



## Position paper on the use of inflation indices

### Introduction

A feature of the economic regulatory regimes in the UK is that price controls (and hence revenue allowances) are frequently expressed in real terms by reference to a measure of inflation. When these sectors were first privatised, price controls were set using the retail price index (RPI), the most widely used measure of inflation at the time.

In 2013, the National Statistician concluded that the formula used to produce RPI did not meet international standards and RPI was de-designated as a national statistic<sup>1</sup>. A subsequent review, carried out by Paul Johnson for the UK Statistics Authority and published in 2015 stated:

*“RPI is a flawed statistical measure of inflation ... taxes, benefits and regulated prices should not be linked to RPI ... government and regulators should work towards ending the use of the RPI as soon as practicable”*

Most recently, the National Statistician, in an article published on 8 March 2018 by the Office for National Statistics (ONS)<sup>2</sup> stated:

*“Our position on the RPI is clear: we do not think it is a good measure of inflation and discourage its use. There are other, better measures available and any use of RPI over these far superior alternatives should be closely scrutinised.”*

RPI continues to be widely used as the inflation metric in financial markets and the ONS has committed to the continued publication of RPI. Other measures of inflation – CPI and CPIH – are also widely used, for example, the Bank of England’s inflation target has been set by reference to CPI since 2003. Pension scheme liabilities for many schemes are now linked to CPI, and, since March 2017, CPIH has been the primary focus of the ONS. We note, however, that the UK government has recently ruled out providing powers for employers or trustees to change rules for existing defined benefit schemes to apply inflation increases using CPI instead of RPI.<sup>3</sup>

Inflation measures are likely to remain an important feature for setting revenue allowances in future price reviews. Some regulators have already transitioned away from RPI as their main inflation metric for rolling forward the real value of net investment, assessing efficient cost allowances and determining allowed revenues – while others have plans to do so. We summarise each regulator’s current use of inflation measures in Annex I and, where regulators have proposed future changes, we set these out for reference.

This paper follows the UKRN’s paper, published in 2016, ‘Inflation measures in economic regulation’, which set out the use of inflation in price controls in the UK. It updates and sets out some considerations that should be taken into account to allow comparison of price control information across sectors, such as the cost of capital, and factors that should be taken into account when assessing historic information for the purposes of making price control decisions.

### Inflation measures

RPI was until recent years a leading and widely used measure of inflation in the UK. Since its de-designation as a National Statistic, the ONS has developed a more robust measure of general inflation in the UK

<sup>1</sup> UKSA (2013), [National Statistician announces outcome of consultation on RPI](#) and UKSA (2013), [Retail prices index](#)

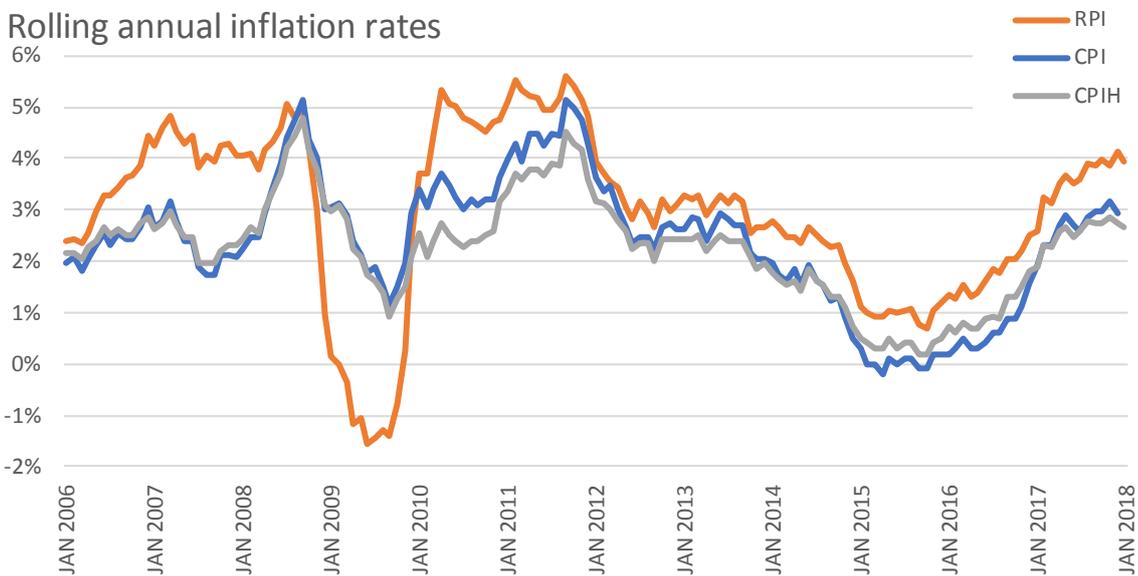
<sup>2</sup> ONS (2018), [Shortcomings of the Retail Prices Index as a measure of inflation](#), 8 March

<sup>3</sup> Department for Work & Pensions (2018), [Protecting Defined Benefit Pension Schemes](#), Cm 9591



economy, the Consumer Prices Index including owner occupiers' housing costs (CPIH). It is closely related to the CPI, but it has wider coverage and in particular includes an element of owner occupiers' housing costs. The National Statistician, in his 10 November 2016 statement, indicated that CPIH has a number of desirable properties and addresses several flaws and limitations present in alternative measures. CPIH is now the ONS's lead measure of inflation in the UK.

Regulators consider both CPIH and CPI to be broadly fair measures of general inflation as experienced by consumers in the UK economy. For customers of regulated utilities, the choice of CPI or CPIH as the regulatory measure of inflation is finely balanced. CPI is the measure of inflation that is typically reported in the press as it is also the inflation target for the Bank of England. Unlike CPIH, there are official CPI forecasts available. However, CPIH is recognised by the ONS as the most comprehensive measure of inflation. The following chart shows the two measures of inflation broadly tracking each other (with RPI for reference).



Statistics on the historical volatility of inflation metrics are presented in table I below. The table shows that CPI and CPIH have been less volatile than RPI. RPI is likely to remain the most volatile in the future since it is most exposed to sharp changes in house prices and mortgage interest rates. There may be benefits to customers associated with the use of CPI or CPIH inflation measures that are a more credible measure of inflation and exhibit lower levels of volatility.

**Table I: Historical volatility of inflation metrics (overlapping 12 month periods, 2006-2018)<sup>4</sup>**

	<b>RPI</b>	<b>CPI</b>	<b>CPIH</b>
<b>Standard deviation</b>	1.6%	1.2%	1.0%
<b>Range</b>	7.2%	5.3%	4.6%

CPI is the measure of inflation that is the target used by the Bank of England, although regulators note CPIH could, at some point in future become the measure used for inflation targeting. For example, in response to the UKSA 2015 consultation on appropriate measures of consumer inflation, the Bank of England stated:

<sup>4</sup> ONS, Consumer Price Inflation, April 2018



*‘once the issues surrounding the measurement of owner-occupied housing costs are judged to have been resolved, the CPIH measure regains its status as a National Statistic, and has a proven track record, there is a strong case for its becoming the main measure of inflation’.*<sup>5</sup>

In April 2018, the UK government signalled its intention to transition away from RPI for indexation purposes, with an expectation that CPIH will be ultimately be the ‘preferred index’.<sup>6</sup> At the time of publishing this paper, a timetable for this transition has not yet been set out however.

### **Inflation and setting cost allowances**

Price inflation for some categories of expenditure incurred by regulated businesses may be subject to specific market or exchange rate influences that could have a material effect on financial uncertainty. Due to different consumption patterns observed in a representative regulated company versus the representative consumer, indexing company revenues to consumer price inflation measures may not keep the company’s purchasing power constant in real terms. When setting allowances or benchmarking expenditure in such cases, it may therefore be appropriate for regulators to use alternative price indices, to construct and use baskets of such indices or to make ex ante adjustments for relative price effects (RPEs). As such adjustments are typically expressed relative to the choice of inflation index (e.g. RPI + 0.5%), any bias present in the inflation index used will be present in the total value of the uplift used to compensate for the RPE.

### **Inflation and finance**

Inflation-adjusted returns in UK bond markets are currently typically expressed in RPI terms, reflecting the current dominance of RPI for index-linked gilts and corporate bonds in traded markets (although CPI-indexed issues are growing).<sup>7</sup> An RPI link may be important for some investors, for example there is a class of investors with RPI-linked pension obligations and HM Treasury’s Debt Management Office continues to issue RPI based index-linked gilts. However, many other investors will be keen to hold assets linked to inflation more generally and may prefer not to be exposed to the higher volatility of RPI<sup>8</sup>. Consistent with this, there is evidence of a significant demand for CPI linked investments<sup>9</sup>, which could lead to CPIH and CPI markets increasing in importance in the future.

Many regulated businesses are capital intensive, and regulators often see advantages for consumers in adopting approaches that help maintain the real value of invested capital in regulated businesses. They do this by indexing the regulatory asset bases<sup>10</sup> to a measure of inflation. This can help protect investors and consumers against inflation uncertainty; it helps to minimise the cost of capital as companies cannot control general inflation and customers would otherwise pay a premium if investors were to bear inflation risk. In many respects, such approaches mirror the situation in unregulated, competitive businesses where the economic value of productive assets will naturally be affected by inflation on the value of goods and services they help produce.

In estimating the cost of capital, regulators may draw from many sources of evidence, many of which will be implicitly or explicitly adjusted for inflation. Regulators will need to ensure that they interpret the evidence

<sup>5</sup> UKSA (2015), [‘Summary of Responses: Measuring Consumer Prices: the options for change’](#), - Bank of England response template.

<sup>6</sup> Treasury Committee, *Oral Evidence: The work of the Chancellor of the Exchequer*, HC 424, 25 April 2018

<sup>7</sup> Recent examples include £700m raised for the Walney Extension Wind Farm, and £60m raised by United Utilities in 2017

<sup>8</sup> Examples would certainly include defined benefit pension schemes with CPI-linked liabilities and insurers subject to regulatory capital requirements.

<sup>9</sup> See: Ofwat, [Water 2020: our regulatory approach for water and wastewater services in England and Wales](#), 2016

<sup>10</sup> These asset bases have various other names depending on the sector, including ‘Regulatory Capital Value’ (RCV), ‘Regulatory Asset Value’ (RAV) and ‘Total Regulatory Value’ (TRV).



so that their estimates and allowances for the cost of capital are consistent with how they index their asset bases.

When using long-run averages of RPI-deflated returns to derive a forward-looking estimate of required equity market return, regulators should be aware of the impact of changes to the ONS's approach to reflecting clothing & footwear in its inflation measurement from 2010. These methodological changes have resulted in a structural increase to the RPI 'formula effect' (i.e. the difference between CPI and RPI due to the different averaging methodology employed in each measure). The impact of this change is liable to vary over time, and is tracked by the ONS.<sup>11</sup> This statistical artefact could overcompensate investors in RPI-linked assets relative to returns actually required unless regulators make an appropriate adjustment to returns to reflect the impact of the change in the ONS' approach to inflation measurement after 2010.

An alternative to using RPI-deflated figures exists in the form of the Bank of England's long-term composite consumer price inflation series (the 'Millennium dataset')<sup>12</sup>. This can be used to derive an inflation-adjusted equity returns series which is affected less by the ONS's post 2010 inflation measurement changes, due to the more prominent role played by CPI. In Appendix E of the report 'Estimating the cost of capital for implementation of price controls by UK Regulators'<sup>13</sup>, the authors use this historical series of inflation to derive a long-run estimate of the total market real return in the range 6-7%.

### Transitioning regulatory inflation measures

Leaving other things equal, switching indexation of the asset bases from RPI (as an upwardly biased measure of inflation compensated for by reduced cost of capital allowances) to CPIH or CPI would alter the balance of customer bills and how investors earn their returns. With RPI-indexation, because RPI overstates inflation, investors receive more of their return in the form of asset base growth, and correspondingly less via their RPI-deflated revenue allowance for the cost of capital. Switching to a CPIH or CPI indexation basis without any other adjustments would therefore mean higher revenue requirements in the short term, but they would permit lower revenue requirements in the longer term. These different approaches should lead to revenue profiles that are very different but are broadly equivalent in net present value terms over the long-term. This is illustrated in Figure I, which shows the effect over a typical asset depreciation period of about 40 years.

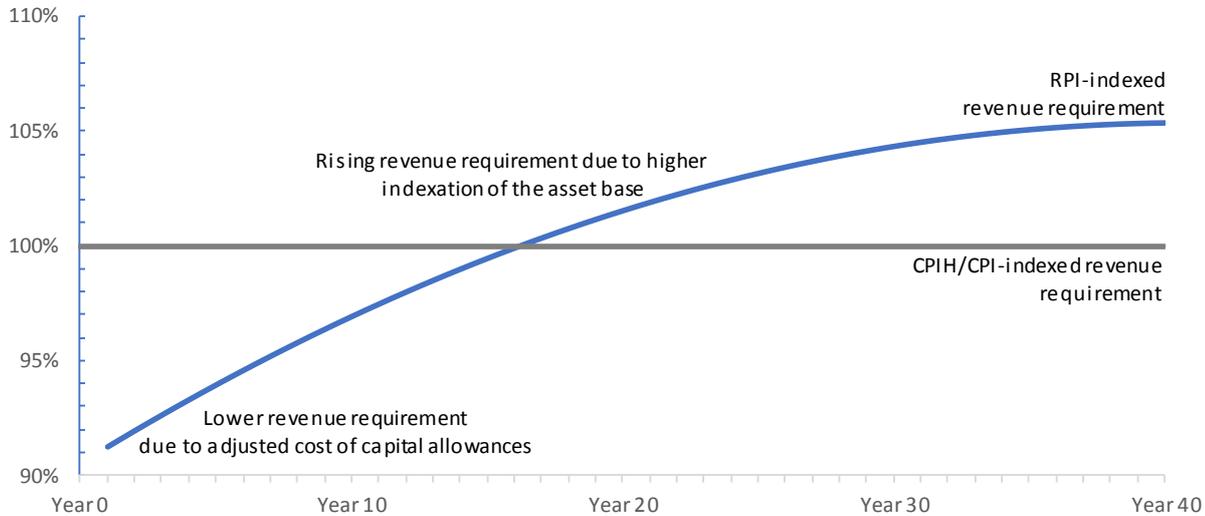
---

<sup>11</sup> See ONS, ['Difference between CPI and RPI due to the formula effect'](#)

<sup>12</sup> Bank of England, [A Millennium of Economic Data](#), version 3.1 (2017)

<sup>13</sup> Wright, Burns, Mason, Pickford, [Estimating the cost of capital for implementation of price controls by UK Regulators](#), 2018

**Figure I: Relative revenue requirements from different indexation bases**



A regulator changing its indexation basis from RPI would have a range of options for smoothing or adjusting the revenue profile to mitigate the impacts on charges between different generations of consumers. Examples would include phasing-in the use of CPIH/CPI-indexation, adjusting regulatory depreciation or totex capitalisation rates. It would be a matter of judgement for each regulator to decide when and how it should move away from RPI given the particular features of each sector. When regulators choose to change the indexation for regulatory asset bases, and how they do it, will be informed by their duties.

A regulator may wish to consider:

- the relative legitimacy of alternative measures of inflation for customers
- ensuring that indices used to underpin price controls are robust to maintain credibility
- the incidence effects that might arise for customers and investors discussed above
- the relative attractiveness for investors for investing in different classes of index-linked assets
- the impact on company credit metrics and their interpretation by ratings agencies
- existing and future company use of index-linked bond finance or inflation-linked derivatives that use RPI
- the markets for financial instruments that may help regulated businesses manage inflation risk
- the value to investors of medium and long-term certainty in regulatory approaches

Regulators recognise the importance of ensuring that allowances they make for the cost of capital when they set regulated revenues fairly take account of the approaches they adopt to maintain the value of invested capital for inflation when determining the cost of capital.

### Agreed propositions

RPI is a flawed statistical measure of inflation and, since 2010, systematically overstates inflation in the UK economy. The extent of overstatement is in many cases material to the decisions that regulators make and to the understanding of information that they from time to time present.

*Proposition 1: Regulators should avoid using RPI when presenting financial information as inflation-adjusted or in constant price terms.*

In general, regulators should use CPIH or CPI when presenting information in inflation-adjusted or constant price terms. If RPI is used to rebase financial information after 2010, (for example when setting out the operation of mechanisms that explicitly use RPI or for comparison with other RPI-based information), regulators should make it clear that the information is RPI-deflated and therefore different to inflation-adjusted, noting that RPI is not a national statistic.

*Proposition 2: Regulators should avoid any systematic bias when taking account of the effects of inflation on regulated business expenditure when making estimates or setting/specifying allowances relevant to regulated revenues.*

When designing mechanisms to preserve the purchasing power of allowed revenues, regulators should aim to index customer bills to inflation measures that are most relevant to how investors experience inflation. Due to the systematic bias in measured RPI due to the ONS's post 2010 changes in inflation measurement, using unadjusted RPI to do so may overcompensate investors and CPI and CPIH therefore represent preferable measures to achieve this end.

Due to differences in how regulated companies experience price inflation, regulators may also wish to consider using more specific indices or baskets of such indices which reflect Relative Price Effects (RPEs) and thus maintain purchasing power of revenue allowances at the intended levels. Where a regulator continues to use RPI as a baseline from which RPEs are calculated, they should calibrate the adjustments to correct for the systematic bias that is present in RPI.

*Proposition 3: regulators should avoid any systematic bias when taking account of the effects of inflation on invested capital and when estimating the cost of that capital.*

Real-terms components of the allowed cost of capital should be estimated using an inflation measure which is consistent with the indexation of the regulatory asset base to which it is applied. This means that regulators should adjust evidence from RPI-linked debt markets when estimating the real risk-free rate or the real cost of corporate debt when regulatory asset bases are linked to CPIH or CPI. The long-term prospective difference between RPI and CPI was assessed by the Office for Budget Responsibility as 1.0 percentage points in 2015<sup>14</sup>, and by the Bank of England as 1.3 percentage points in 2014<sup>15</sup>.

When using long-run average equity returns to inform forward-looking estimates of the cost of equity, regulators should aim to deflate nominal figures using the most authoritative and consistently-calculated long-run inflation series available. If regulators choose to use RPI-deflated data to derive a prospective required equity return, they should adjust the resultant figure to compensate for the structural increase in RPI inflation from the ONS' 2010 change in methodology before using it to derive an allowed cost of capital.

Care should also be taken to ensure that changes in the inflation measure used to index the asset base are neutral in Net Present Value (NPV) terms and that impacts on the profile of customer bills are considered. For example, investors facing slower asset base growth when moving from RPI to CPIH indexation can be compensated by applying a CPIH-deflated regulatory WACC, which will tend to be higher. This will however increase the share of investor returns earned via revenues as opposed to asset base growth, generating upwards pressure on customer bills in the short term. Where a switch to a different index means a change in the share of the overall investor return earned via indexation of the regulatory asset base, regulators may wish to consider making corresponding adjustments to depreciation and/or capitalisation rates to preserve the profile of customer bills.

<sup>14</sup> Bank of England, [Inflation Report](#), February 2014

<sup>15</sup> Office for Budget Responsibility, [Revised Assumption for the long-run wedge between RPI and CPI inflation](#), March 2015

## Annex I – Current and proposed use of inflation by regulators

Regulator	Current and proposed future use of inflation in price controls
Ofwat	<p>Price controls will remain indexed to RPI until 31 March 2020. In 2016, Ofwat amended company licences to confirm price controls from 2020 would be set by reference to CPIH or CPI. In 2017, Ofwat’s methodology for the 2019 price review confirmed revenue allowances would be set by reference to CPIH. Ofwat also confirmed indexation of the RCV would transition to CPIH. Ofwat confirmed that 50% of the RCV at 1 April 2020 would be indexed by RPI, the remainder of the RCV, including all future RCV additions would be indexed by CPIH. Ofwat provided a statement of principles it will apply when considering the transition of the indexation of the RCV beyond 2025 in <a href="#">Water 2020: our regulatory approach for water and wastewater services in England and Wales</a>.</p>
Ofcom	<p>Ofcom began moving away from indexing charge controls using RPI in 2013. For the fixed access market and wholesale broadband access markets, Ofcom proposed in June 2013 to make CPI the preferred inflation index for these charge controls and confirmed this decision in June 2014. Since that time, Ofcom has also set the mobile call termination charge control, the leased lines charge control and the fixed termination charge control using a CPI-X formulation. This means that all of Ofcom’s main telecoms charge controls are now indexed to CPI. The price control on Royal Mail 2nd class stamps also uses CPI. Ofcom has no current proposals to move away from indexing the charge controls against CPI to an alternative inflation index.</p> <p>Ofcom uses a nominal cost of capital in many of its telecoms price controls, although some of the parameters are derived from real RPI-based data (e.g. index-linked gilt yields).</p>
Civil Aviation Authority (CAA)	<p>Heathrow Airport – the current price control is operated on an RPI basis, with RPI-linked revenue allowances and an RPI-indexed regulatory asset base (RAB). For the next price control, CAA plans to continue with an RPI-indexed RAB but is considering either RPI or CPI indexation for revenue allowances. The CAA acknowledges the advantages of a transition to CPI over the longer-term, but is taking a cautious approach to transition for RAB indexation given the critical phase that the next price control period will represent in financing capacity expansion.</p> <p>NATS – the current price control is operated on a CPI basis, though the CAA has retained an RPI-indexed regulatory asset base. The regulatory asset base has a relatively small impact on revenue requirements compared with most other regulated sectors. CAA’s review for the next price control period, RP3, is underway and will be informed by NATS’s customer consultation process. The CAA does not expect significant calls from NATS’s airline customers for a change in indexation basis in this review.</p>
Ofgem	<p>To date, the price control decisions by Ofgem have used RPI for both RAV indexation and the allowed return. In addition, Ofgem also made an explicit allowance (Real Price Effects) to recognise that company expenditures may not move in line with RPI. For competitively tendered assets, Ofgem has allowed bidders to put forward their own view of inflation within their proposals (‘biddable’ indexation).</p> <p>In March 2018 Ofgem proposed to move away from RPI use (for price controls) to either CPI or CPIH and sought views on how this should be done, noting that it was not convinced a phased transition was necessary.</p>



Office of Rail and Road (ORR)	<p>In CP5, Network Rail’s access charges, and payment rates in other mechanisms where it has set the method of indexation, have been indexed using the RPI measure of inflation. However, for CP6 ORR is considering whether they could be indexed by the CPI measure of inflation.</p> <p>ORR expects to present its PR18 determination in real (constant 2017-18) and cash prices. Access charges for CP6 will initially be set in real (constant 2017-18) prices and then be indexed to reflect changes in general inflation. However, network grants will not be indexed.</p>
Utility Regulator for Northern Ireland	<p>The Utility Regulator (UR) is responsible for regulating the electricity, gas, water and sewerage industries in Northern Ireland. At present, all of the UR’s price controls are indexed using RPI. However, the UR is currently exploring alternative options to indexation within its Price controls. It is recognised that there are shortcomings in the use of RPI and that there is merit in transitioning to a new index methodology. The Regulator will consult with stakeholders on any proposed changes to its price control approach.</p>