



Review of Ofgem's Estimate of the RPI Formula Effect

A Report for Energy Networks Association

August 2014

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1. Overview

NERA has been commissioned by the Energy Networks Association (ENA) to examine Ofgem's approach to adjusting its allowances for both real price effects (RPE) and the cost of equity for the "RPI formula effect". The RPI formula effect refers to the change in computation of the RPI in 2010.

This report draws extensively on a separate NERA report for the Energy Networks Association (ENA) on Ofgem's RPE allowances, which reviewed Ofgem's wider approach to estimating RPEs, including its adjustment for the formula effect.¹ In our ENA RPE report, we show that Ofgem's estimate of the formula effect of 40 basis points (bp) overstates the effect, and we conclude that a reasonable interpretation of the evidence supports a smaller adjustment of 15bp.

This report also draws on our separate report for ENA on Ofgem's approach to setting the cost of equity.²

The remainder of this chapter summarises Ofgem's approach to adjusting allowances for both RPEs and cost of equity for the RPI formula effect and our concerns with its approach to both.

Section 2 sets out in detail our critique of Ofgem's calculation of the RPI formula effect.

1.1. Summary of Ofgem's Approach and Our Concerns

1.1.1. RPEs

In the Cost Assessment Appendix to its Draft Determination, Ofgem adjusts its RPE calculations for a 2010 "step change" in RPI.³ As explained in more detail in our separate RPE report for ENA, Ofgem reduces those real input price forecasts which draw on historical averages by 40 bps to reflect its estimate of the step change in RPI going-forward relative to the historical RPI.

For the reasons set out in section 2, we consider that Ofgem's overstates the adjustment for the formula effect. As a consequence, Ofgem's proposed allowance for RPEs is insufficient to compensate companies for expected increases in input prices over the RIIO-ED1 period. Ofgem should revise its long-run RPE forecasts (i.e. those not based on short-term forecasts but derived based on long-run historical averages) by 15 bp for the formula effect as opposed to 40bp.

¹ NERA (2014) Review of Ofgem's Draft Determination of Real Price Effects for RIIO-ED1

² NERA (2014) A Response to Ofgem's Cost of Equity Estimates in the RIIO-ED1 Draft Determination

³ Ofgem (30 July 2014), "RIIO-ED1: Draft determinations for the slow-track electricity distribution companies – Business plan expenditure assessment", <https://www.ofgem.gov.uk/ofgem-publications/89068/riio-ed1draftdeterminationexpenditureassessment.pdf>, p. 119.

As set out in our separate RPE report, Ofgem should also correct its approach to RPEs for other issues namely in relation to its use of third-party wage forecasts, and the method to calculate long-term growth rates.

1.1.2. Cost of equity

In addition to adjusting its forecast RPEs, Ofgem also draws on the formula effect to justify its cost of equity estimate of 6 per cent. Ofgem determined a 6 per cent cost of equity allowance in its February 2014 decision on the methodology for assessing market returns,⁴ with confirmation in its Financial Issues Appendix to its Draft Determination.⁵

1.1.2.1. February 2104 decision

In its February 2014 decision, Ofgem considers that a cost of equity of 6% is consistent with its interpretation of long-term evidence for debt yields adjusting for the RPI formula effect. It stated:⁶

“In our Strategy decision, we quoted a range for the risk-free rate of 1.7 to 2.0 per cent reflecting our long-term view. As explained in our consultation on the equity market return, we subsequently gave more detailed consideration of the uncertainties in our estimate and in particular to the impact of the RPI formula effect. The formula effect has led to an enduring increase of around 0.4 per cent per annum in the RPI due to a problem with the calculation methodology ... [leading to] a corresponding reduction in the yield or cash flow return that investors require on index-linked assets. After adjusting for this effect in RPI, our previous range for the risk-free rate becomes 1.3 to 1.6 per cent.”

In its Financial Issues Appendix to its Draft Determination, Ofgem shows that its cost of equity is consistent with a risk-free rate of 1.5 per cent. Thus, Ofgem considers that its decision on the risk-free rate is consistent with long run market evidence, adjusted for its view of the RPI formula effect.

However, Ofgem’s adjustment to the long-run evidence on the risk-free rate of 40 bps for the formula effect, and therefore its proposed range of 1.3-1.6 per cent, is incorrect. A more

⁴ Ofgem (February 2014) Decision on our methodology for assessing the equity market return for the purpose of setting RIIO-ED1 price controls. Link: <https://www.ofgem.gov.uk/publications-and-updates/decision-our-methodology-assessing-equity-market-return-purpose-setting-riio-ed1-price-controls> See also: Ofgem (December 2013) Consultation on our methodology for assessing the equity market return for the purpose of setting RIIO price controls. Link: <https://www.ofgem.gov.uk/publications-and-updates/consultation-our-methodology-assessing-equity-market-return-purpose-setting-riio-price-controls>

⁵ Ofgem (30 July 2014) RIIO-ED1: Draft determinations for the slow-track electricity distribution companies, Financial Issues

⁶ Ofgem (February 2014) Decision on our methodology for assessing the equity market return for the purpose of setting RIIO-ED1 price controls, para. 1.17. p.8. Ofgem included an equivalent statement in its consultation. It stated: “We consider that the effect of the ONS conclusion has been to reduce the yields required by investors in RPI-indexed assets by about 0.4%. Accordingly, we recalibrated our estimate of the long-run real risk-free rate from the 2.0% we used in our RIIO-GD1 decision to 1.6% and reduced our estimate of the real (RPI) equity market returns to 6.85%.” Source: Ofgem (Dec 2013): Consultation on our methodology for assessing the equity market return for the purpose of setting RIIO price controls

reasonable interpretation of the historical long-run average would be 1.55 to 1.85 per cent, based on Ofgem's assumed range for the risk-free rate, gross of the formula effect, of 1.6 to 2 per cent, but reduced by 15bp for the formula effect.

1.1.2.2. Draft Determination

In its Financial Issues Appendix to its Draft Determination,⁷ Ofgem places greater emphasis on current market conditions in estimating the risk-free rate and equity risk premium rather than drawing on long-run historical averages (as described above). Therefore, it does not set out evidence on long-run historical returns as the basis for its decision (as per its February 2014 decision), and therefore it does not need to consider the formula effect. Instead, it draws on the Competition Commission's (CC) decision on the risk-free rate and equity risk premium in relation to Northern Ireland Electricity (NIE).⁸

As we set out in our separate cost of equity report, CC's NIE decision is not relevant for RIIO-ED1 given the two different reviews periods. In summary, the RIIO-ED1 price review period (2015-2023) starts 3 years later and finishes 6 years later than NIE's (2013-2018). The current exceptional period of low interest rates – reflected in the CC's assumption of a 1.5% real risk-free rate for NIE – is unlikely to hold, with the market expecting the economy to return close to long-run normal conditions. For this reason (among others set out in our separate cost of equity report), we consider that CC's estimates of the risk-free rate and EPR for NIE are not relevant to RIIO-ED1.

1.1.3. Conclusions on cost of equity

Ofgem's determination of a long-run risk-free rate of 1.3 to 1.6 per cent based on 40 bp adjustment for the formula effect, as set out in its February 2014 decision, is incorrect. A reasonable adjustment to long-run historical average would be 15bps, leading to a risk-free rate of 1.55 to 1.85 per cent based on Ofgem's own analysis. As a consequence, its final point estimate of 1.5 per cent based on CC NIE decision set out in its Draft Determination is at the bottom of the range suggested by long-run market evidence.

In our separate cost of equity report for ENA, we also show that Ofgem should not draw on the short-term market data employed by the CC for NIE given that the CC NIE decision applies to a very different time period.

Overall, as set out in our separate cost of equity report, Ofgem should adopt a total market return (TMR) of 7 per cent instead of 6.5 per cent set out in its Draft Determination reflecting the expectation of normal economic conditions over RIIO-ED1.⁹

⁷ Ofgem (30 July 2014) RIIO-ED1: Draft determinations for the slow-track electricity distribution companies, Financial Issues

⁸ Competition Commission (2014) NIE final determination; Link: <https://www.gov.uk/cma-cases/northernireland-electricity-price-determination>.

⁹ NERA (2014) A Response to Ofgem's Cost of Equity Estimates in the RIIO-ED1 Draft Determination, p. XX

2. Analysis of the RPI Formula Effect

The chapter sets out our detailed critique of Ofgem’s estimate of the formula effect. It draws extensively on the material set out in our separate report on RPEs for ENA.

Section 2 provides the necessary context for understanding Ofgem’s decision, and Section 2.2 discusses Ofgem’s rationale. Section 2.3 argues that the 40bp adjustment is arbitrary in light of prior changes to the RPI. Section 2.4 considers the size of the adjustment that ought to be made, *assuming* that Ofgem is justified in making one. Section 2.5 discusses the impact of possible future changes to RPI. Section 2.6 draws conclusions.

2.1. Background

There is more than one method for aggregating individual price changes into an economy-wide index. The RPI and CPI use different formulae at the lowest level of aggregation: an arithmetic and a geometric average respectively. The implication is that the RPI is more sensitive than the CPI to increases or decreases in variation in the sample of price changes.¹⁰ If a modification to ONS data collection methods raises the variation in a quantitatively important sample, the wedge between the RPI and CPI is likely to increase.

In 2010, ONS made some modifications to its data collection methods for clothing and footwear. These modifications raised the variation of the relevant samples. In December 2010, ONS analysed the wedge between the RPI and CPI and concluded that the portion of the wedge attributable to the difference in formulae (“the formula effect”) had gone up by 32bp as a result of the change.¹¹ The OBR said in a 2011 working paper that it expected the long-term effect of the change to fall between 30 and 50bp.¹² More recently, the Bank of England said in its February 2014 inflation report that it expected the formula effect that influences the difference between CPI and RPI to remain about 40bp above its pre-2010 average.¹³

2.2. Ofgem’s Decision

In its ED1 Draft Determination, Ofgem states that RPI has “*experienced a step change relative to underlying cost inflation in the economy*”.¹⁴ Specifically, Ofgem asserts, RPI growth will be 40bp higher each year than it would have been in the absence of a step change. Since DNOs’ cost allowances are indexed to the RPI, this means that DNOs will receive larger allowances (in terms of both expenditure allowances and allowed return on equity)

¹⁰ ONS (December 2010), “CPI and RPI: Increased impact of the formula effect in 2010”, <http://www.ons.gov.uk/ons/guide-method/user-guidance/prices/cpi-and-rpi/cpi-and-rpi--increased-impact-of-the-formula-effect-in-2010.pdf>, p. 3.

¹¹ Ibid., p. 1.

¹² Miller, R. (November 2011), “The long-run difference between RPI and CPI inflation”, <http://budgetresponsibility.org.uk/wordpress/docs/Working-paper-No2-The-long-run-difference-between-RPI-and-CPI-inflation.pdf>, p. 10.

¹³ Bank of England (February 2014), “Costs and prices”, *Inflation Report 2014*, <http://www.bankofengland.co.uk/publications/Documents/inflationreport/2014/ir14feb4.pdf>, p. 34.

¹⁴ Ofgem (July 2014), p. 119.

than they would have received in the absence of a step change. Ofgem's adjustments are attempts to offset this effect.

Ofgem refers the reader to its February 2014 decision¹⁵ on the equity market return for RIIO-ED1 for more detail. In that decision, Ofgem states that “*a problem with the calculation methodology*” for the RPI has led to “*an enduring increase of around 0.4 per cent per annum in the RPI*”.¹⁶ It notes that the RPI has been de-designated as a National Statistic (for reasons related to the formula effect).

Ofgem's decision is somewhat misleading. The UK Statistics Authority did not de-designate the RPI as a National Statistic because of the 2010 changes or the rise in the formula effect. It did so because ONS was *not* willing to contemplate major changes to the RPI, such as a switch from an arithmetic to a geometric mean.¹⁷ ONS had declined to bring the RPI in line with international practice, stating that “*there is significant value to users in maintaining the continuity of the existing RPI's long time series without major changes*”.¹⁸

Therefore, the RPI was de-designated as a National Statistic precisely *because* ONS wanted to preserve its suitability for long-term indexation. It was not de-designated because of any alleged step change. Neither the UK Statistics Authority nor ONS has ever recommended that users adjust for changes to the RPI formula by deducting 40bp per year (or making any adjustment whatsoever).

2.3. Prior Changes to the RPI

ONS publishes a new Consumer Price Indices Technical Manual¹⁹ every year. This publication demonstrates that the CPI and RPI are subject to frequent methodological adjustments. (ONS considers all of these to be “routine” updates, in contrast to the “major” changes considered and rejected in 2013.) For example:

- Prior to 1994, collectors used their own judgment to choose outlets within a particular location. Afterwards, formal sampling methods were introduced. However, collectors continued to use their own judgment to choose items in a particular category within a particular outlet. In 2004, formal sampling methods were applied to certain goods.²⁰

¹⁵ Ofgem (17 February 2014), “Decision on our methodology for assessing the equity market return for the purpose of setting RIIO-ED1 price controls”, <https://www.ofgem.gov.uk/ofgem-publications/86366/decisiononequitymarketreturnmethodology.pdf>.

¹⁶ Ofgem (17 February 2014), p. 9.

¹⁷ UK Statistics Authority (March 3013), “Assessment of compliance with the Code of Practice for Official Statistics: the Retail Prices Index”, <http://www.statisticsauthority.gov.uk/assessment/assessment/assessment-reports/assessment-report-246---the-retail-prices-index.pdf>, p. 2.

¹⁸ ONS (10 January 2013), “National Statistician announces outcome of consultation on RPI”, http://www.ons.gov.uk/ons/dcp29904_295002.pdf, p. 1.

¹⁹ See ONS (2014), *Consumer Price Indices Technical Manual*, <http://www.ons.gov.uk/ons/rel/cpi/consumer-price-indices---technical-manual/2014/index.html>.

²⁰ ONS (2014), p. 25.

- Prior to 1995, the choice of locations for sampling “*largely reflected the location and availability of civil servants*” required to carry out the work. In 1995, ONS introduced strict rules for selecting locations. By 1999, it had moved to complete random sampling.²¹
- In 1996, ONS decided to draw from fewer locations but to collect more quotations for highly variable commodities and fewer quotations for less variable commodities.²²
- In 2000, ONS introduced a new procedure for determining locational boundaries. Locations were defined around a central shopping centre and “grown outward” at a rate depending on the level of retail activity.²³
- Prior to 2011, prices for out-of-stock seasonal items were carried forward until a new price was available. After 2011, ONS introduced a method for calculating “imputed” prices.²⁴
- Various other changes pertaining to particular categories of items (e.g. telephone service, new cars, fruits and vegetables) have been introduced over time.

It is simply not practicable for Ofgem to review every change in the RPI and adjust both its RPE calculations, and allowed cost of equity, accordingly. In this case, Ofgem has proposed a particular adjustment to both RPEs and historical real risk-free rate based on a figure reported in an OBR working paper, and its focus on the 2010 step change was not part of a regular series of reports but an investigation of an issue that happened to interest the author.

There are three implications. First, Ofgem cannot reasonably expect to be informed about every quantitatively important change to the RPI in future. Second, even if it were perfectly informed, it would have an incentive to “cherry-pick”, imposing deductions for changes that exert upward pressure on the RPI but dismissing changes that exert downward pressure as unimportant. Third, Ofgem certainly has not analysed and corrected for past methodological changes listed above. Some of these changes may have had large quantitative effects, but (since ONS methods and analytical capabilities were less advanced 20 years ago than they are today) there is likely to be little evidence either way.

In light of these observations, we consider Ofgem’s 40bp deduction to be an arbitrary adjustment. By cherry-picking and adjusting for one particular change in RPI, Ofgem’s resulting RPE forecast may be biased downwards.

2.4. Scale of the Proposed Adjustment

Even if we were to adopt Ofgem’s view that it is appropriate to adjust the forward-looking RPE to reflect the impact of the change in RPI that took place in 2010, recent data shows that the 40bp adjustment would be excessive.

The “formula effect”, as defined and calculated by ONS, can be summarised as “*the difference between the CPI and RPI*” arising from different formulae used to aggregate price

²¹ ONS (2014), p. 21.

²² ONS (2014), p. 28.

²³ ONS (2014), p. 22.

²⁴ ONS (2014), p. 54.

changes. However, it is *literally* the difference between the actual CPI and a recalculated CPI using the RPI formula.²⁵ Put simply, it is the effect of the CPI formula on the CPI, not the effect of the RPI formula on the RPI. Since the two indices differ in other ways (e.g. they include different items and place different weights on the items they both include) these two effects may not be identical.

Northern Powergrid makes the same observation in a January 2014 response²⁶ to Ofgem's consultation²⁷ on its methodology for setting the equity market return. Northern Powergrid notes that the correct way to determine the effect of the RPI formula on the RPI is to compare the RPI to the RPIJ, which uses a geometric mean at the elementary aggregate level but is otherwise equivalent to the RPI. Since ONS has calculated the RPIJ over a long time series (beginning in 1997), it is possible to determine the effect of the 2010 step change by comparing the pre-2010 difference between RPI and RPIJ to the post-2010 difference.

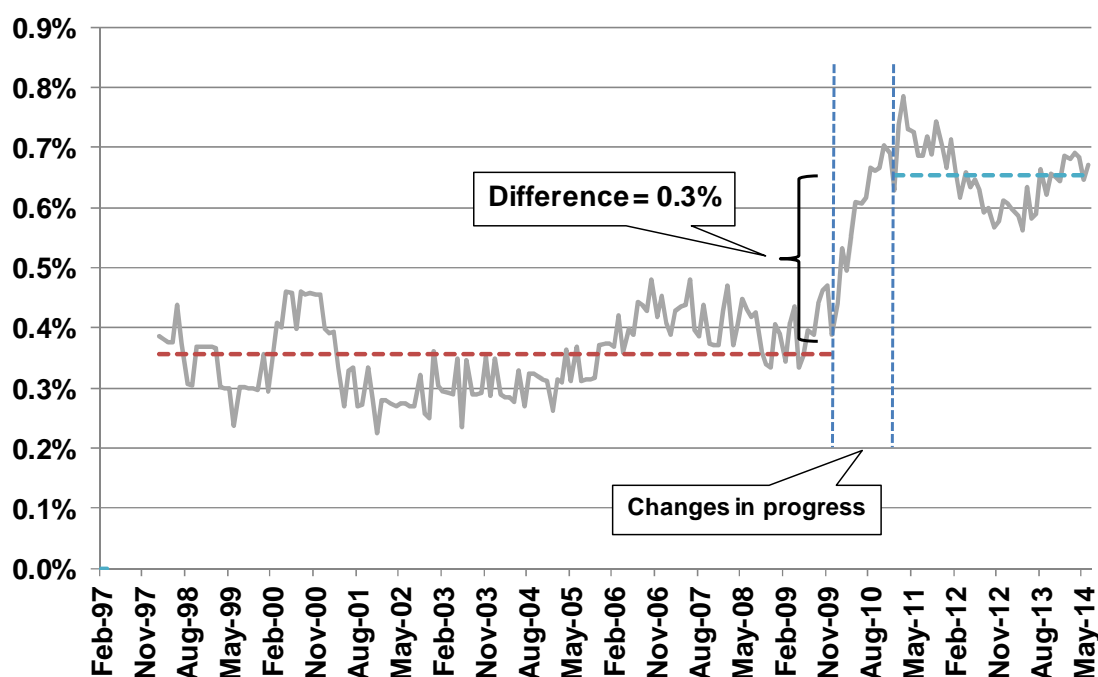
We agree with the Northern Powergrid comment, suggesting comparing RPI and RPIJ is a more appropriate method for estimating the increase in RPI due to the methodological change that ONS implemented in 2010. Hence, using this approach, in Figure 2.1 we compute rolling year-on-year growth rates for RPI and RPIJ. We then compute the average difference in growth rates across each period. (We omit 2010 since the new data collection methods were implemented gradually over the course of the year.) We find that the true formula effect over this period is 30bp, which is 10bp below the formula used by Ofgem.

²⁵ ONS (2010), "Consumer Prices Index and Retail Prices Index – analysing differences", <http://www.ons.gov.uk/ons/guide-method/user-guidance/prices/cpi-and-rpi/consumer-price-index-and-retail-price-index---analysing-differences.pdf>, p. 2.

²⁶ Northern Power Grid, 7 January 2014, "Appendix 2 to the consultation", <https://www.ofgem.gov.uk/ofgem-publications/85473/eqmrworkshop7jan2014npgpresentation.pdf>, slide 3.

²⁷ Ofgem (6 December 2013), "Consultation on our methodology for assessing the equity market return for the purpose of setting RIIO price controls", <https://www.ofgem.gov.uk/ofgem-publications/85020/consultationonequitymarketreturnmethodologyletter.pdf>.

Figure 2.1
Difference between RPI and RPIJ



Source: NERA analysis of ONS data

2.5. Future Changes to RPI

The latest ONS work programme for consumer price statistics from October 2013 indicates that a further change in the data collection method of clothing might be implemented as soon as 2015.²⁸ The improvement of the clothing price collection methodology is set out as one of the focus projects. ONS introduced a pilot price collection in 2012 based on a revised methodology which aims at “*introducing greater consistency to the price collection for clothing and hence reduce the volatility within clothing inflation indices*”.²⁹ The National Statistician’s Consumer Prices Advisory Committee (CPAC) finds in its pilot update report that the revised collection methodology of the pilot results in a smaller gap between the RPI and CPI, reducing the “formula effect” on average by around 12 per cent.³⁰

While a final conclusion on the implementation of the revised methodology for the main clothing price collection has not been reached yet, the pilot project and the ONS work programme indicate that further changes to the RPI may be expected, which are likely to

²⁸ ONS (2013), “Work Programme for Consumer Price Statistics”, <http://www.ons.gov.uk/ons/guide-method/user-guidance/prices/cpi-and-rpi/work-programme-for-consumer-price-statistics.pdf>, p. 12.

²⁹ ONS, Consumer Prices Advisory Committee (2012), “Update on clothing pilot price collection”, <http://www.ons.gov.uk/ons/guide-method/development-programmes/other-development-work/consumer-prices-advisory-committee/cpac-papers/update-on-clothing-pilot-price-collection.doc>, p. 10.

³⁰ Ibid, p.9.

reduce the “formula effect”. This suggests that Ofgem’s downward adjustment of 40bps for RII0-ED1 would more than offset the impact of the change in RPI.

The ONS work programme presents a number of other projects and proposed amendments for consumer price statistics, which include:

- Implementation of temporal sampling for specific items in the basket of goods and services, as opposed to currently single index day sampling;
- Continued development of Northern Ireland private rental data for inclusion in CPI/RPI in the future;
- Updating the sample frame used to select locations for the local price collection;
- Considering new data collection methods such as the use of scanner data; etc.

Hence, it is clear that during the ED1 period, further changes that may *reduce* the formula effect may be implemented. This reinforces the conclusion that Ofgem’s proposed 40bps adjustment for the whole forecast period materially overstates the impact of the 2010 structural change in RPI on the real input price inflation (i.e. above RPI), and the cost of equity financing, that DNOs will expect to face in the coming regulatory period. This evidence also shows that reviews and modifications to the RPI calculation methodology will continue to be part of the regular work programme of the ONS, so controlling for particular changes in price indices constitutes cherry-picking.

2.6. Conclusions

In light of prior changes to the RPI, we believe that the case for an RPI adjustment is weak. We consider 30bp (10bp below the adjustment used by Ofgem) to be the upper bound on *any* plausible adjustment, based on the difference between RPI and RPIJ.³¹

However, given that the RPI has undergone other structural changes in the past, and will continue to do so in the future, it would be selective to adjust for this effect without considering the possible effect of other changes to the way RPI is (or will be) calculated. In this case, it would be inappropriate to apply any RPI adjustment at all. However, reflecting the relatively significant nature of the change in RPI that took place in 2010, we recommend that a more reasonable adjustment for the RPI effect would be to reduce by 50% the maximum RPI adjustment that we consider to be potentially justifiable (30bps), giving a negative adjustment of 15bps instead of Ofgem’s assumption of 40bps.

Our proposed adjustment for the RPI formula effect has the following two consequences:

- Ofgem should revise RPE forecasts based on long-term historical averages by 15bp instead of 40bp, i.e. it should increase the allowances set out in the draft determination by 25 bp.

³¹ We note that a smaller adjustment (or the absence of an adjustment) would reduce measured growth rates for 2010-14 and short-term earnings growth forecasts but would raise the “baseline” forecasts computed from long-term historical averages.

- Ofgem's determination of a long-run risk-free rate of 1.3 to 1.6 per cent based on 40 bp adjustment for the formula effect, as set out in its February 2014 decision, is incorrect. A reasonable adjustment to long-run historical average would be 15bps, leading to a risk-free rate of 1.55 to 1.85 per cent based on Ofgem's own analysis. As a consequence, its final point estimate of 1.5 per cent based on CC NIE decision set out in its Draft Determination is at the bottom of the range for long-run market evidence.

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