

taking TMR decisions, and we consider regulators' reasoning on why it was right for them to diverge from one price control to the next.

3.1.5   Finally, it is not unusual for the technical debate to evolve over time, as the TMR is a parameter which is inherently uncertain and the underlying data can be interpreted in a range of ways. Our review aims to highlight incidents where the technical debate has resulted in a material change in the TMR range from one decision to the next.

3.1.6   It is also important to note that in 2023, the UK Regulators Network (UKRN) published its cost of capital guidance, which was aimed at enhancing consistency and transparency in how regulators in different sectors set the cost of capital. We examine whether the UKRN guidance has promoted consistency and transparency in TMR setting across GB regulated sectors.

3.2   Time periods of our review

3.2.1   To facilitate a systematic and detailed review of previous regulatory decisions, we have segregated the discussion into several distinct periods.

3.2.2   First, we discuss the analysis and evidence which led to the inception of a 'fixed TMR' approach.[21] This is in Section 3.3.

3.2.3   In Section 3.4, we then examine TMR decisions taken towards the later period of the RPI-real price controls (2008 onwards).

3.2.4   Following this, in Section 3.5 we examine the TMR decisions in price controls that were set in CPIH-real terms. We discuss these decisions in a separate section for clarity, as the TMR decisions defined in CPIH-real terms are not directly comparable to those set in RPI-real terms without adjustment.

■   It is important to be aware of an important cut-off point in time which separates TMR decisions. From 2015 onwards, some regulators (e.g. Ofgem and Ofwat) switched to CPIH as the main inflation measure for regulatory purposes. This change was applied as the UK Statistics Authority identified issues with the RPI measure of inflation.

■   This change in policy towards inflation should not have an impact on value, however, this necessarily depends on the methodology and assumptions used in implementing this policy change. We therefore discuss RPI- and CPIH-real price controls separately, before analysing the full period together to ensure that important differences due to the inflation assumption are clearly noted.

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[21]   See for example Ofwat (2025) PR24 final determinations: Aligning risk and return, allowed return appendix, p. 61.

3.2.5   In Section 3.6 we discuss the most recent collection of TMR decisions, i.e. the regulatory decisions taken after the UKRN published its 2023 Cost of Capital Guidance, as Ofwat and Ofgem, in particular, stated that they aimed to set the allowed return based on the UKRN's recommendations in the 2023 Guidance paper.

3.2.6   Finally, in Section 3.7, we reflect on the full history discussed in this review, and in particular, assess whether the approach taken to date serves regulators' stated objectives and/or duties.

3.3   Inception of the 'fixed TMR' approach

3.3.1   UK Regulators including Ofgem currently use an approach to estimate the cost of equity that is much closer to a 'fixed TMR' approach, as opposed to a 'fixed ERP' approach. This approach is intended to provide a more stable CoE allowance over time. This approach implies:

   ■   TMR should only vary slightly from one control to another (to the extent that long term historical average evolves). It is designed to 'look through' business cycles rather than respond to short-term market fluctuations.[22]

   ■   As a result, the CoE becomes less volatile than the underlying risk-free rate (RFR), since ERP adjusts when RFR changes to keep TMR relatively constant.

3.3.2   The concept of directly estimating the TMR (instead of ERP) was initially introduced in the Smithers 2003 report, where the authors noted that, "*an estimate of the equity premium to an estimate of the safe rate [(the risk-free rate)] may be, at best, a not particularly efficient way to proceed, and at worst, a source of misunderstanding and errors.*"[23] The authors highlighted two main reasons for their recommendation:

   ■   assumptions on the risk-free rate and ERP should be made consistently when operationalising the CAPM model. Using the TMR (rather than the ERP) ensures this consistency; and

   ■   there is "*considerably more uncertainty about the true historic [...] equity premium*"[24] (the ERP) than the TMR, making TMR a more reliable input.

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22   Under a fixed ERP approach, the allowed equity return would move 1-1 with changes in interest rates, all else equal. This is because the equity risk premium is specified separately to the risk-free rate. In other words, the allowed return under a fixed ERP approach can be mathematically described as: equity return = risk-free rate + Beta x equity risk premium, where the risk-free rate and equity risk premium are estimated separately.

23   Smithers & Co Ltd (2003) A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the UK, p. 13.

24   Smithers & Co Ltd (2003) A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the UK, p. 4.

3.3.3   Therefore, they recommend that the CAPM model should be specified using the "aggregate equity return". This approach reduces inconsistencies between the ERP and RFR, lowers uncertainty, and therefore leads to more stable CoE estimates.

3.3.4   This reasoning represents the first step toward a 'fixed TMR approach' that has been carried forward to today, including by Ofgem. The Smithers report recommended an indicative range of 6.5% - 7.5% in (RPI) real terms, but did not expand further on how to estimate the TMR. As a result, it was left to regulators to determine how to do so in their individual decisions.[25]

3.3.5   This left Ofgem and other regulators a challenging task: to estimate a parameter that is supposed to be relatively fixed, but without a well prescribed method *or* a sufficiently narrow range (although, as we will see below that the inherent uncertainty in estimating the TMR has resulted in a range as wide as 1 or 2 percentage points in practice).

3.3.6   With changing capital market conditions, and the need to adhere to their duties, we find that Ofgem and other regulators leaned into the estimation uncertainty in order to produce TMR estimates. We observe some degree of discrepancy in the TMR decision in almost every price control in the last two decades.

3.4   RPI-real price controls

3.4.1   Prior to 2015, price controls were primarily set in RPI-real terms reflecting the historically commonplace reliance on RPI as the headline measure of inflation. Figure 1 summarises the TMR decisions taken by Ofwat, Ofgem, and the CMA from 2009 onwards.

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[25]   Smithers & Co Ltd (2003) A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the UK, p. 4 and 49. The embedded RFR in this measure was 2.5%, The Smithers report was unclear on the deflator that was used in this range.

Figure 1   RPI-real TMR decisions
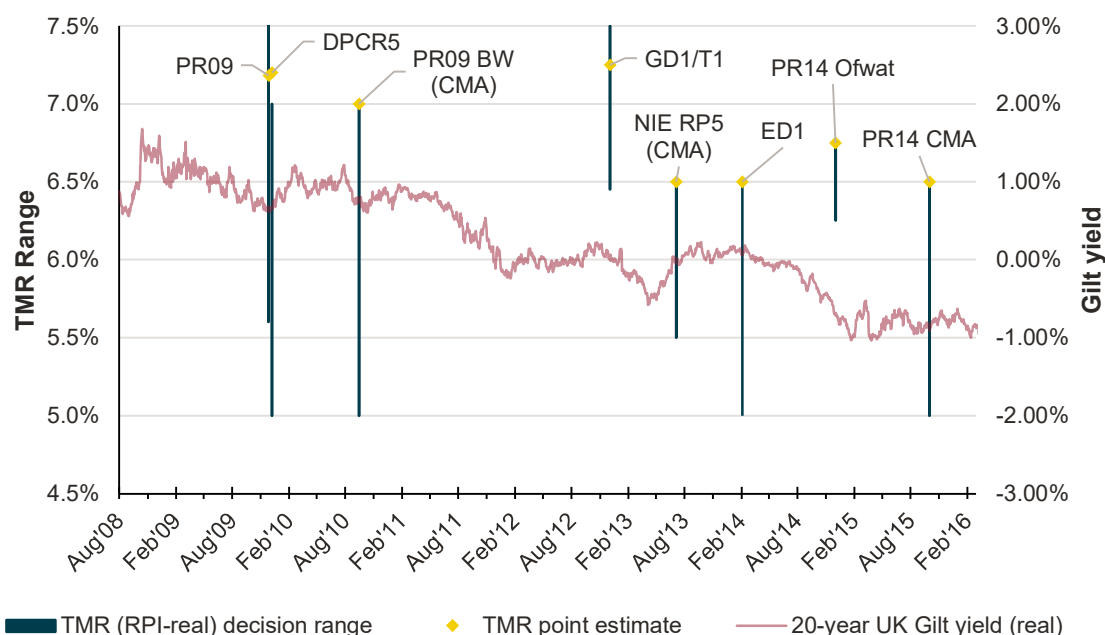
Note: *NIE RP5 decision was broadly decided at provisional stage, which is why we have presented this decision in between GD1/T1 and ED1. 20-year UK Gilt yields are shown at monthly frequency using monthly average real yields.*

3.4.2   This period of decisions was characterised by significant uncertainty due to the effects of the Global Financial Crisis (GFC) that started in 2008. The crisis initially resulted in a sharp spike in gilt yields, followed by an extended period of declining rates. We observe that this protracted period of falling rates was not forecasted by the majority of economic commentators, but it eventually led to the point where real gilt yields fell below zero for the period 2011 – 2015 shown in the figure above.

3.4.3   Between 2009 and 2015, we observed that Ofgem not only widened the TMR range but also tended to 'aim up' toward the top of that extended range, as illustrated in Figure 1.

- For DPCR5, Ofgem may have increased the top end of the TMR range to accommodate uncertainty, although the language in the decision is ambiguous. To illustrate, if all of the 'aiming up' is attributed to TMR, this would have implied a TMR of 7.2% in RPI terms.[26]

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[26]   Ofgem found that the appropriate RFR was 2% and the corresponding ERP range was 3% - 5%, meaning that the top end of the TMR range was 7%. Ofgem was not explicit in its TMR range, and it had aimed up on the equity return, to derive an allowed equity return point estimate of 6.7%. If all of the aiming up was attributed to TMR, this would imply a TMR of 7.2%.

■ For RIIO-T1 Ofgem took the same approach as DPCR5, increasing the top end of the TMR range, as it considered that the uncertainty from the GFC and Eurozone sovereign debt crisis had not abated. Ofgem set a TMR of 7.25%, which exceeded the range recommended in an expert report provided by Europe Economics .[27]

3.4.4 As time passed, a more enduring low interest rate environment emerged, following a period of volatility following the Eurozone debt crisis. In response, at the NIE RP5 appeal in March 2014[28] the Competition Commission (CC), the predecessor to the Competition and Markets Authority (CMA), set the TMR at 6.5%, **down** from the 7% it had set at its previous regulatory appeal, i.e. Bristol Water 2010, denoted as 'PR09 BW (CMA)' in Figure 1 above.

3.4.5 This CC decision stated that this downward move was required because "*A forward-looking expectation of a return on the market of 7 per cent does not appear credible to us, given economic conditions observed since the credit crunch in 2008 and lowered expectations of returns*".[29]

3.4.6 Following this, the ED1 slow track decision was taken in July 2014 (draft) and finalised in November 2014.[30] In this decision, Ofgem aligned directly with the TMR and RFR ranges determined by the CC for NIE in its RP5 Appeal.

3.4.7 Ofwat's PR14 decision was issued in December 2014. The TMR range was 6.25% - 6.75% with a point estimate at the top end of 6.75%, reflecting a combination of the previous PR09 precedent of 7.2% and a decrease with reference to the CC's NIE decision taken earlier that year. We note that:

■ The PR14 decision considered forward looking approaches also like DGM and survey evidence.

■ Ofwat also looked at the NIE decision and the ED1 decision and set the TMR at 6.75% which is also a decrease from its PR09 level albeit a smaller decrease compared to ED1.

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[27] Europe Economics (2011) The Weighted Average Cost of Capital for Ofgem's Future Price Control - Phase III Report, paragraph 2.48. Ofgem's 7.25% TMR comprises of an RFR was 2% and ERP was 5.25%. The ERP of 5.25% was above the recommended range provided by Europe Economics of 4.5 - 5.0. Europe economics stated the top end of the range is supported by the belief that the 08/09 crisis had past, and no upwards adjustment to the 'normal time' ERP is required. By inference, Ofgem seems to have applied a 25bps adjustment to the ERP estimate to reflect that a 'normal time' ERP was not applicable over the T1 period, which covered 2013-2021. See Ofgem (2012) RIIO-T1: Final Proposals for National Grid Electricity Transmission and National Grid Gas, Finance Supporting Document, paragraph 3.44.

[28] Competition Commission (2014) Northern Ireland Electricity Limited price determination – Final determination, paragraph 13.146.
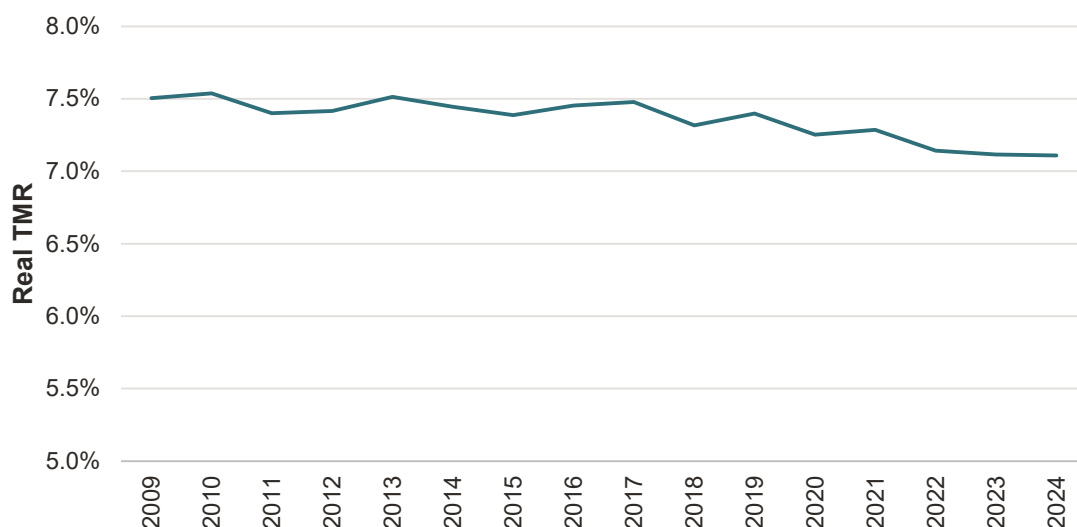
[29] Competition Commission (2014) Northern Ireland Electricity Limited price determination – Final determination, paragraph 13.14.

[30] Ofgem (2014) RIIO-ED1: Draft determinations for the slowtrack electricity distribution companies - Financial Issues, Supplementary annex to RIIO-ED1 overview paper, Table 2.2.

■ The PR14 CMA decision for Bristol Water's Appeal was taken in October 2015, and retained Ofwat's PR14 decision on TMR, using 6.75%.[31]

3.4.8 It is clear from the above that a reasonably wide range of TMR decisions were taken over a relatively short five year period, during which the underlying data on long-term historical equity return from DMS was relatively stable, as shown in Figure 2 below.

Figure 2   Historical arithmetic average UK real TMR reported by DMS

Source: UBS Global Investment Returns Yearbook, Credit Suisse Investment Yearbook

Note: This shows TMR in real terms using real values directly reported by DMS. This differs from Ofgem's historical ex-post estimate due to differences in the assumed inflation series.

3.4.9 It is also clear that regulators attempted to react to market conditions and events as they arose in order to deliver their policy objectives, as evidenced by their own statements.

3.4.10 Lastly we observe that TMR ranges proposed in regulatory decisions over this period varied from one decision to the next. There is no observable pattern in respect of the location of the maximum, the minimum or the overall width of the range relied on at each decision. It is difficult to conclude that such variability in the TMR range was overall justified and consistent, given the underlying data series from DMS (on which the decisions primarily relied) was relatively stable.

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[31]   Competition Commission (2014) Northern Ireland Electricity Limited price determination – Final determination, paragraph 13.146.

3.5 CPIH-real price controls

3.5.1 As concerns in respect of the robustness of RPI inflation index grew, Ofgem and Ofwat commenced the transition from RPI-real to CPIH-real price controls. It was generally accepted that, at that time, RPI had been approximately 1% higher than CPI, although it was also understood that the wedge between RPI and CPI/CPIH[32] fluctuates over time due to methodological changes and changes in the underlying data.

3.5.2 Figure 3 summarises the CPIH-real controls taken by Ofgem and other regulators (Ofwat and the CMA), over time.

Figure 3　　CPIH-real TMR decisions
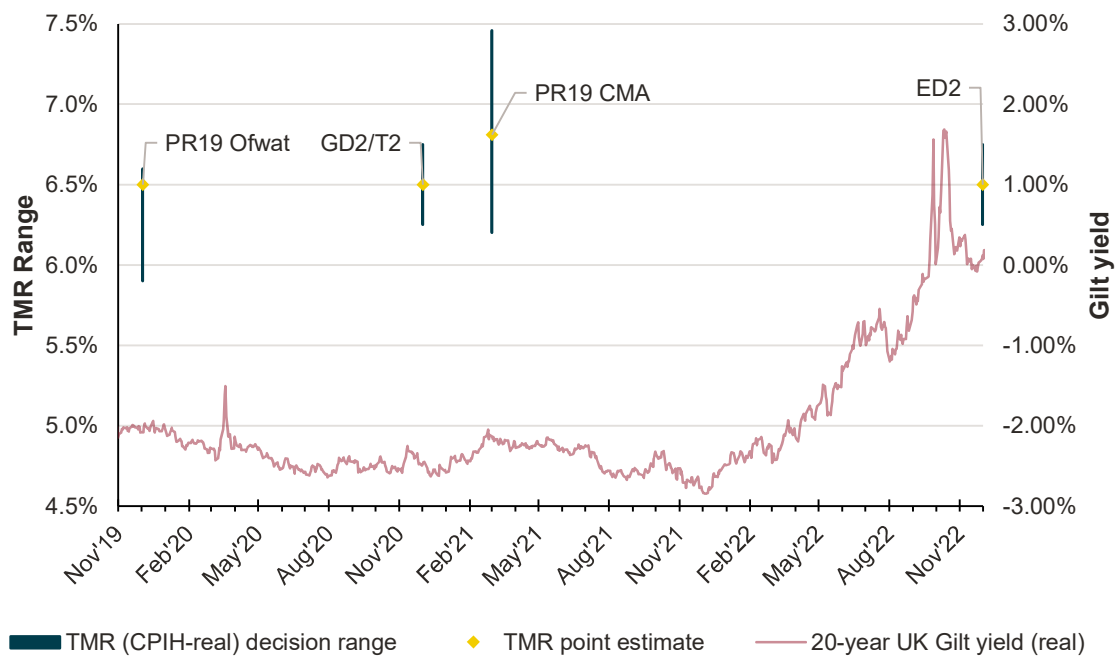
Source: *Frontier Economics analysis, Bank of England, Ofgem, Ofwat, CC and CMA*
Note: *20-year UK Gilt yields are shown at monthly frequency using monthly average real yields.*

3.5.3 After PR14, interest rates continued to stay low, with accommodative central bank monetary policy being the new norm for most advanced economies. By this time, the 'fixed TMR' approach as envisioned by Smithers et. al. coupled with low interest rates resulted in what some perceived to be an allowed return that was simply too high. Around this period, some parties raised concerns on regulated utilities' apparent excessive level of profits, leading to mounting public pressure on regulators to tighten price controls.

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[32] Prior to the inflation spike in 2022, CPI and CPIH were considered broadly comparable by regulators in the context of allowed return.

3.5.4   While the CC RP5 decision and the ED1 slow track decision had already lowered TMR relative to prior decisions (see paragraph 3.4.4 above), it was clear that regulators considered that it was now necessary to go further, in particular at PR19 and for RIIO-2. This created a conflict between the preferred 'fixed TMR' regulatory policy, and the need to reflect prevailing market conditions and what had become known as the era of 'cheap money'.

3.5.5   For example, at PR19, stakeholders submitted that Ofwat focused on new approaches to estimate the TMR given the 'lower for longer' interest rate environment – with a particular focus on DGM-based forward looking analysis to reflect prevailing equity market conditions, i.e. TMR estimates which were lower than the historical average.[33]

3.5.6   In 2017 (leading up to the consultation period RIIO-2), Ofgem and some other UK regulators commissioned a study from a range of independent experts (including two of the authors of the Smithers Co. paper, Prof Robin Mason and Prof Stephen Wright) to update the guidance on setting the allowed returns (Ofwat did not participate in this study). Their work was eventually published in a 2018 report for the UKRN.[34]

3.5.7   Among other things, this report continued to recommend a fixed TMR approach. To produce an updated estimate for the UKRN 2018 report, the relevant authors (Mason, Miles and Wright (MMW)), approached the task by considering whether new evidence would suggest a change from their previous estimate where they had estimated a geometric average[35] TMR of 5.5%, and applied the relevant uplift to derive an arithmetic average range of 6.5%-7.5%.

3.5.8   The 2018 UKRN report proposed a new range of 6%-7% for the TMR, citing *"we suggest a modest downward adjustment of the original range proposed by MMW, to a range of 6[%]-7%, primarily reflecting a smaller adjustment from geometric to arithmetic returns."*[36]

3.5.9   However, as explained above, at this time the regulators decided to switch their upcoming price controls from RPI-real to CPIH-real. The authors of the URKN 2018 report did not specify which inflation index the 6%-7% TMR range referred to. Given the modest downward adjustment, it was reasonably interpreted that

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[33]   Ofwat (2019) PR19 final determinations, Allowed return on capital technical appendix, p. 43.

[34]   UKRN (2018) Estimating the cost of capital for implementation of price controls by UK Regulators.

[35]   A geometric average calculates the typical yearly return by considering compounding — how each year's return builds on the previous years. It shows the steady growth rate that would get you from the starting amount to the ending amount over time. A geometric average TMR is the average total market return based on this method, reflecting the real growth investors earn over the long term. This is different from the simple or arithmetic average, which just adds up yearly returns and divides by the number of years, ignoring the effect of compounding. The geometric average usually gives a more accurate picture of investment growth over time.

[36]   UKRN (2018) Estimating the cost of capital for implementation of price controls by UK Regulators, p. 8.

the range remained in RPI-real terms. The authors also demonstrated that historically – over more than a century – the difference between RPI and CPI was minimal, which means historically, whether the 6% - 7% was expressed in RPI or CPI real terms made little difference. This is because for the most of that historical period analysed, CPI did not actually exist, and the data that was relied on by the authors were back-casted CPI observations which to a large extent converged to the similar calculation results as RPI ones.

3.5.10　However, on a forward looking basis, at the time of that decision, whether a rate of return is RPI or CPI (CPIH) real made a significant difference (i.e. by about one percentage point). This difference arises because the actual CPI and RPI in modern times follow different calculation formulas and track different baskets of goods. The fact that the RPI-CPI wedge was minimal in the past but significant in the future meant that whether a historical nominal series is interpreted in CPI real instead of RPI real directly led to value losses for companies.

3.5.11　In its consultation on the shift from RPI to CPIH price control, Ofgem had initially assured companies and investors that the transition from an RPI regime to a CPIH one would be NPV-neutral, i.e. a real allowance in CPIH terms would be about 1% higher than the equivalent real allowance in RPI terms previously.[37] This would have meant that the 6% - 7% RPI-real range from the UKRN report had to be converted into CPIH real terms in this way, i.e. approximately 7% - 8% in CPIH terms.

3.5.12　Therefore by using the technicality that the UKRN report did not specify the inflation index for its range, Ofgem restated a CPIH real TMR to 6% - 7% which was an unwelcome, negative shock to the sector.[38] In other words, Ofgem has arguably (through the UKRN 2018 report) identified a way to bring the TMR down by one full percentage point, without changing the estimation method of the TMR itself.

3.5.13　So, at T2/GD2 in December 2020, Ofgem set a CPIH-real TMR range of 6.25%-6.75%, based on an abbreviated version of the 6% - 7% range identified in UKRN 2018. The reason Ofgem truncated the range compared to the recommendation in the UKRN 2018 report was not clear[39], but Ofgem produced a final point estimate in the middle of this truncated range.

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[37]　Ofgem (2021) RIIO-2 Sector Specific Methodology Annex: Finance, paragraph 6.12.

[38]　See for example: Ofgem (2020) RIIO-2 Draft Determinations – Finance Annex, para. 3.11

[39]　UKRN's recommendation on the relevant range primarily involved suggesting that the top end of their range was less relevant for longer holding periods, therefore it is unclear why Ofgem moved the bottom end of this range as well.

3.5.14   Networks mounted serious challenges on Ofgem's interpretation of the relevant inflation measure applied to the UKRN TMR range, amongst other things, which eventually crystallised into an element of the appeal at ELMA 2021.

3.5.15   It may be helpful to pause here to consider the implications of this decision by Ofgem and consider how far its TMR estimates had moved since the Smithers report was published in 2003. This is shown in Table 1 below.

Table 1   Evolution of key energy sector TMR decisions since the 2003 Smithers report

Year	Decision	Inflation measure	TMR decision
2003	Smithers	RPI	6.5% - 7.5%
2009	Ofgem, DPCR5	RPI	7.2%
2012	Ofgem, RIIO-T1/GD1	RPI	7.25%
2013	CC, NIE RP5	RPI	6.5% (The CC's decision was the first 'break' in the pattern of setting TMR around 7%.)
2014	Ofgem, ED1	RPI	6.5% (Ofgem then followed the CC's NIE precedent)
2018	UKRN	CPI (although unclear)	6% - 7%
2020	Ofgem, RIIO-2	CPIH	6.5%

Source: Ofgem, Ofwat, CC, CMA, UKRN, Frontier Economics analysis

3.5.16   Using the UKRN's 2018 recommendation of 6% to 7% (which at first sight could appear consistent with the CC's NIE RP5 decision), Ofgem sets a TMR of 6.5% CPIH-real for RIIO-2. In reality, 6.5% in CPIH-real terms would be closer to 5.5%

in RPI-real terms, thus representing a c.a. 1.5% reduction in TMR relative to the initial proposed 'fixed TMR' range in the Smithers 2003 report of 6.5% - 7.5%.[40]

3.5.17　Supported by the UKRN 2018 report, Ofwat adopted a similar position in PR19 (setting a TMR of 6.5% CPIH-real). Four water companies appealed against Ofwat's PR19 decision, and in March 2021 the CMA published a decision setting out its redetermination. The CMA set a point estimate for TMR of 6.81% CPIH-real (vs Ofwat's original 6.5%). In reaching this decision the CMA engaged in an exhaustive debate of numerous topics, including in respect of inflation, in particular the formula effect of RPI, historical inflation measures, and various different ways to compute arithmetic and geometric averages.[41]

3.5.18　In the light of the then ongoing PR19 redetermination process, all transmission and gas distribution companies decided to exercise their appeal rights at RIIO-2 in respect of COE, including the TMR range (ELMA 2021).

3.5.19　Notwithstanding the outcome of the PR19 redetermination, the CMA found Ofgem was not wrong to have set TMR at 6.5%. Hence energy companies received a COE based on a TMR of 6.5% CPIH-real at RIIO-2, 30bps lower than the level that informed the COE received by disputing water companies, even though the CMA took these decisions only 6 months apart from each other, an outcome that many observers attribute to differences between the de novo appeal rights of water companies versus the focused merits appeals regime in energy.[42]

3.5.20　The ED2 decision was published by Ofgem in November 2022 and included the same TMR range as the earlier RIIO T2/GD2 decision. While this decision was taken around the time that one can now see the era of cheap money was ending, no company decided to appeal, a decision that was likely informed by the fact that Ofgem's position was upheld at ELMA 2021 by the CMA.

3.5.21　In summary, TMR setting in this period is characterised by regulators lowering TMR estimates relative to levels observed in the 'RPI era'. The debate around the appropriate TMR became increasingly complex, covering a broad range of technical topics such as the appropriate deflator and the presence and size of serial correlation (among other things). This is amidst a backdrop of increasing scrutiny and political pressure. Despite the wide scope of the technical debate

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[40]　Again here, using the rule of thumb that CPI and RPI real estimates are approximately 1% apart over the consultation periods of PR19 and RIIO-2. However, noting that the actual wedge fluctuates over time, and the appropriate forward-looking gap between CPI, CPIH and RPI should be estimated accordingly.

[41]　CMA (2021) Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations - Final report.

[42]　CMA (2023) Energy licence modification appeals 2021.

(and volume of supporting evidence underlying said debate), regulatory decisions appeared to have coalesced around a point estimate of 6.5% CPIH-real.

3.6 Introduction of the UKRN's 2023 cost of capital guidance and TMR decisions taken with respect to this Guidance

3.6.1 Ofgem has a long standing commitment to work with other regulators, through the UKRN, which was established in 2014. We understand the UKRN has three main objectives

- improve the consistency of economic regulation across sectors;
- deliver efficiency of regulation; and,
- to improve understanding of how independent economic regulation works in the interests of consumers,[43] while maintaining a positive environment for investment.[44]

3.6.2 In 2022, the UKRN consulted on a Guidance paper for setting allowed returns in regulated sectors. The Guidance, which was published in 2023 (after consultation), echoes the UKRN's original objectives. More specifically, this Guidance was prepared in response to a request from the Government to streamline the regulatory process and debate on this topic:

"*The Government has asked Ofwat, Ofgem and Ofcom ('the Named Regulators') to work together, through the UKRN, to identify areas where there is already significant alignment in cost of capital methodologies and areas where further alignment could be achieved. Greater **transparency** and **consistency** in decisions should **reduce the uncertainty associated with the final price control outcome** and should allow for easier cross-sector comparisons.*

*Estimating the WACC involves judgement where there are different possible approaches to estimate many of the cost of capital parameters. In some cases, differences between methodological approaches applied will be due to sector specific issues. Where this is not the case, **aligning around a reasonable methodology for market parameters where practicable** would **reduce the need to continue revisiting theoretical debates** where there is not a clear benefit of doing so.*

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[43] Ofwat (n.d.) UK Regulators launch new network to bring cross-sector regulation closer together, https://www.ofwat.gov.uk/uk-regulators-launch-new-network-to-bring-cross-sector-regulation-closer-together/.

[44] In 2014, the UKRN published an investor guide aimed at promoting transparency on the UK regulated network sector for investors, see UKRN (2014) UK Regulated Infrastructure – An Investor Guide.

> *This in turn would allow companies and regulators to **focus on the effective running of their respective sectors** and allow all parties to focus on delivering best outcomes for customers. In addition, **greater alignment should improve the predictability of regulatory decisions** and may reduce the risk of investing in UK infrastructure, benefitting consumers by lowering costs and supporting sustainable investment.*"[45]

3.6.3   Given this, the UKRN states that the "primary focus" of the 2023 Guidance is on "the common parameters for the cost of equity", and, "the overall framework for choosing a point estimate for the allowed return on equity".[46]

3.6.4   In response, the UKRN formulated nine recommendations on how to estimate the allowed cost of capital.[47] These recommendations were developed based on recent decisions. Specifically, the UKRN states that their "proposals bring together and consolidate existing methodologies."[48]

3.6.5   Having said that, the UKRN goes on to note that the Guidance is "not binding" and "each regulator will continue to make decisions in accordance with its own statutory duties."[49] The UKRN also states that the Guidance creates value through "transparency and predictability" but many factors could "constitute a case for revising regulatory practice".[50]

3.6.6   In summary, when the Guidance was developed, the Government and UKRN believed that a common approach would bring consistency, transparency and predictability, which generates value for customers and promotes effective regulation. The Guidance is a collation of the approaches taken in recent regulatory decisions leading up to the consultation period in late 2022.

3.6.7   On the TMR specifically, the UKRN Guidance set out that regulators had been setting TMR in a stable 'through-the-cycle' way which means:

■   The TMR tends to be relatively less variable than the underlying RFR.

■   Although TMR may vary between regulatory periods, it does so modestly because the assumption is designed to 'look through' business cycles.[51]

3.6.8   This approach aims to:

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[45]   UKRN (2023) UKRN guidance for regulators on the methodology for setting the cost of capital, p. 3.

[46]   UKRN (2023) UKRN guidance for regulators on the methodology for setting the cost of capital, p. 4

[47]   UKRN (2023) UKRN guidance for regulators on the methodology for setting the cost of capital, p. 4 and 5.

[48]   UKRN (2023) UKRN guidance for regulators on the methodology for setting the cost of capital, p. 4.

[49]   UKRN (2023) UKRN guidance for regulators on the methodology for setting the cost of capital, p. 4.

[50]   UKRN (2023) UKRN guidance for regulators on the methodology for setting the cost of capital, p. 5.

[51]   UKRN (2023) UKRN guidance for regulators on the methodology for setting the cost of capital, p. 19 and 20

- Support greater stability in the cost of equity allowances over time.
- Enhance "predictability and transparency in the regulators' methodologies for estimating the allowed rate of return, and one that is fair to investors and customers over time."[52]
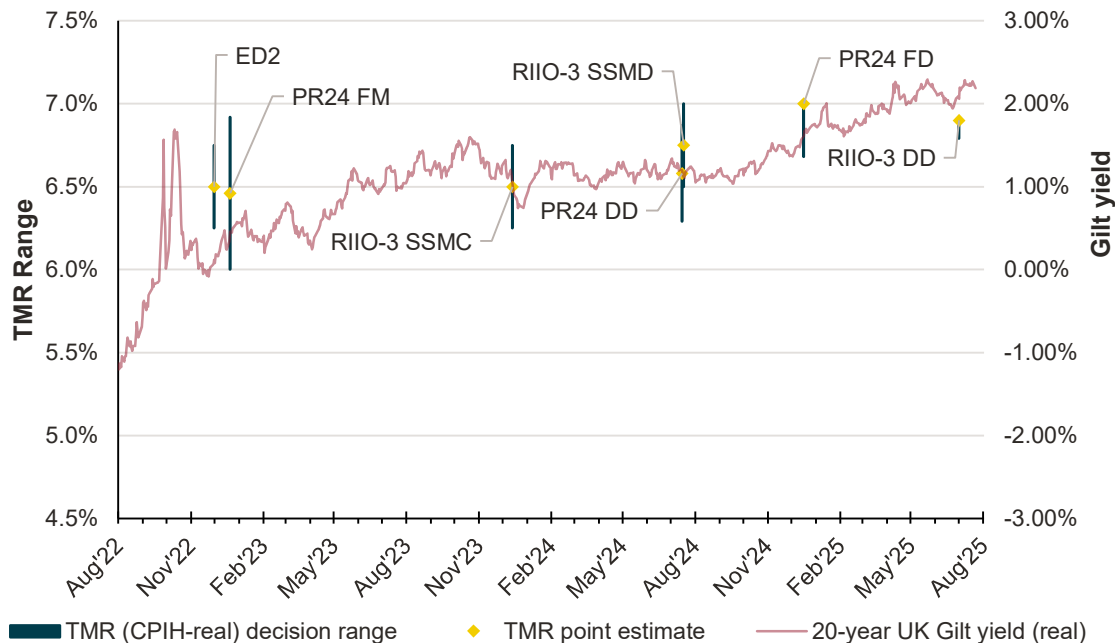
3.6.9   But the Guidance also noted the drawback of the 'through-the-cycle' approach explained above, i.e. when the interest rate environment is low, the 'through-the-cycle' approach can overstate TMR e.g. during the period after the financial crisis. Conversely, when interest rates are high, the TMR can be underestimated.

3.6.10   In its recent RIIO-3 consultations and decisions, Ofgem has stated that it intends to follow the 2023 Guidance for setting the cost of capital. Specifically, Ofgem states: "We committed to adopting the recommendations within this guidance, where appropriate, and for RIIO-3 consider these to be an appropriate starting point.[53] Ofwat has stated a similar commitment.[54]

3.6.11   Despite the UKRN Guidance, the TMR estimates that Ofgem and Ofwat produced in the run-up to PR24 and RIIO-3 differ materially, both between one and other and over time.

3.6.12   Figure 4 below summarises the TMR estimates made by Ofgem and Ofwat after the UKRN Guidance has been established.

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[52]   UKRN (2023) UKRN guidance for regulators on the methodology for setting the cost of capital, p. 19 and 20.

[53]   Ofgem (2023) RIIO-3 Sector Specific Methodology Consultation – Finance Annex, paragraph 3.7.

[54]   See for example in Ofwat (2022) Creating tomorrow, together: Our final methodology for PR24 - Appendix 11 - Allowed return on capital, p. 5, 9 and 49.

Figure 4   TMR estimates made by regulators under the UKRN 2023 cost of capital Guidance

Source: Frontier Economics analysis, Bank of England, Ofgem, Ofwat

Note: For PR24 FD, we have represented the TMR point estimate at the top of the range to reflect Ofwat's decision to aim up to the top of its CoE range

3.6.13   At PR24 Final Methodology stage at the end of 2023, Ofwat estimated a TMR of 6.46% CPIH-real. This is slightly lower than the 6.5% from Ofwat PR19 FD and Ofgem RIIO-ED2 which were the then latest precedents from the two regulators respectively.

3.6.14   Subsequently, the PR24 DD was published in July 2024 and included a TMR of 6.58% CPIH-real. RIIO-3 SSMD was published within the space of a week of PR24 DD. But Ofgem estimated a TMR of 6.75%.

3.6.15   At the PR24 Final Determination in December 2024, Ofwat chose to aim up to above the top of its COE range, effectively setting a TMR of 7% CPIH-real. Additionally, the PR24 range changed substantially from the DD stage, narrowing to only about 30bps. This was largely due to Ofwat discarding evidence from the Barclays Equity Gilt Study at FD, even though the shortcomings of the dataset had been well documented before the DD, these concerns had been disregarded by Ofwat. This demonstrates the degree to which arcane technical arguments can sway the TMR decisions and how unpredictable these decisions can be.

3.6.16   At the RIIO-3 DD, Ofgem have estimated a TMR of 6.9%. The increase since SSMD can be technically attributed to an increase in Ofgem's estimate of the
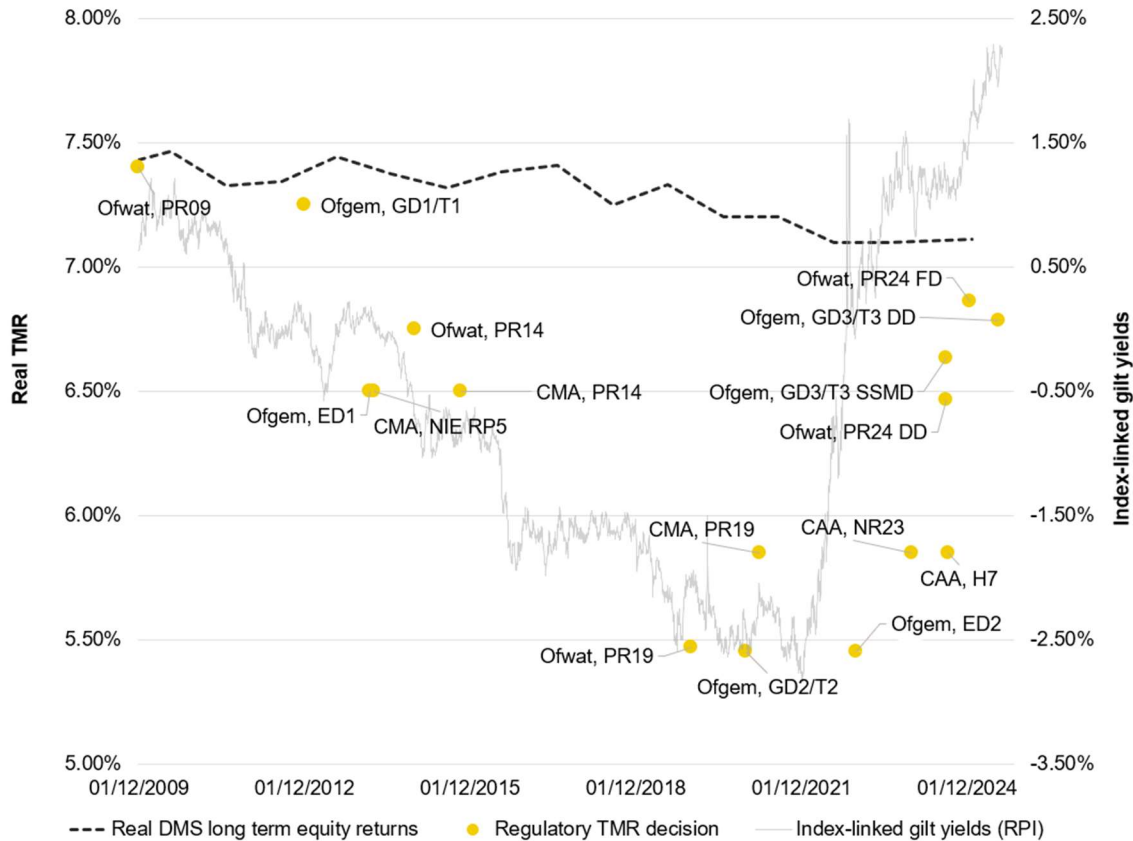
frontier economics

historical ex-ante TMR. The rationale for this change was that data is now provided by DMS to do the calculation in nominal terms before deflating using the same inflation series as Ofgem uses for its ex-post calculations. Ofgem also decided to remove the serial correlation adjustment.

3.6.17 It is worth noting that the capital market had stayed relatively stable during the time covering all of the regulatory publications in Figure 4. This was after the initial spike of interest rates as a result of the war in Ukraine, and the market settled down at a high interest rate environment throughout these past two years (and indeed, does not show any signs of reverting to the previously very low interest rate environment).

3.6.18 Furthermore, as shown in Figure 5 below, the underlying long-term average historical equity return published by DMS has also barely moved. Yet we see regulators' estimates of the TMR moving significantly from one publication to the next within this period. It is therefore unclear if the UKRN Guidance, summarised earlier in this section, had achieved its stated objectives of being consistent across regulators and across time. If the Guidance was sufficiently prescriptive, we would not observe e.g. changes in methodology between Ofwat's DD and FD that materially changed the range; or such divergence between the TMR decisions taken by Ofwat and Ofgem, even though those decisions were only published one week apart.

3.7   Reflections on the approach taken by Ofgem and other regulators

3.7.1 An examination of recent TMR decisions over time demonstrates that Ofgem and other regulators have had to deviate from the stated 'fixed TMR' policy to identify the most appropriate level of TMR that they considered necessary to fulfil their duties.

3.7.2 To help see this more clearly, we summarise all of the decisions in Figure 5. The TMR decisions are expressed in real terms in the relevant inflation measure for that price control.

Figure 5   Long-run TMR as estimated by DMS, regulatory decisions on TMR expressed real terms, and yields on 20-year ILGs

Source: Frontier Economics analysis, UKRN, BoE, DMS Yearbook

Note: For comparability to the ILG yield, where possible we present the decisions in RPI terms as reported by the UKRN. For the recent PR24 and RIIO-3 decisions we present these in RPI terms using a wedge of 0.11% according to Ofgem's own calculations in its RFR section See Ofgem's RIIO-3 Draft Determinations Finance Annex, paragraph 3.15.

The DMS long-run equity returns shows TMR in real terms using real values directly reported by DMS. This differs from Ofgem's historical ex-post estimate due to differences in the assumed inflation series

3.7.3   If the stated approach to setting the TMR is for it to be 'fixed' over time using the long-term historical average and only vary moderately to the extent that this long-term average varies, then it is not convincing that regulators have actually followed it.

3.7.4   As we can see in the figure above, Ofgem and other regulators have instead deviated from the stated policy. However, the basis for these deviations has not been transparent –either at the time decisions were made or in hindsight. Many methodological changes that lead to the results being different are arguably not new and it is unclear as to why certain changes are adopted while others are not.

3.7.5   For example, the T1/GD1 and CC NIE RP5 decisions were taken less than a year apart, and yet both regulators arrived at a different interpretation of the forward looking prospects for the equity market. The T1/GD1 decision selected a point estimate outside of the recommended range, while the CMA considered the same estimate to be implausibly too high.

3.7.6   It may be the case that regulators allowed enhanced scrutiny and political pressure to influence TMR setting. This heightened scrutiny was highly intense around 2016 and 2017, with a particular focus on the returns and performance of regulated infrastructure.

3.7.7   Around this time, bodies such as the National Audit Office (NAO), Public Accounts Committee and Citizens Advice published reports questioning the level of achieved returns and whether the methods that led to them were appropriate.[55]

3.7.8   These reports played into an increasingly polarised political landscape, which then crystallised into proposals by the Labour party to nationalise utilities.[56] Such arguments gained significant traction with the public and posed a serious threat to the privatised utility model, and indeed, the role of utility regulators. We note that this series of events occurred right before the wave of regulatory decisions in 2018-2020. In Figure 5, these are notably lower than the previous batch of decisions. Meanwhile, the long-run average reported by DMS remains relatively unchanged.

3.7.9   A separate but relevant factor is the debate around the limitations of the RPI. This discussion around the issues with the RPI measure was triggered around 2010, and RPI was officially removed as a national statistic in 2013.[57] While the transition to CPIH-real price controls was appropriate, it is not clear to us that the conversion was addressed appropriately in the context of setting TMR and allowed returns. In particular, it seems illogical that a change in inflation measure should result in an actual decline in the TMR estimate, as discussed in Section 3.5, specifically paragraph 3.5.10 onwards.

3.7.10 One might argue that earlier decisions suffered from inconsistency due to the absence of clear, shared guidance on setting allowed returns. We find the 2023 UKRN guidance did not have any meaningful impact on consistency or the transparency of decision-making – it is not sufficiently prescriptive and it explicitly left scope for regulators to exercise their judgement. For example:

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[55]   Further detail in Section 4.3 and National Audit Office (2020) Report – Value for money – Electricity networks.

[56]   The Labour Party first proposed this idea formally in October 2018 at a Labour Party conference, see for example here: The Labour Party (2018) Clear Water – Labour's vision for a modern and transparent publicly-owned water system, https://www.labour.org.uk/wp-content/uploads/2018/09/Conference-2018-Water-pamphlet-FINAL.pdf.

[57]   UK Parliament (2019) Measuring Inflation – Chapter 2: Criticism of the Retail Price Index.

■ Ofwat's PR24 DD and Ofgem's RIIO-3 SSMD decisions were taken within the same week but these TMR estimates were 17bps apart and used different estimation methods; and

■ Ofwat's PR24 FD decision was 30bps higher than the PR24 DD and Ofwat aimed up on the CoE.

3.7.11 In conclusion, while regulators continuously claim that they are taking a **'through-the-cycle'** approach and have not flexed TMR according to the prevailing interest rate environment (as shown by the grey line in Figure 5), the evidence indicates that TMR decisions did move with interest rates, but did so in an unpredictable way and in a way which cannot be explained under a common methodology.

3.7.12 Although it is within regulators' rights to set TMR in a manner which they consider necessary to fulfil their duties (as long as it reflects available evidence), in our view, companies and investors will have found that regulators' deviation from stated policy has been applied in an opaque and unpredictable way. There has been significant volume of evidence and analysis presented in price control documents, all increasingly complex. Despite this, we have found little consensus on why and how the regulators have moved their TMR estimates around from one decision to the next.

3.7.13 It would appear that the 'through-the-cycle' approach has presented practical challenges to regulators over the last decades, despite the fact they remain subscribed to the principle in theory. These challenges have led to regulatory TMR decisions that have not been as 'fixed' as expected. Regulators have not explicitly acknowledged that their TMR decisions are, in effect, a response to their statutory duties and broader market conditions – particularly changes in the interest rate environment. While a TMR policy which reflects broader market conditions is sensible, it is important that this is implemented in a predictable and transparent way.

3.7.14 We discuss the consequences and potential harm arising from the current regulatory approach in the following section.

4 Consequences of the approach taken to date

4.1 Overview of this section

4.1.1 In this section, we examine the issues and identify the potential harms that may have been caused by the approach adopted by regulators in setting of the TMR. We note that Ofgem has largely adhered to the prevailing approach used by regulators more generally so far, and therefore its RIIO-3 DD TMR estimate suffers from the issues and consequences identified.

4.1.2 We have shown in the previous sections that while the stated policy is to retain a 'fixed TMR' and 'through-the-cycle' approach, regulators have deviated from the stated approach, and the resulting estimates are far from being 'fixed'.

4.1.3 In our view, there are negative consequences to both the stated 'fixed TMR' approach and the way that regulators have (or rather have not) adhered to this stated approach. In particular, the negative consequences manifest in two ways:

- First, as the UKRN identified, the 'fixed TMR' approach could systematically over- or under-estimate the TMR. This creates issues during both low and high interest rate environments, and it is unlikely that an appropriate TMR is set, for such periods.

- Second, and arguably as a result, regulators have flexed their TMR decisions based on the prevailing macroeconomic environment – something that they generally do not recognise (instead they tend to argue that the estimates are changing due to the refinement of their methodology). Regardless of true reasons behind the changing TMR estimates from one decision to the next, the process is opaque and unpredictable (i.e. it is hard to know where the next technical argument will come from which could change the next TMR estimate up or down again). This practice has acted to reduce transparency and predictability of the regulatory regime.

4.1.4 We discuss each of these consequences in turn in the remainder of this section.

4.2 Issues with the stated 'through-the cycle' approach

4.2.1 The stated approach has been to set a 'through-the-cycle', fixed TMR, that reflects long-term averages. This approach has clear drawbacks.

- When capital markets conditions are accommodative and interest rates are low, the long-term average TMR may overstate the return required to attract investment. This can lead to excess returns for investors at the expense of current consumers, potentially undermining regulators' primary duty to protect customer interests. Symptoms of these issues could include optimism bias in

the valuations of the regulated utilities, consumer disquiet and associated negative perception of the legitimacy of the regime.

■ Conversely, when the capital market conditions are constrained, and interest rates are high, the long-term average TMR may underestimate the return necessary to attract and retain capital. This could undermine the ability of companies to secure the investment needed to serve customers now and in the long run, as well as the Net Zero and Growth target. As this is the opposite experience to recent history of low interest rates, we can extrapolate from events in that period to assess the kinds of consequences which could occur under a 'through-the-cycle' approach. A TMR which is underestimated could lead to low valuations, low interest in private transactions, general lack of appetite to invest and an erosion of investor confidence in the long-term attractiveness of the sector.

Consumer harm of the 'through-the-cycle' approach when the rates are low

4.2.2 Recall from our account of regulatory history that the 'fixed TMR' approach was first put in place in the early 2000s following the Smithers & Co paper, which proposed that regulators set TMR rather than estimating the ERP and RFR independently.

4.2.3 From that time until the late 2000s, this approach provided similar TMR estimates when compared against the alternative fixed ERP approach and therefore, there was limited pressure for the regulators to deviate from the practice to estimate the TMR. A comprehensive methodology was established by the CC in its Bristol Water 2010 decision.

4.2.4 However, since then the decade that ensued has seen some of the lowest interest rates in modern history. In this environment, there was increasing public debate on the legitimacy of the regulatory system and allowed returns. As we set out in section 3.7, enhanced scrutiny was applied by bodies such as the NAO, Public Accounts Committee, and Citizens Advice; covering perceived excess outperformance and generous allowed returns.

4.2.5 At the same time, regulators also cited a series of private equity transactions where regulated utilities changed hands at high premium to RAV. It is hard to identify the underlying causes for the high transaction premia but regulators have repeatedly cited 'higher than necessary' allowed returns as one of the root causes.

4.2.6 In response, Ofgem's RIIO-2 methodology included a 3-step approach to setting the allowed equity return, where only the first step is the estimation of the cost of equity, and the latter two steps are mechanisms with which Ofgem could provide comfort to itself (and other stakeholders) that the return has not been set too

high, although many parties had pointed out that Ofgem's Step 2 suffered from various robustness and methodological issues. Ofgem's arbitrary downwards adjustment at Step 3 was quashed at the CMA appeal, and based on the SSMD, Ofgem does not intend to carry this step forward into its RIIO-3 approach.

4.2.7   In any case, the need to put in these extra steps (in our view) indicated a lack of confidence from regulators in their own method of estimating the allowed return (arguably as a result of a combination of the 'fixed TMR' approach and an ultra-low interest rate environment), and that they were concerned that consumer harm could result if they simply 'turned the handle' on the WACC calculation without keeping a close eye on the wider macroeconomic environment.

4.2.8   Indeed, these 'extra steps' were put in place to move the TMR decisions *down*, as we can see in the TMR figures set for RIIO-2, PR19 and during the PR24 consultation (see Figure 5 above). These TMR estimates are inconsistent with a fixed or 'through-the-cycle' approach; more specifically, they are by definition too low to be consistent with such an approach since they are below the long-run historical average returns (although the regulators tried at the time to justify these low values to be the long-run average, only to be contradicted now by their own most recent estimates).

4.2.9   This is an early indication that a rethink of the approach to setting the TMR is necessary. At the time, regulators had already concluded based on market evidence that a true 'through-the-cycle' approach, which would have produced a figure around 7%, might be considered too high. As a result, their decision to set TMR at 6.5% reflected a 'flexed' version of the TMR, adjusted to account for prevailing market conditions. The ensuing arguments used at the ELMA 2021 appeal were all focused on how in the real world the required equity return was low, with particular emphasis on evidence such as transaction premium and market value of regulated companies.

4.2.10   The problem was, and still is, that Ofgem and other regulators presented this 'flexed down' version of the TMR to the companies as a true long-term average, even though this was considerably lower than what they presented as the true long-term average in previous price controls. The narratives that came with this 'lower long-term average' was that the previously 'higher' long-term average contained estimation errors that needed to be corrected. In fact, when companies pointed out that Ofgem was wrong to focus on the short-term market conditions and that it had deviated from the fixed long-term average TMR approach, Ofgem defended its decision by saying that the lower TMR decision was not to reflect short-term market conditions but rather to correct previous technical errors in estimating the long term average (e.g. historical inflation series, auto correlation in the return series, weight given to various averaging methods, etc.)

4.2.11   In effect, Ofgem conflated i) the need to flex the TMR to account for prevailing market conditions with ii) an under-estimated long-term average. Amidst this conflation, network companies could not accept the materially lower long-term average presented by Ofgem, since true long-term average cannot plausibly change so significantly from one price control to the next (especially when the underlying DMS data does not support such a change). The ensuing ELMA 2021 appeal devoted consideration debate on, among other things, Ofgem's TMR decision.

4.2.12   A further problem with this conflation is that when market conditions reverse and regulators find themselves needing to 'flex' the TMR back up, there is then a need to roll back on its previous 'corrections' to somehow move the long-term TMR back to a higher level, effectively implying that their previous decision on long-term average was wrong, again. Indeed, the RIIO-3 DD TMR range lies entirely above the RIIO-2 TMR range without overlap.

4.2.13   However, rolling back on RIIO-2 'corrections' only goes as far as bringing the TMR back to the true unbiased long-term average. There is no guarantee that the regulators can find further technical arguments in the opposite direction to support a higher number than the long-term average, even if this is what the market needs in order to invest in the sector. This asymmetric treatment over time presents a clear problem which we discuss next.

Long-term harm of the 'through-the-cycle' approach when the rates are high

4.2.14   The war in Ukraine and wider geopolitical developments have resulted in a significant shift in the global macroeconomic environment, and one of the consequences of these developments is a sustained period of high interest rates. Therefore, the same 'fixed TMR' approach is now coming under pressure, but in the opposite direction when compared to the period of low interest rates.

4.2.15   This comes at a time when many regulated sectors now face the need for infrastructure investment at an unprecedented scale, i.e. companies are trying to raise a material quantum of new capital when capital markets are tighter than we have seen in a decade and a half. Notwithstanding measurement challenges, an overwhelming body of evidence suggests that the current required equity return in the capital market is higher than the historical long-term average. [58]

4.2.16   The 'through-the-cycle' approach with fixed TMR is now at risk of setting an allowed return that is inadequate, i.e. below investor requirements, at a time when investors are spoiled for choice as to where to deploy funds. As a result,

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[58]   For more detail, see Frontier Economics (2025), 'Updated Cost of Equity Cross-Check Evidence – A report prepared for the Energy Networks Association.

insufficient capital may be made available to provide critical investment over upcoming price controls, noting that these investments are a necessary condition to delivering on policy objectives such as Clean Power 2030, and ensuring we continue on the path to Net Zero by 2050.

4.2.17 Apart from the obvious signs that show capital markets requiring a higher rate of return (e.g. UK government bond yields have maintained their relatively high level since 2022 when compared to post-GFC levels), we observe that the conditions for bringing forward the required infrastructure to meet Net Zero are becoming increasingly challenging. For example, the development of the Hornsea 4 windfarm has recently been discontinued[59], and the previous AR5 CfD auction in 2023 did not receive any bids.[60] Moody's have also issued a negative outlook on regulated utilities, as "large investments weigh on credit metrics" and "Regulators face the challenge of facilitating investment while maintaining affordability".[61] These are indications that there are real risks if allowed returns are set at a level which is not appropriate.

4.2.18 A TMR that is set at a level consistent with TMR decisions from the past decade (i.e. decisions taken when interest rates were very low) risks not providing adequate investment incentives for investors in the current market to want to continue to inject capital into the regulated businesses, given the opportunity costs offered elsewhere, e.g. the bond market once one considers the risk-adjusted returns.

4.2.19 Although Ofgem has increased its TMR estimate at the RIIO-3 DD compared to RIIO-2, this has only moved towards the long-run historical average returns. If a TMR below the historical average of returns is allowed when prevailing rates are low and a TMR in line with average returns is allowed when prevailing rates are higher, investors never receive the average that 'through-the-cycle' assumes. Put another way, without the possibility of Ofgem allowing the TMR to raise above the long-run average when the market requires, investors will conclude that the 'through-the-cycle' approach implies they will not receive the required return, on average.

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[59] Ørsted (2015) Ørsted to discontinue the Hornsea 4 offshore wind project in its current form, https://orsted.com/en/company-announcement-list/2025/05/orsted-to-discontinue-the-hornsea-4-offshore-wind--143901911

[60] The Guardian (2023) Giant windfarm off Norfolk coast halted due to spiralling costs, https://www.theguardian.com/business/2023/jul/20/giant-windfarm-norfolk-coast-halted-spiralling-costs-vatttenfall; Energy-UK (2024) Energy UK explains: Allocation Round 6 and the UK's energy security goals, https://www.energy-uk.org.uk/publications/energy-uk-explains-allocation-round-6-and-the-uks-energy-security-goals/#_ftn2; Timera Energy (2023) 5 challenges facing wind, https://timera-energy.com/blog/5-challenges-facing-wind/#:~:text=to%204%20above-,1.,challenges%20(see%203%20below).

[61] Moody's (2025) Regulated Electric & Gas Networks – Europe, Outlook changed to negative as large investments for energy transition weigh on key credit metrics.

4.2.20   There are consequences to such an approach. If a regulatory allowance is set below investor expectations, while this may not lead to a full blown and immediate withdrawal of capital, except in extremis, it is reasonable to expect investors to curtail and scale back their investment plans. This would simply be a rational response to allowed returns being set too low regardless of the underlying reason. On the same vein, potential investors may be deterred from deploying their capital in the sector.

4.2.21   The full effect of incremental withdrawal or withholding of capital investment may not be immediately perceivable, and may only become apparent over time, when it becomes clear that insufficient investment has led to suboptimal outcomes for consumers, through reduced performance levels and/or the failure to achieve policy objectives such as Clean Power 2030 and the overall progress towards achieving Net Zero by 2050.

4.3   A lack of transparency and predictability in TMR decisions

4.3.1   As discussed in the previous section, a rigidly executed 'through-the-cycle' fixed TMR could undermine primary duties, causing consumer harm and jeopardizing investor confidence. It is clear that this should not be an approach that regulators pursue at all costs.

4.3.2   Indeed, our examination of past decisions suggests that regulators have implicitly recognised the potential harms of adopting the 'through-the-cycle' approach fully, as in reality, regulators have set TMR in a different way in every price control decision.

4.3.3   The purported benefit of the 'through-the-cycle' approach is a stable allowed return regime, which builds investor confidence over the long term as methods are clear, decisions transparent and well understood, and the temptation for regulators to apply material discretion at each price control materially subdued. The intent is for this to provide stable returns, stable customer bills and lower risks for investors that should decrease the actual cost of capital over time.

4.3.4   However, it is increasingly clear that achieving this long run stability cannot be allowed to outweigh other duties going forward. In the absence of a commonly agreed approach, regulators have evidently felt that they were compelled to deviate from the stated approach when faced with large structural movements in the capital market conditions.

4.3.5   But a system that purports to be anchored in this principle of long run stability, yet de facto devolves into reliance on regulators' ad hoc decisions at each price control based on arcane arguments risks losing credibility on all sides. Consumers are losing confidence in the regulatory system (as evidenced by the political pressure and investigations that have taken place with increasing

frequency); at the same time, investors grow more wary of the scale of regulatory complexity and risk, and frustrated with outcomes that appear erratic, and which seem to us capable of increasing the actual cost of capital, when ideally regulatory decisions should be reducing it.

4.3.6   At the core of this loss of credibility is the lack of transparency on *how exactly regulators make their decisions on the TMR*. What is considered? What information is relevant? How do these decisions serve the primary duties? These unanswered questions naturally lead to inconsistency in a parameter which should be common for a given market. Not only that; regulators have largely denied that the reason for the movement in their TMR decisions are decisions they made in service of delivering their duties, i.e. let the TMR estimate follow the market conditions to some extent.

4.3.7   Rather than focussing on adapting TMR to market conditions (something that regulators evidently felt that it was necessary to do as interest rates decreased) the regulatory debate has tended to focus on technical arguments on how the TMR is actually estimated. We think it is debateable whether the methodological choices regulators have made are in all cases methodologically superior. It is questionable whether the same choices would have been made if some of these arcane topics were explored now, in a time when capital markets are tight and it is critical that allowed returns are set at an investable level. Therefore, there is doubt whether regulators are actually adapting their methodology in the face of new arguments or evidence in the pursuit of some true fixed and ideal TMR number, or whether these arcane arguments are simply being used in service of necessary fine tuning to reflect market conditions.

4.3.8   Indeed, Ofgem's TMR range of 6.8% - 6.9% at RIIO-3 DD excludes entirely its TMR range of 6.25% - 6.75% at RIIO-2. We note that there is almost no underlying change in the historical long-term realised return data on which Ofgem relies in both price controls. Although this increase coincides with an increase in interest rates which would imply that the RIIO-2 estimate of 6.5% is now far too low, **Ofgem has never offered any clarity on this**. It chooses to hide behind a myriad of technical arguments such as quality of certain data series or the level of auto correlation, most of which were arguments already debated at RIIO-2 when Ofgem took a different position.

4.3.9   This is unfortunate, as this defeats the purpose of the 'fixed TMR' approach which was meant to deliver stability, transparency and predictability. The discussion in Section 3 shows that Ofgem and Ofwat have estimated different levels of the TMR, using the same underlying data, the same time window, and even though both regulators have stated they will follow the 2023 UKRN Guidance. The movement of Ofgem's TMR estimate from RIIO-2 to RIIO-3 and the movement of Ofwat's estimate from Final Methodology to Draft Determination and Final Determination are significant, and not well explained. While this

increase was necessary to reflect capital market conditions, there is an underlying lack of predictability and therefore risk a loss of credibility of the overall regime.

4.3.10   This lack of predictability has already been recognised by debt holders. A recent Moody's report emphasises that a well-established and transparent regulation is important to support credit quality.[62] It is conceivable that such conclusions also apply to the allowed returns methodology as a whole.

4.3.11   Ultimately, this creates uncertainty over how regulators are actually determining allowed returns and in particular TMR at any given time, and also, over time. Uncertainty like this is simply bad for the sector, both for companies and for customers, and we consider that it will increase the actual cost of capital over time – the opposite of the very thing that the 'fixed TMR' approach is purported to achieve.

4.3.12   It is clear the current system needs fixing in order to tackle the challenge associated with the scale of investment required. Combined with affordability concerns where customers should not pay more than necessary in the long term, it is imperative that the approach with which the regulators set the TMR can fulfil their duties in a systematic and fail-safe way, without the regulators having to constantly change tack using arcane technical arguments that are inconsistent and that most observers cannot follow or predict.

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[62]   Moody's (2025) Regulated Electric & Gas Networks – Europe, Outlook changed to negative as large investments for energy transition weigh on key credit metrics.

5 Adaptations to Ofgem's current approach are needed for RIIO-3 and beyond

5.1 Overview of this section

5.1.1 In the previous sections, we have identified several issues associated with the current approach to setting the TMR:

■ The truly 'through-the-cycle' approach will contribute to some consumer harm and detriment to the long-term interest of the consumers, in that a 'fixed TMR' results in a TMR decision which is likely to be too high or too low given prevailing capital market conditions. Indeed, this is demonstrated in the TMR cross-check evidence in Frontier's DD cross-check report[63];

■ Regulators, including Ofgem, were compelled to deviate from adhering to the 'fixed TMR' approach in many decisions, to ensure that they did not fail their primary duties of protecting the short-term as well as long-term customer interests; and,

■ The deviation from the 'fixed TMR' was unfortunately not accompanied by any transparency and predictability when regulatory decisions were made (including by Ofgem), leading to increased (perceived and/or real) regulatory risk which may have increased the cost of capital of the sector.

5.1.2 Clearly, the limitations of the 'through-the-cycle' approach have become increasingly evident, particularly when interest rates were materially different from long-term average values. There is a clear need for the methodology to be overhauled, especially for RIIO-3 which represents a critical price control for the planned trajectory towards climate objectives.

5.2 Objectives that an appropriate TMR policy should achieve

5.2.1 Our discussion so far shows that an effective TMR policy should do at least three things:

(a) Reflect contemporaneous market data/expectations

(i) The TMR should be set in a way that moves to reflect prevailing market expectations.

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[63] Frontier (2025) Updated Cross-check evidence, A report prepared for the ENA, Executive Summary

(ii) At the same time, the TMR decision should be balanced to facilitate an allowed return level which attracts and retains investment but is set at the appropriate level to prevent current customers from over-paying.

(iii) By so doing, a TMR will be set at the appropriate level to protect the current and future interests of customers, while facilitating Net Zero and Growth targets of the Government.

(b) Stable and insulated from short-term fluctuations

(iv) While the TMR decision should be set at an appropriate level that reflects prevailing market expectations (as above), a volatile TMR estimate which adjusts unduly with prevailing short-term market expectations would be undesirable. This is because allowed returns would be volatile, creating challenges for securing long-term investment, and inducing instability in bill profiles.

(v) A better approach would be to have a methodology which yields TMR decisions that move less than short-term market movements, and are relatively insulated from business cycles, while continuing to reflect overall market expectations.

(c) Use an approach that is transparent and predictable

(vi) Additionally, executing the requirements above in a transparent and predictable way (which limits undue regulatory discretion) would provide clarity for customers and investors.

(vii) This would support the sector's long term credibility and attractiveness to investors. Such an environment is typically understood to play a key role in lowering the cost of capital of the sector over the long run.

5.2.2   The current 'fixed TMR' approach cannot deliver the above three things because it only considers long-term historical average data. It is clear for part (a) of Paragraph 5.2.1 to be fulfilled in a satisfactory way the appropriate method must include some measurement of prevailing market conditions. As discussed in Section 0, the most reliable measure (albeit not perfect) of short-term TMR is DGM based estimates.

5.2.3   A solution to the 'TMR trilemma' set out in Paragraph 5.2.1 above is achievable. This would require a codified approach to setting a TMR that regulators and companies can both sign up to, which accounts for both the long-term average TMR and the prevailing market conditions.

■   If the two are close to each other, then the TMR decision could be set based on the long-term average.

■   To the extent that prevailing market conditions materially diverge from the long-term average, a certain amount of weight must be given to the former in
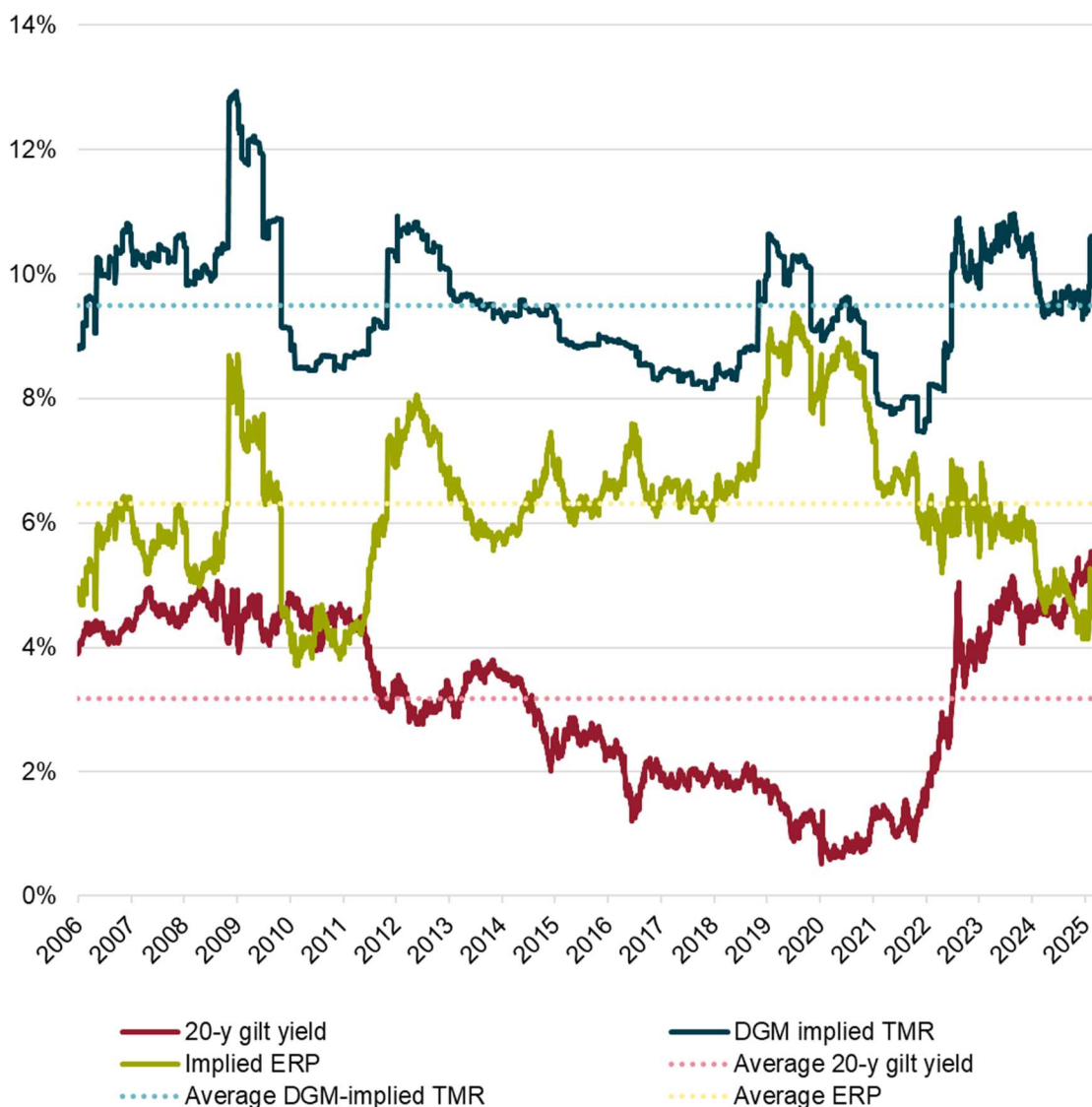
order for the primary duties to be fulfilled. The remaining weight can be given to the long run average to anchor returns in the long run and to preserve a reasonable degree of stability.[64]

5.3 Structural changes in market conditions versus short-term volatility and the implications for TMR-setting

5.3.1   The market can demonstrate structural changes, and short-term market volatility. For setting TMR policy, it important to distinguish enduring changes from short-lived (sometimes erratic) movements. It is the former that we consider necessary to be incorporated into regulators' considerations of the TMR decisions and not the latter. In the remainder of the chapter, we explain how these structural changes can be reflected in TMR-setting.

5.3.2   Figure 6 below shows the DGM-measured TMR for the period of 2006-present (the period over which dividend forecast data was consistently available at a sufficiently granular level to execute a two-step DGM calculation).

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[64]   There is academic evidence to support such an approach e.g. with discounted growth models.

Figure 6   DGM TMR, gilt yields and implied ERP (nominal terms)

Source: *Frontier analysis, Bloomberg, IMF*
Note: *We consider 20-year nominal gilt yields*

5.3.3   The figure above shows nominal TMR (which averages 9.5%) and the nominal gilt yield (which averages 3.2%). Furthermore, we also show the difference between the TMR and the gilt yield, which is the implied Equity Risk Premium (ERP), (averaging 6.3%). We consider whether we can rely on any of these measures to develop TMR policy which reflects structural market changes.

5.3.4   The chart shows that the ERP and gilt yields often move in opposite directions. This observation broadly supports the original Smithers & Co conclusion that the TMR is more stable than the ERP, an observation that led to the current fixed TMR policy. However, we can see also from the figure that despite the co-movement of the ERP and gilt yields in opposite directions, movements in the

two do not perfectly offset each other. This explains why the TMR set out in the figure is still relatively volatile over time. At present this volatility is currently also not considered in regulatory methods, albeit regulators place weight on this volatility in different ways (and they ways in which this is carried out is not clearly set out in the TMR-setting rationale).

5.3.5   We can also observe that major movements in the ERP coincide with high-profile events, such as the Global Financial Crisis, the Eurozone crisis, the 2016 Brexit referendum, and subsequently Brexit, and the Covid-19 pandemic. These events typically lead to large spikes of the ERP, but then subsequent, relatively swift drops. So, it is not entirely clear that ERP reflects structural market changes that need to be factored into regulatory allowed return setting.

5.3.6   We can also examine the evolution of gilt yields, which reflect bond market reactions to these events. There are two well-understood phenomena that explain bond market movements.

- **Risk appetite and flight to safety:** During periods of uncertainty or crisis, investors tend to shift funds from equities into safer government bonds. This "flight to safety"[65] drives the ERP up while simultaneously pushing bond yields down. These reactions are typically sharp but short-lived and contribute to the inverse relationship between the ERP and the risk-free rate, which contributes to the TMR measure being more stable than ERP.

- **Monetary policy effects:** Central banks influence the risk-free rate through interest rate policy and quantitative easing or tightening. These policy-driven changes are largely independent of the ERP and typically drive the TMR in the same direction as the risk-free rate, as ERP normalises after the onset of triggering events.

5.3.7   Figure 6 shows how these events played out in the bond market in the past two decades, such as the drop during the Eurozone crisis reflecting flight to safety, the sustained decrease of yield until 2021 reflecting qualitative easing for nearly a decade, and then finally the gradual increase since the high inflation caused by Russian invasion of Ukraine leading to monetary tightening.

5.3.8   Considering the effect of these two phenomena above, and other factors which are not explored here, the net result we observe is that the TMR is more stable than the ERP or the risk-free rate, but it is not stable enough to the point that it can be considered fixed. To put it differently, neither a fixed ERP nor a fixed TMR regime accurately describes reality, as these two measures fluctuate with different levels of volatility.

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[65]   A flight-to-quality, or flight-to-safety, is a financial market phenomenon occurring when investors sell what they perceive to be higher-risk investments and purchase safer investments, such as gold and government bonds.

5.3.9   It is our view that the movements in the ERP are more sudden and short-lived than those sustained structural movements in the bond market. On this basis, we consider that the trend in gilt yield represents a better proxy for the overall capital market conditions (and thus should be given (more) weight in TMR decisions). Whereas the movements in ERP (although relevant at the time) tend to be transitory and are hard to track or predict accurately and therefore should not be the focus of regulatory decisions.

5.3.10   Based on the discussion and evidence shown above, we consider that the appropriate TMR policy that strikes the balance between reflecting the capital market whilst avoiding short-term volatility is one that reflects structural changes in macroeconomic conditions, and is stable and predictable. A method like this would acknowledge the fact that ERP and the risk-free rate sometimes move in opposite directions (hence long-term average TMR as a starting point) but not when the movement in the risk-free rate is caused by structural changes such as monetary policy. Such a TMR setting policy would acknowledge a lower (higher) than average TMR in a low (high) interest rate environment. We discuss a potential approach to design such a policy.

5.4   An approach which meets the objectives

5.4.1   The challenge we have identified is not insurmountable, i.e. for Ofgem to have a TMR-setting policy in RIIO-3 which delivers the objectives shown in Section 5.2, and thus avoids the negative consequences set out in Section 4.

5.4.2   At SSMC, in a report prepared for National Grid,[66] we set out to develop a framework to operationalise the UKRN's Guidance of setting a stable TMR by estimating a (linear) relationship between the market-implied required TMR and gilt yields: the TMR Glider.[67] The TMR Glider involves the following steps:

(a)   Estimate the market-implied TMR using a two stage DGM model.
(b)   Estimate a linear relationship between DGM estimates of TMR and gilt yields.
(c)   Use the current gilt rate to estimate the TMR using the linear relationship estimated in the step above.

5.4.3   Following our latest data updates, the relationship estimated by the TMR Glider equation is as follows:[68]

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[66]   Frontier Economics (2024) The relationship between total market return and gilt yields, prepared for National Grid Electricity Transmission.

[67]   The TMR Glider developed at that stage was intended as a cross-check.

[68]   For more detail, see Frontier Economics (2025), 'Updated Cost of Equity Cross-Check Evidence – A report prepared for the Energy Networks Association'

$$Nominal\ TMR = 8.34\% + 0.354 \times (20\ year\ nominal\ gilt\ yield)$$

5.4.4   Adopting the TMR Glider as a method to set the TMR is one approach that is able meet the objectives set out in Section 5.2. We set out how this can be achieved in the table below.

Table 2   How the TMR Glider satisfies the characteristics of effective TMR policy

Requirements	How the TMR Glider satisfies the requirements
Reflects contemporaneous market expectations	First, the TMR Glider reflects contemporaneous market data and expectations as it takes current gilt yields as an input.
	As noted in Section 5.3 above, gilt yields are a better proxy for structural market movements (relative to the TMR and ERP).
	The TMR Glider passes through some of this structural variation (35.4%) in its implied TMR estimate. In doing so, the TMR Glider implies a TMR estimate which reflects contemporaneous market expectations, meeting the first objective.
Stable and insulated from short-term market fluctuations	By construction, the Glider smooths short-term volatility and aims to only reflect secular changes in the macroeconomy through interest rate levels.
	TMR Glider smooths out these fluctuations of the DGM-TMR by estimating a linear relationship between TMR and gilt yields over an extended period.
Transparent and predictable	The direction of travel of TMR based on such an approach is predictable; one can predict the resulting TMR estimates based on a view of how interest rates are evolving.
	The TMR Glider methodology can also be agreed or consulted-on ahead of time, increasing transparency and lowering the perception of regulatory risk.
	The data required for Glider estimation is accessible to regulators and other parties of interest.

Source: Frontier analysis

5.4.5   To further illustrate how the Glider satisfies the policy objectives, we show the evolution of the TMR Glider estimates over time, alongside two estimates which we consider may not fully meet all the requirements: the raw-DGM and the long-run historical ex-post DMS arithmetic average. We discuss each in turn below.

Figure 7   DGM-based TMR cross-check evidence and the long-run DMS arithmetic average TMR (CPIH-real)

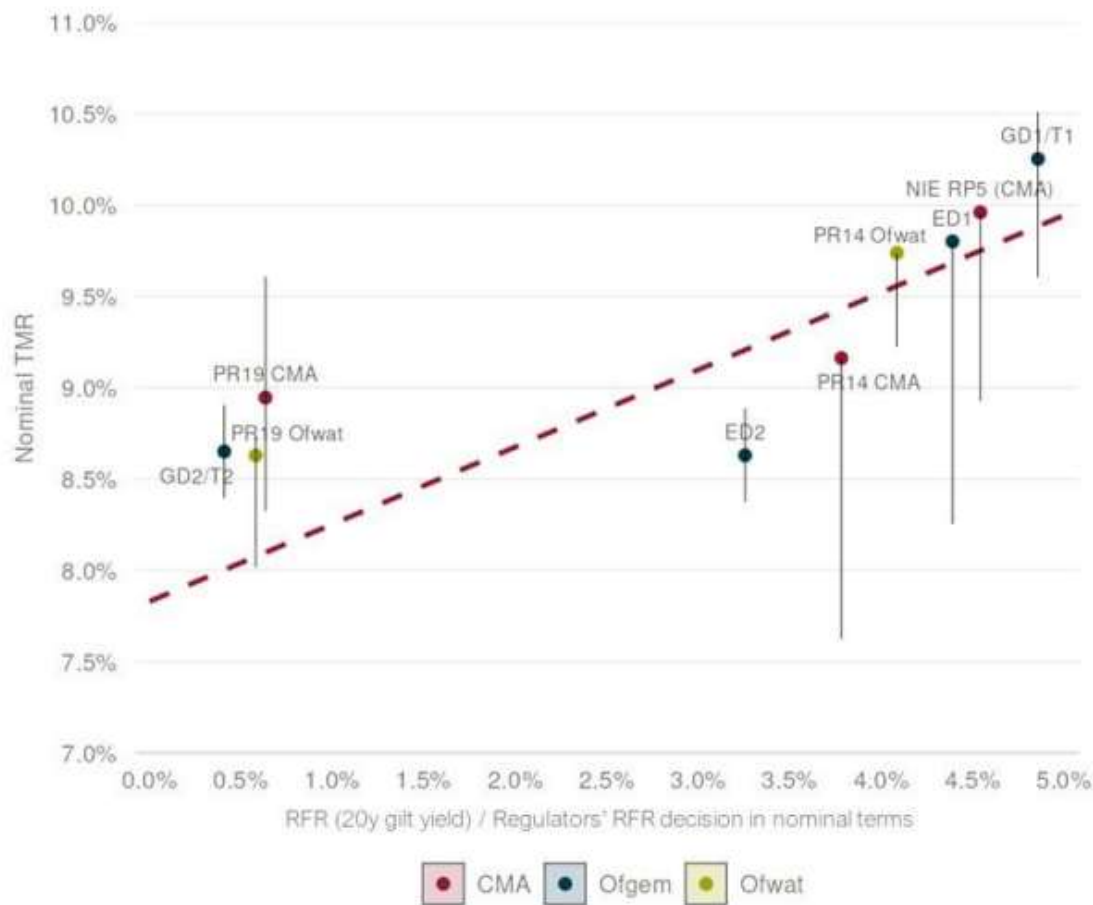*Source:*   *Frontier analysis, DMS*

Note: *For the DMS TMR, the 2006 observation consists of the average between 1900 and 2006. The 2007 observation is the average across 1900-2007, and so on*

5.4.6   First, using the evidence in the figure above, we compare the TMR Glider estimates to the long-run average TMR as reported by DMS. The long-run average is generally considered to be an estimate of the 'fixed TMR' and has been relied on by regulators consistently (albeit different weight has been assigned to this estimate over time).

(a)   We find that the TMR Glider value fluctuates above and below the long-run historical average but with significantly less volatility than the raw DGM-implied TMR. For example, the TMR Glider reflects tightening capital market conditions post-pandemic, as demonstrated by the relatively elevated Glider-implied estimates in the last two years. The long-run average does not reflect this structural change.

(b)   While both the Glider and the long-run average are transparent and predictable, the Glider as an approach can better satisfy the other policy objectives. In fact, the UKRN has stated that a 'fixed TMR' policy will rarely produce a TMR that is appropriate for any given time period.

5.4.7   Second, also drawing on the evidence in the figure above, we compare the TMR Glider estimates to the raw DGM-implied TMR. The DGM-implied TMR is a proxy for the current, forward-looking expected TMR.

(a)   The DGM-implied TMR is more volatile than the TMR Glider. For example, there is a spike in the DGM in April 2025 which reflects the market reaction to US trade policy announcements. While the DGM-implied TMR increased significantly before dropping to similar levels observed before the announcements, the TMR Glider remained relatively stable.

(b)   While the DGM-TMR is transparent, it may not be predictable as market expectations fluctuate over the short-term. On this basis it fully reflects the most current market expectations but it does not provide a stable TMR estimate.

5.4.8   In addition to being able to meet the policy objectives, we note that the Glider (as it is currently specified) reflects TMR levels adopted in actual regulatory decisions reasonably well. Figure 8 below shows TMR Glider against previous TMR and RFR decisions, as most decisions lie close to the Glider line.

Figure 8   TMR Glider against regulatory TMR and RFR decisions

5.4.9   Overall, an approach that embodies some form of relationship between the TMR decision with the contemporaneous gilt rate would be a helpful addition to the regulatory toolkit. Importantly, adopting such a tool would avoid TMR decisions that are misaligned with prevailing rates, and would help Ofgem and regulators deliver their objectives in a more transparent and predictable way.

5.4.10   There are several implementation options that could be used to further refine the process of setting the TMR using the Glider relative to the objectives set out in Section 5.2. For example:

■   **Taking a moving average.** While the Glider already smooths short-term volatility relative to DGM outputs, regulators could use a moving average to further smooth any short term volatility and thus reduce the risk that the spot rates at the time of a decision implies a particularly high or low value which may not be representative of the upcoming period. While there are benefits to applying a moving average, it is important not to apply longer-term averages

to avoid misrepresenting current market conditions. For example, in March 2025, the two year moving average of the Glider was 7.83%.

- **Defining a cap and a floor:** One of the options which we set out in our Business Plan cross-checks report is to define a range around that central point informed by the TMR Glider.[69] The Glider we developed provides a framework for TMR to move with gilt yields, not fully one-to-one, but with a coefficient of 35%. We noted that recent evidence indicates that the width of the Glider interquartile range was c. 1%, and therefore proposed that this could be adopted as a reasonable range of permitted variation of a stable TMR around the central point. If we apply a 1% range around the historical ex-post average of 7.0%, the Glider would currently imply a TMR of 7.5% for RIIO-3.

- **Applying indexation to the TMR.**[70] With a pre-defined relationship between the TMR and gilt rates, as set out in the TMR Glider equation above, it is possible to index the TMR in a similar way to the RFR using the prevailing gilt rate. Figure 9 below shows the implied TMR from the Glider if it was indexed using the October average gilt rates as used in the AIP process for the RFR. While the initial TMR implied by the Glider over 2018 and 2019 is very similar to Ofgem's decision of 6.5% at RIIO-2, interest rates have changed significantly over the RIIO-2 period. Therefore while the RIIO-2 decision on the TMR arguably reflected contemporaneous market data and expectations at the time of the decision, this is no longer the case due to the significant change in capital market conditions over the 5-year period. Indexing the TMR, as shown below, would update the TMR for these changes and therefore remain reflective of market expectations.

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[69]   Frontier Economics (2024). 'Updated Cost of Equity Cross-Check Evidence – A report prepared for the Energy Networks Association'.

[70]   We note that this is a significant regulatory change which may require licence amendments. While this may not be feasible to implement in the short term, this could be implemented in future price controls.

Figure 9   TMR Glider with Indexation relative to Ofgem's RIIO-2 decision
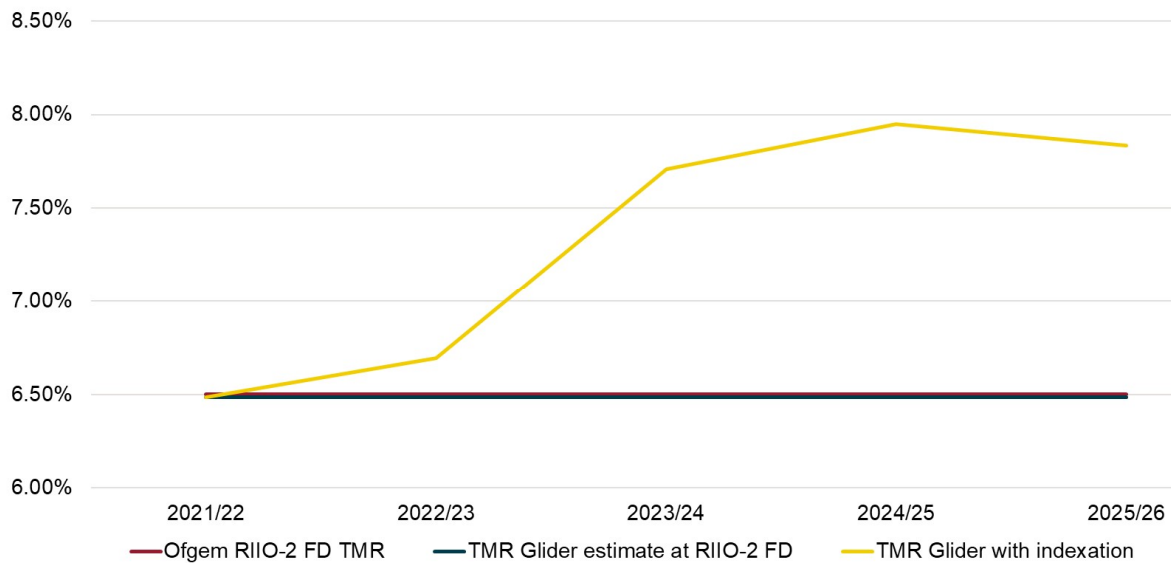
Source: Frontier analysis, Ofgem

Note: We show the TMR Glider using the October average gilt rate (with 18 month lag) in line with Ofgem's AIP process for the RFR

5.4.11   Regardless of the exact implementation, moving towards this approach would be an unambiguous improvement over recent experience, where regulators have been seen producing materially different results whilst attempting to estimate a supposedly 'fixed' number, which in reality tends to fluctuate with economic events. So decisions have ostensibly hinged on arcane technical arguments, such as the appropriate deflator and the presence and size of serial correlation (among other things), which are defended and then abandoned from price control to price control in order to deliver a number that makes sense at a particular time. It is our view that regulatory credibility and predictability is lost along the way at each of such decision point.

5.4.12   We note that putting some weight on TMR estimates that reflect forward-looking market expectations is common practice in some jurisdictions. There are examples of other regulators relying on a combination of different methods, including a forward-looking DGM method.

(a)   IPART, the Australian regulator which covers energy markets, relies on six different DGM models to set the ERP. A 2/3 weight is placed on DGM evidence.[71]

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[71]   IPART, February 2018, "Review of our WACC method"

(b) The New York Public Service authority places weight on DGM and CAPM models to set the allowed return (although this is in relation to the entire CoE and not just the TMR).[72]

5.4.13 In summary, it is clear that DGM models provide helpful information which can complement the long-term historical average. No matter what the specific approach is, as long as it does the three things set out in Section 5.2, it would be a significant improvement to the approach that regulators have taken to date.

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[72] 2022 and 2024 Con Edison rate case testimonies on the authorised ROE 25-E0072 and 22-E-0064 relating to 2025 and 2022 respectively

6   Concluding comments

6.1.1   Regulators including in particular Ofgem have claimed to have aligned their approach to setting TMR using a 'through-the-cycle' policy to promote stability, predictability, and transparency. In practice, however, they have not managed to adhere to this stated policy due to external pressures and the need to fulfil their regulatory duties.

6.1.2   Our review has shown that in the immediate aftermath of the Global Financial Crisis, regulators extended the top end of the TMR range and aimed up, due to concerns that networks may not access capital markets. Subsequently, when interest rates fell and remained low for an extended period, regulators lowered markedly their TMR decisions in response. Yet throughout this whole period, regulators claimed to be following the same, essentially 'fixed TMR' policy, while actually carrying out material adjustments on each occasion.

6.1.3   The UKRN has acknowledged that a 'through-the-cycle' approach could yield a TMR which is either too low or too high, so it is perhaps unsurprising that the temptation to do something different has proven too great when regulators are taking TMR decisions. Under the banner of a continued 'fixed TMR' policy, substantial flexibility has also been afforded to regulators by the UKRN, as a large set of permissible data sources, averaging methods etc. that could inform a TMR decision have been approved for use as each regulator sees fit. Regulators have made use of this flexibility to pick and choose the evidence needed to deliver the number they believe they need. To illustrate, Ofwat had previously ignored submissions on the unreliability of the historic ex ante TMR estimates using Barclays data up to and including the PR24 DD stage, but it then chose to give weight to these concerns at the PR24 FD and scrapped the analysis based on this data. As a result, the TMR estimate in the FD was substantially higher relative to the DD, owing to the same argument that had already been submitted to them before the DD.[73]

6.1.4   It is hard for the observers to tell whether these decisions indeed delivered regulators duties as they intended. But what is clear is that the lack of stability, predictability and transparency associated with TMR setting is detrimental for both investors and customers, as uncertainty increases regulatory risks for investors, which in turn can result in an increase in the cost of capital and negatively impact customers. An approach that brings greater stability, predictability and transparency has the potential to markedly lower risk, and by doing so reduce the actual cost of capital.

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[73]   See Section 3.6 above.

6.1.5   The energy sector currently faces the significant challenge of achieving Net Zero. If a regulatory allowance is set below investor expectations, this would lead to scaling back of investment plans. New investors would also be deterred from deploying their capital in the sector. The full detriment may only become apparent over time, but insufficient investment will inevitably lead to reduced performance levels or inability to achieve policy objectives, which leads to long term consumer harm. Even if investment is forthcoming, because regulators find a way to entice investors to commit funds by other means, there remains the clear danger that securing access to capital comes at a higher cost than it should.

6.1.6   There is a clear need to fix the way TMR is set by regulators. The right approach to setting the TMR should reflect contemporaneous market expectations, in a stable, transparent and predictable way, as we have set out in Section 5 above. This is not what Ofgem has done in the RIIO-3 DDs.

6.1.7   While we think this issue is an important one that all regulators should consider, it is particularly critical for RIIO3 given Ofgem's stated ambitions for the sector and the government's Clean Power 2030 objectives. Absent change, Ofgem's approach risks eroding investor confidence at a time when securing investment is paramount. We therefore urge Ofgem to engage on this issue for RIIO-3 and to adapt its approach in the FDs. This will ultimately serve the long-term and short-term interests of customers.

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