Response to the CMA on estimating RPI-adjusted equity market returns

Prepared for Heathrow Airport Limited

15 April 2020

Final

1 Introduction

In its provisional findings report[1] in the NATS (En Route) Plc regulatory appeal, the CMA has looked at two approaches to deflating historical equity returns, which it terms 'CED/CPI' and 'CED/RPI'. The CMA concludes on a range of 5 – 6% for the RPI-real TMR. This is aligned with the results from the CED/CPI methodology and effectively places no weight on the cross-check using the CED/RPI methodology.

The CED/RPI cross-check makes two adjustments relative to the approach used by the CMA in the Northern Ireland Electricity (2014) price control re-determination.

1. For the period 1900-1947 the CMA replaces the Cost of Living Index (COLI) with the Consumption Expenditure Deflator (CED), which increases the long-run average RPI inflation by around 35bp;
2. The CMA increases the long-run historical average of RPI inflation by 35bp based on an observation from a chart showing an increase in the contribution of the 'formula effect' to the difference between RPI and CPI inflation.[2]

The CMA justifies these methodology changes by highlighting two concerns with using the RPI index to deflate returns after 1947:[3]

[1] CMA (2020), 'NATS (En Route) Plc/CAA Regulatory Appeal, Provisional findings report', 24 March 2020.
[2] Competition and Markets Authority (2020), 'NATS (En Route) Plc /CAA Regulatory Appeal: Provisional findings report', 24 March, para. 12.192 and 12.208.
[3] Competition and Markets Authority (2020), 'NATS (En Route) Plc /CAA Regulatory Appeal: Provisional findings report', 24 March, para. 12.192.

1. RPI is a less robust measure of inflation than CPI;
2. RPI is an inconsistent measure of inflation over time due to changes over time to the way that RPI is calculated.

The evidence that the CMA has used to make changes to the methodology for deflating equity returns is not new, and was readily available when the CMA re-determined the price control for Northern Ireland Electricity in 2014. The cumulative impact of these adjustments is a 70bp reduction in the RPI-real TMR relative to that determined by the CMA in 2014. The CMA reports that this produces a range of 5.6 – 6.2%. This approach is not robust, as explained below.

2 The role of RPI in estimating real returns

The first concern – that RPI is a less robust measure of inflation than CPI – is an argument for using CPI instead of RPI to measure inflation today, but does not apply to the past. The CPI was first published in 1996 and was subsequently modelled back to 1988. In 2013, further modelling extended the CPI estimates back to 1950.[4] The authors of the latter exercise cautioned that:

> It is difficult to assess the accuracy of the series, as the true CPI can never be known. For that reason it is also worth emphasising that these modelled estimates can only be considered as broad indications of the level of the CPI series at best and caution should be exercised when using these series. For the same reason, these estimates are **not** National Statistics.[5]

The consequences of relying on estimated data are evident in the evolution of the modelled data for the 1988–1995 period. In 1998 this data was described as 'a good proxy to what the series would have been if constructed from scratch according to the rules of the official HICP series'.[6] However, twenty years later, the ONS corrected an error in the modelled historical CPI series for the period 1988–1996.

> In developing the [CPIH historical] series, we identified an error in the calculation of the modelled CPI historical estimates. This does not affect the CPI National Statistic series published from 1997. The affected part of the series is between 1988 and 1996, which was modelled later, after the introduction of CPI in 1997.[7]

Although this error was corrected for the 1988–1995 period, it still exists for the 1950–1987 period and the ONS is in the process of revising these estimates.

In contrast, the RPI has been published since 1947 and is not subject to estimation error.[8] This extended history for RPI is valuable when deflating historical equity returns since 1900, and forming an estimate of the required rate of return to use when setting price controls. Using RPI's considerably longer time series of raw underlying price data means that important economic shocks that investors have faced in the past, and may potentially face in the future, can be captured.

[4] O'Neill, R. and Ralph, J. (2013), 'Modelling a Back Series for the Consumer Price Index', Office for National Statistics.
[5] O'Neill, R. and Ralph, J. (2013), 'Modelling a Back Series for the Consumer Price Index', Office for National Statistics, p.7.
[6] O'Donoghue, J. (1998), 'Harmonised Index of Consumer Prices: Historical Estimates', *Economic Trends*, No. 541, December, p. 50.
[7] Office for National Statistics (2018), 'Consumer Prices Index including owner occupiers' housing costs (CPIH) historical series: 1988 to 2004', 14 December.
[8] The Interim Index of Retail Prices was introduced in 1947, which underwent methodological changes and became the Index of Retail Prices in 1956.

3 Accounting for methodological changes in the RPI series

The second concern – there have been several changes to the RPI methodology over time – suggests that the impact of all changes made to the calculation of the RPI over time may make the historical average of RPI inflation incomparable to the way RPI is calculated today. However, instead of investigating all the changes over the history of the RPI, the CMA has only considered the change in the way clothing prices were collected in 2010.[9]

Wright and Smithers (2014) expressed their concern about making such a selective adjustment:

> We therefore simply do not know whether, for example, this new source of bias [referring to the 2010 change in RPI] may simply offset the impact of other biases in earlier data.[10]

There have been several other important changes to the RPI methodology. The CMA acknowledges some of these in Appendix E, para 8:

> Oxera highlights 5 (further) key changes in the RPI methodology since 1947:
>
> (a) In 1956 the RPI experienced a range of important methodological improvements, in particular, all wage-earning households were included— not only the working class, the index took its weights from the more recent 1953 expenditure survey, rather than the pre-war late-1930s survey, and owner-occupier housing costs were included for the first time.
>
> (b) From 1962, expenditure weights were updated on an annual basis. 5 Johnson Review, page 53.
>
> (c) In 1968, prices of food and drink purchased in restaurants were introduced.
>
> (d) In 1975, mortgage interest payments were introduced to represent owner occupiers' housing costs.6
>
> (e) In 1986 it was decided to exclude the top 4% of households, based on their household income (before this, households earning more than a certain amount were excluded). In the following years, holidays started being included as well.

The Oxera research conducted for Heathrow used an indicator saturation approach to test for all the breaks during the history of the RPI and is thus a more comprehensive and objective analysis than that undertaken by the CMA.[11]

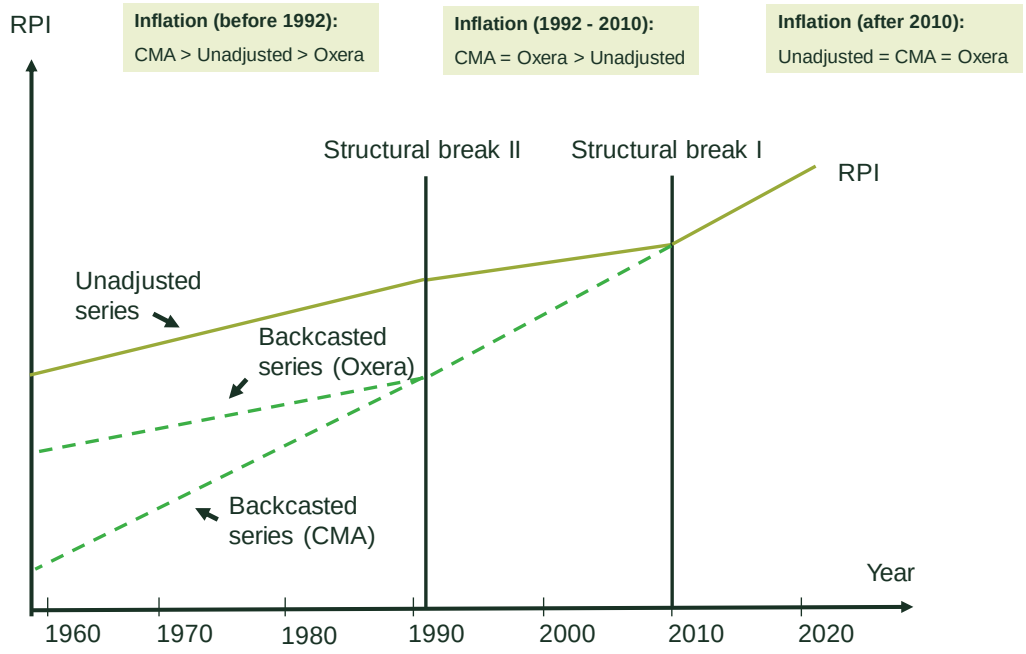
This research concluded that the maximum upward adjustment that would be required to make the long-run average of historical RPI inflation consistent with how RPI is calculated today was 30bp. Moreover, under some specifications of the structural break test, the net effect of all the changes was zero, implying that no adjustment should be made to the long-run average of RPI inflation. In other words, the long-run average of RPI inflation could be used to deflate the

[9] Competition and Markets Authority (2020), 'NATS (En Route) Plc /CAA Regulatory Appeal: Provisional findings report', 24 March, para. 12.207.
[10] Wright, S. and Smithers, A., The Cost of Equity Capital for Regulated Companies: A Review for Ofgem, page10 (2014).
[11] Oxera (2019), 'Estimating RPI-adjusted equity market returns', prepared for Heathrow Airport Ltd, 2 August.

long-run average equity return without making any further adjustments for the forecast wedge between RPI and CPI inflation.

Error! Reference source not found. illustrates the difference between the approaches. While the CMA only picks up the 2010 change, and effectively uses it to back-cast until 1900, the Oxera approach has the capability to detect and estimate the impact of further shocks, such as the introduction of foreign holidays in the early 1990s. As illustrated, this may drive a wedge between the back-cast RPI series of Oxera and the CMA and may result in a lower average inflation.

Figure 3.1 \ Why only examining the 2010 change biases the estimate of historical RPI downwards and overstates historical inflation



Note: The magnitudes of the effects are not drawn to scale. The lines on the graph show the growth of the RPI with and without the adjustments by Oxera and the CMA, and the corresponding differences in inflation can be read from the relative slopes of the lines.

Source: Oxera analysis

3.1 Updating the Oxera indicator saturation approach

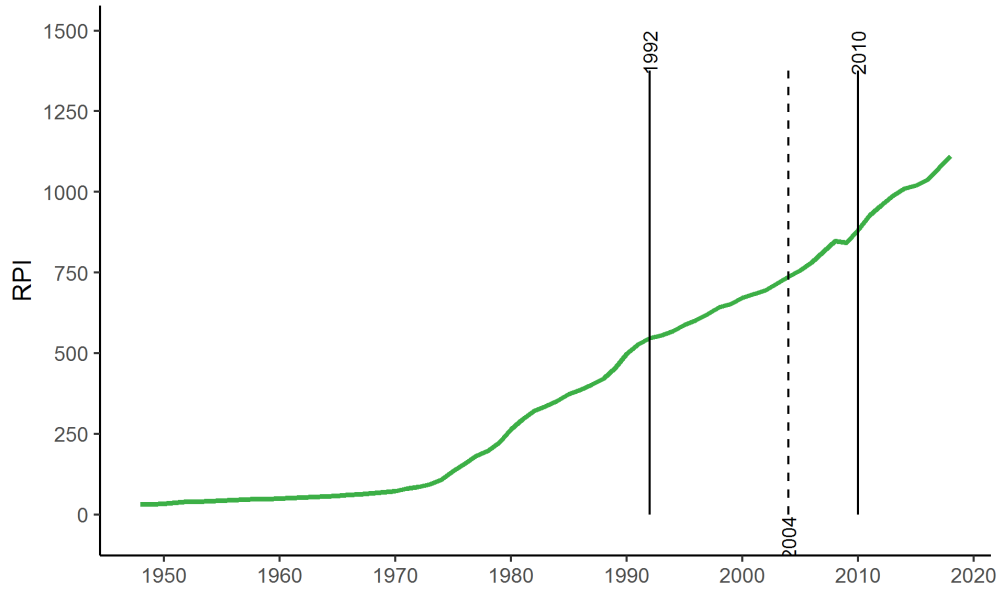
Since Oxera's original report on estimating adjustments to the RPI, we have updated the analysis to explicitly control for known macro-economic shocks, such as GDP, oil price, mortgage interest payments and exchange rate movements. This addresses the preliminary nature of the original model which required judgement to separate economic from methodological shocks.

This evolved approach allows us to more systematically control for economic shocks and makes it easier for the indicator saturation approach to identify methodological changes.

As data on mortgage interest payments extends only back to 1987, at this stage we are only able to identify breaks that appear in the period 1988-2018.

This updated model finds the structural breaks identified in figure 3.1 below:

Figure 3.1 Structural breaks identified with the updated model



Source: ONS, Oxera analysis

The structural breaks identified are consistent with the following changes relating to the RPI:

- 2010: changes in clothing price methodology
- 2004: a large change in the prices of used cars, which may have a disproportionate impact on RPI as used car prices are used as a proxy for all car prices
- 1992: several consecutive changes made in 1993-1995, such as the inclusion of foreign and domestic holidays, housing depreciation and the council tax

Of these breaks, the 1992 and 2010 breaks have a more substantial effect on the RPI. We exclude the 2004 break from the calculations, as the cause of the break is more likely to be related to the economy than the RPI methodology

The results from this analysis show that there are methodological changes to the RPI series other than the 2010 adjustment that materially affect the RPI series. This is consistent with known changes and our previous analysis.

If the methodological changes identified are removed from the RPI series, the adjustment that would be applied to average RPI inflation would be less than 1 basis point, as the 2010 and 1992 breaks almost cancel each other out. Therefore, on the evidence available, the net effect of the identified changes in methodology is approximately zero, implying that no adjustment should be made to the long-run average of RPI inflation. Such a possibility was foreseen by Wright and Smithers (2014):

> We therefore simply do not know whether, for example, this new source of bias [referring to the 2010 change in RPI] may simply offset the impact of other biases in earlier data.[12]

[12] Wright, S. and Smithers, A., The Cost of Equity Capital for Regulated Companies: A Review for Ofgem, page10 (2014).

The updated analysis suggests that there are likely to have been significant methodological changes in the RPI series other than just the 2010 change. Making a selective upward adjustment to the long-run average of RPI inflation based on just the 2010 change ignores these other changes and is therefore not robust and is likely to bias the estimate of long-run RPI upwards.

If, for example, the changes in the early 1990s are also accounted for, it would be appropriate to deflate the long-run average equity return using the published RPI data without making any further adjustments for the forecast wedge between RPI and CPI inflation.