

Agenda

Advancing economics in business

Choosing an inflation index: RPI, CPI and regulated utilities

The choice of inflation index is important in a number of public policy contexts, including inflation targeting, indexation of social security benefits, and regulation of utilities. Tim Tutton, Senior Adviser at Oxera, discusses the relative merits of the different measures of consumer price inflation used in the UK (the Retail Prices Index and the Consumer Prices Index), and asks what effects they might have in their different applications and on utility price controls

Most countries have a plethora of indices for measuring inflation. Sometimes these measure price changes for completely different bundles of goods and services (eg, retail prices, wholesale prices, and input prices for particular economic activities); sometimes they are different measures of what appear to be, at least at first glance, the same bundle of goods and services (eg, different measures of consumer prices).

The highest-profile measures of inflation are those that purport to measure changes in retail prices. Among other uses, they are employed in the UK to:

- set the inflation target for the UK Bank of England's Monetary Policy Committee;
- index state and private sector pensions, as well as various other social security benefits;
- provide the measure of inflation that is used in various regulated utilities' price controls.

From time to time, there have been both actual and contemplated changes in the inflation index used for these and other purposes.

- In December 2003, the UK Treasury changed the Bank of England's inflation target from 2.5%, as measured by the RPIX (the RPI, excluding mortgage interest rates), to 2%, as measured by the CPI (formerly known as the Harmonised Index of Consumer Prices).
- The UK government announced in the 2010 budget that the CPI would replace the ('All Items') RPI for the indexation of benefits, tax credits and public service pensions from April 2011. It has since been

announced that the inflation indexation required of private sector pensions will also be the CPI as from the same date.

- As part of its RPI-X@20 review of energy network regulation, Ofgem, the GB energy regulator, has contemplated both partial and total replacement of RPI indexation with CPI indexation, in both its price control calculations and in the price control formulae, which limit the revenue that energy networks can recover—although it has decided to continue to use the RPI, at least for the forthcoming price control reviews for gas and electricity transmission and for gas distribution ('RIIO-T1' and 'RIIO-GD1').¹

Against this background, I address:

- the differences between the RPI and the CPI—in particular, why the inflation rate, as measured by the CPI, will systematically trend below the inflation rate as measured by the RPI;
- the different implications of using CPI indexation in three areas:
 - the Bank of England's inflation target;
 - the cost of those pensions and social security benefits that will, in future, be indexed to the CPI;
 - regulated utility price controls.

In particular, the point is to draw out:

- why the choice of the Bank of England's inflation target has no simple implications for the choice of inflation index in other areas;

- the fact that the implications for utility price controls are more complex than the implications for the indexation of pensions and other benefits. Specifically:
 - switching benefit indexation from the RPI to the CPI will imply that, over time, the benefits concerned will be worth less than they would have been without the switch;
 - for regulated utilities, in contrast, a similar switch *would* imply slower growth of the regulatory asset value (RAV), but *should* imply a broadly compensating increase in the rate of return earned on that value—with implications for the time profile of cash flows but not for the net present value (NPV) of those flows.

Why is RPI inflation typically above CPI inflation?

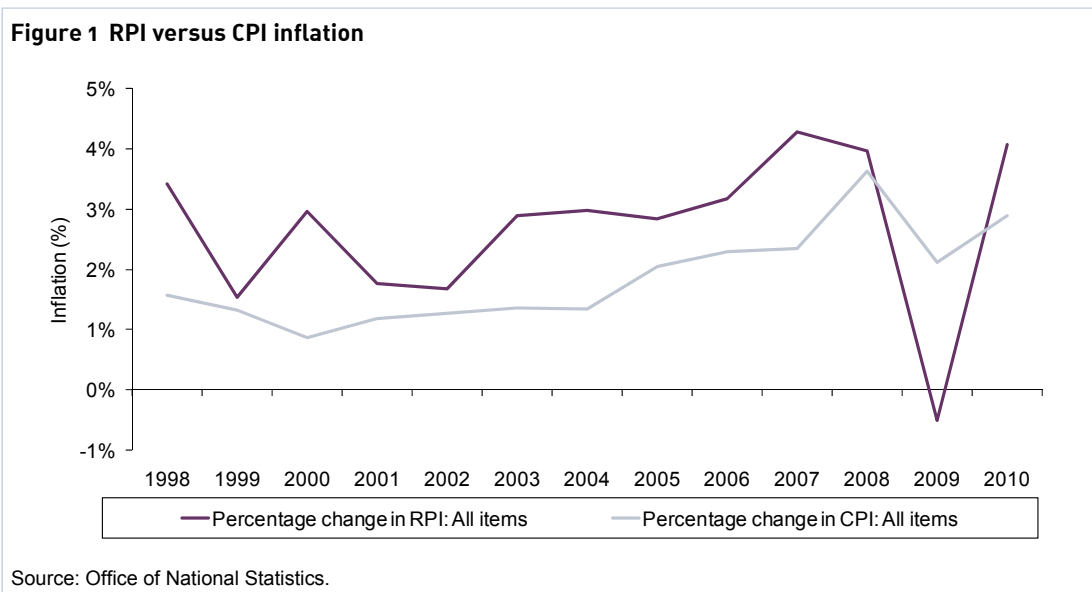
The first point to note about CPI inflation and RPI inflation is that the latter has been systematically higher than the former, even though this has not been the case in every individual year, as illustrated in Figure 1 below. The CPI was formally launched in the UK in 1996, albeit the Office of National Statistics (ONS) has also estimated what it would have been before that time. Between 1997 and 2009, the RPI increased by around 36%—an average of around 2.6% per annum; whereas the CPI increased by around 24%—an average of around 1.8% per annum—implying a gap of around 0.8 percentage points per annum.

In other words, the choice of index for benefits or regulated revenue is not a trivial issue. The June 2010 budget forecast is that the substitution of the CPI for the RPI in the indexation of various benefits will save £1.2 billion in 2011/12, rising to £5.8 billion in 2014/15.²

At an individual level, and using the historical differential inflation rates quoted above, an individual retiring now with an inflation-indexed pension of £20,000 per annum could expect to be receiving, in ten years' time, an income of around £23,900 on the basis of CPI indexation, as against around £25,860 on the basis of RPI indexation.

So, why will CPI inflation typically be lower than RPI inflation? This requires looking at the differences in how the CPI and the RPI are computed, including the following.³

- The two indices are based on *different baskets of goods and services*. Notable among the items that are included in the RPI but excluded from the CPI are mortgage interest payments, house depreciation and council tax.
- They use *different expenditure data sources (and thus different populations) to estimate the weights* applied to different goods and services. For example, the CPI uses National Accounts data and covers all private UK households, whereas the RPI uses survey data, which excludes certain groups, including the highest earners and pensioner households that are dependent mainly on state benefits.
- They use *different formulae* for constructing the respective indices. In particular, the RPI uses an arithmetic mean at the lowest level of aggregation—ie, it uses the arithmetic mean of the inflation rates for each item included in the basket of goods (eg, for different brands of white sliced bread). In contrast, the CPI uses a geometric mean. The economics of this difference is that (*again, only at this lowest level of aggregation*):



- the RPI assumes that a change in relative prices leads to no substitution away from a commodity/brand whose relative price has increased;
- the CPI assumes that demand for that commodity/brand will fall by the same proportion as the increase in the price.

Thus, in any given year (or other relatively short period), the reasons for differing RPI and CPI increases could be mainly due to differences in the baskets of goods and the weights attached. For example, the one year since 1997 in which RPI inflation was less than CPI inflation (2009) reflected, at least in part, movements in housing-related prices, which are included in the calculation of the RPI but not the CPI. It is worth noting in this context that the government is investigating the inclusion of owner-occupier housing costs in the CPI in future.

However, in the longer term, it is the formula effect that is both the most consistent driver of the difference between CPI and RPI inflation (mortgage interest payments, for example, go down as well as up) and the largest (sometimes reckoned to be worth around 0.5 percentage points per annum⁴). The CPI's assumption of a particular pattern of substitution away from goods whose relative price has increased means that, in respect of this factor taken in isolation, CPI inflation will always be below or equal to RPI inflation. This has also sometimes been given as one reason why the CPI is a 'better' measure of the welfare impact of inflation than the RPI.⁵ In addition, and to the extent that the *relative* price of housing-related items can be expected to increase, this will further increase the gap between CPI inflation and RPI inflation.

The basis for the switch in the Bank of England's inflation target from the RPIX to the CPI

From May 1997 to December 2003, the Bank of England's inflation target was 2.5%, as measured by the RPIX.⁶ In December 2003, the target was changed to 2% as measured by the CPI. Because CPI inflation

will typically be less than RPI inflation, and because the gap has averaged above the 0.5 percentage point seen as attributable to the formula effect, the change ran the risk of being seen as a (small) relaxation of the Bank's inflation target. However, the justification given by the Governor for the change (reproduced in the box below) was similar to that given by the Treasury in the June 2010 Budget for switching to CPI indexation for various benefits (see above and footnote 3).

However, the choice of the CPI (rather than the RPI or RPIX) for the Bank of England's inflation target has no direct implications for the choice of index for other purposes. In particular, it is worth remembering why the original Bank of England target was measured by the RPIX rather than the RPI. This was because the Treasury was not directly concerned with measuring changes in the cost of living *per se*, but with measuring the *underlying* rate of inflation. The Treasury thus wanted to exclude mortgage interest rates from the Bank of England's target, not least on the grounds that the Bank's main weapon for reducing the underlying rate of inflation is to raise interest rates—but, in the short run at least, this would directly cause an increase in the RPI.

The RPIX was thus chosen to better measure underlying inflation and to be an appropriate macroeconomic inflation target. However, there is no *necessary* reason why the index used for the Bank of England's target should be used for other purposes, especially when those other purposes are to measure changes in the cost of living as accurately as possible. However, the idea has been floated of having a version of the CPI with more account taken of owner-occupier housing costs, thus marrying the allegedly superior formula characteristics of the CPI with a basket of goods which actually better reflects one of the main elements of many people's cost of living.

Implications of CPI indexation for benefits and pensions

The implications of replacing the RPI indexation of pensions or other benefit payments with CPI indexation

The Governor of the Bank of England's justification for moving its inflation target from RPIX to CPI

'Each month – on 'Index Day' (either the second or third Tuesday of the month – around 300 "price collectors" visit a wide range of retail outlets and record the prices charged for 130,000 different items, ranging from small loaves of brown bread to large lawnmowers. Each of these items will have changed in price by a different amount. A key difference between the CPI and RPIX is how these 130,000 price changes are averaged to give a measure of overall inflation. RPIX inflation is, for most goods, an arithmetic average of the inflation rates for each item. In contrast, CPI inflation is measured as the increase in the geometric average (the average of the

logarithms) of the different prices. That reduces the weight given to those retail outlets where prices are rising the fastest, and allows the overall measure of inflation to take into account the way families are changing their shopping habits away from outlets where prices have been rising relatively rapidly, like traditional high street stores, towards those where they have been rising relatively slowly, like newer more heavily discounted stores. For that reason, the formula used to calculate CPI inflation is superior to the formula used in RPIX.'

Source: King, M. (2004), 'Speech to the Annual Birmingham Forward/CBI Business Luncheon', January 20th.

(and remembering that *state* pensions are to be indexed to the higher of earnings, CPI inflation or 2.5%) are reasonably straightforward. For the reasons described above, CPI inflation can be expected to track below RPI inflation and therefore, as noted above, the main implication of changing the basis of indexation is that the affected payments (which could also include private sector defined-benefit pensions where there is no explicit commitment to RPI indexation) will be lower over time than they would otherwise have been.

Potential implications for regulated utility price controls

As part of its RPI-X@20 review, Ofgem raised the question of partial or total replacement of the RPI with the CPI in energy network price controls, even though it has now decided to continue to use the RPI for at least its next two price reviews. However, unlike the switch to the CPI for social security or pension indexation, such a change would not necessarily mean less revenue for utilities, at least in an NPV sense.

To understand the implications for utility price controls, it needs to be remembered that RPI inflation has until now played a number of roles in energy network price reviews and in price controls.

- In setting price controls, Ofgem indexes RAV to the RPI and applies a real rate of return to that RAV.
- Through the price control period, revenue is indexed to the RPI.
- RPI inflation has been the baseline for assessing ‘real price effects’ in respect of future input costs.

As far as the last of these is concerned, any move to equating ‘inflation’ with the CPI, rather than the RPI, should have no significant effect—it should just mean that anticipated real price effects for the goods and services in question should be higher as a result of being compared with a lower inflation index.

The implications for company returns are slightly more complicated. Taken by itself, an indexation of RAV to the CPI, rather than to the RPI, would mean lower returns for companies. However, to index RAV to the CPI without making other changes would be inconsistent. This is because the ‘real’ rate of return, which is combined with the RAV to calculate allowed revenue, is itself grounded in returns on index-linked bonds which are indexed to the RPI. This is presumably why, at least in part, Ofgem says that a possible precondition for incorporating the CPI into the setting of price controls is the existence of a market in CPI-indexed bonds.

On the assumption that the returns on (as yet hypothetical) CPI-indexed bonds would be higher than their RPI-indexed equivalent, the main effect of incorporating the CPI into both the indexation of RAV and the assessment of an appropriate real rate of return would thus not be to affect the NPV of allowed revenue, but to change its time profile. In principle, companies would get a higher return on a slower-growing RAV, thus implying more front-loaded revenue. For electricity networks, this would partly offset the impact on the duration of cash flows of longer regulatory asset lives, which are an implication of the conclusions to Ofgem’s RPI-X@20 project.

Tim Tutton

¹ Ofgem (2010), ‘RIIO: A New Way to Regulate Energy Networks’, October.

² HM Treasury (2010), ‘Budget 2010’, June.

³ There are a number of publications, including several by the ONS, which describe the differences between how the CPI and RPI are computed. One of the more concise, and the one which is drawn on heavily in this article, is the ONS publication ‘Differences Between the RPI and CPI Measures of Inflation’, undated but available at <http://www.statistics.gov.uk/CCI/nugget.asp?ID=19>.

⁴ In a speech to the annual Birmingham Forward/CBI business luncheon on January 20th 2004 about the reasons for the Bank of England’s inflation target being re-specified as 2% CPI inflation rather than 2.5% RPI inflation, Mervyn King suggested that: ‘Arcane though it may sound, the “formula” effect reduces estimated inflation in Britain by about half a percentage point a year’.

⁵ See, for example, HM Treasury (2010), ‘Budget 2010’, June, para 1.106.

⁶ The reason for choosing RPIX rather than RPI was that, from the perspective of macroeconomic management, it was thought to be perverse to have an inflation measure that increased if the government raised interest rates to reduce the rate of inflation.

If you have any questions regarding the issues raised in this article, please contact the editor, Dr Gunnar Niels: tel +44 (0) 1865 253 000 or email g_niels@oxera.com

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