

UK Consumer Price Statistics: A Review

Summary and Recommendations

Paul Johnson

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Paul Johnson

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All that said I should stress of course that all the conclusions and opinions, and in particular all the mistakes, which appear in this review are mine and mine alone.



Paul Johnson

Terms of Reference

On 16 May 2013, Sir Andrew Dilnot, Chair of the UK Statistics Authority, invited Paul Johnson, Director of the Institute for Fiscal Studies, to conduct a review of UK price indices with the following terms of reference:

Consider what changes are needed to the range of consumer price statistics produced for the UK to best meet current and future user needs.

In doing so:

- recommend a framework of consumer prices statistics that will understand and best meet the needs of users, and be accountable, flexible, transparent, and no more burdensome than is clearly justified;
- promote recognised and high-quality statistical standards;
- consider the arguments for using cost of living or cost of goods concepts;
- consider how public and private sectors can best work together, using all possible data to maximise quality and efficiency; and
- work within the findings of the Authority's review of the governance arrangements and structures supporting the production of price statistics.

The review will be led by Paul Johnson.

The review will report to the Board of UK Statistics Authority and deliver a final report for publication with recommendations in January 2015¹.

¹The review was initially scheduled to deliver its final report in summer 2014.

Introduction

Most of us probably think we know what inflation is – it's just the rate at which prices increase. But that simple definition hides a host of choices over what we really want to measure, and a whole set of difficulties over how to measure it. There is no single correct answer to the question: "what is consumer price inflation?"

That partly reflects the different uses to which inflation figures are put. It may be that the question the Bank of England is asking when it wants to know what economy wide inflation is for the purposes of setting interest rates and targeting inflation, is subtly different from the question one is posing when asking about the inflation that has been experienced by households. The inflation rates experienced by different households – by rich and poor, by pensioners and those of working age – will likely be quite different.

But there is an even more fundamental question about what we mean by inflation. When we talk about inflation we usually talk about the "cost of living" – inflation of 2% suggests that the cost of living, or the amount we have to spend to be just as well off as we were before prices rose, has risen by 2%. In fact the inflation measures we use don't do that at all. They measure the increase in prices of goods and services that we bought a year ago, not the amount by which our incomes would have to rise to make us as well off as we were. We could try to do the latter, but no statistical agency in fact does – and there are good reasons, both practical and principled, for that.

Even if we could agree on exactly what concept of inflation we want to measure there are big choices to be made over what prices to collect, how to collect them and how frequently. You have to decide how much weight to give to different items in the shopping basket. Crucially you need to decide how to aggregate up all the individual price changes to create a single inflation number. And you need to cope when new goods are introduced or when the quality or

characteristics of goods change – what happens when smartphones are introduced or when flat-screen TVs replace bulky old TVs?

These are not issues of merely statistical interest. They matter enormously. Inflation statistics are amongst the most important official statistics. They underpin the UK's monetary policy and affect the incomes of millions of people. They have been used to adjust benefit levels. They form the basis of many wage negotiations. And inflation statistics are used in hundreds of billions of pounds worth of contracts, most notably for index-linked gilts. So the inflation figures produced by the Office for National Statistics (ONS) need to be credible, trusted and stable – frequent or substantial changes in the way they are produced could undermine confidence in vast swathes of contracts and in particular in contracts for government debt.

These are just some of the issues we have had to contend with in this review of the range of consumer price statistics. Commissioned in the wake of the controversy surrounding the outcome of the former National Statistician's consultation on the future of the long-standing Retail Prices Index (RPI), the review has set out to achieve two key things:

- Provide some clarity over what consumer price statistics are for, and what statistics are required to meet user needs.
- Review a whole range of methodological issues in constructing price indices, including data sources, aggregation, how to account for owner occupiers' housing costs, how to compare goods over time, amongst others.

We have been guided in doing this by three central considerations.

First, there is rarely a single "correct" answer. There is frequently a set of judgements and trade-offs that need to be made in determining everything from how many headline statistics to produce, to exactly how to collect prices, how to aggregate over different items and how to compare items over time. All the way through we have tried to set out the different considerations and

explain why we have come to a particular judgement, whilst stressing that in the end it is only a judgement.

Second, there are issues beyond “statistical purity” that matter. Inflation statistics need to command public confidence, be broadly explicable, and to be robust over time.

Third, we start where we are. We are constrained by UK and European legislation. Both the CPI and, especially, the RPI, are used in long term contracts which need to be respected. Some degree of consistency is important in making comparisons over time. And simple practical considerations in some instances mean that major changes to data sources, for example, may be difficult to achieve in the short term. Nevertheless we have of course tried to set out how these constraints have affected conclusions and where the conclusions may have been different in the absence of these constraints.

Current practice

The Consumer Prices Index, or **CPI**, is currently the headline measure of inflation. It was first published in 1997 to measure inflation consistently across all European Union states. In 2003 the CPI became the Bank of England’s inflation target. The CPI is required by European law and ONS has to produce the CPI to the specification of European legislation.

CPIH was introduced in 2013. It includes a measure of owner occupiers’ housing costs using a rental equivalence method. It is otherwise identical to the CPI, although its calculation and structure are controlled by ONS and so it may deviate further from the CPI in future. It has currently had its status as a National Statistic suspended because of concerns over the process used for calculating increases in rents which feeds in to measure owner occupiers’ housing costs.

The Retail Prices Index, or **RPI**, is the longest running measure of consumer price inflation; it was introduced in 1947. The RPI has a somewhat different structure and coverage from the CPI and CPIH, but is created from the same price quotes. The RPI lost its National Statistics status in March 2013 because a formula used to calculate average price change does not meet international standards. Because of its use in long term contracts, including index-linked gilts, there is national legislation controlling changes to the RPI.

Alongside the de-designation of the RPI, **RPIJ** was created following the National Statistician's consultation. RPIJ is identical to the RPI except that the "Carli" formula used in aggregating price quotes in the RPI is replaced by the (internationally standard) "Jevons" method (hence "J"). This index was primarily created as a tool to show the effect of using the Carli in the RPI. RPIJ was made a National Statistic in November 2013.

The recommendations of the review fall into two categories – those that relate to the overall question of what it is that we are, or should be, trying to measure, and those that relate to ensuring that data and methodology are appropriate for the task at hand.

What should we be measuring?

Why might there be more than one measure of inflation?

“Inflation” can mean a range of different things. There are at least three different concepts we might want to distinguish:

- The increase in prices between period 1 and period 2 (suitably weighted to reflect consumption of different goods and services);
- The increase in spending required to achieve the same level of welfare in period 2 as in period 1, in the face of rising prices;
- The increase in the actual cash outlay required by households to achieve the same consumption between periods 1 and 2 – what some have referred to as a “household index” or an “uprating index”.

CPIH, once the shortcomings in the processing of private rents data have been addressed, will achieve the first of these pretty well. It is a good, comprehensive measure of price change in the household sector. The second and third measures are not so much about pure price changes as about costs faced by households.

The second concept asks not about price change but about how much more money households might require to reach the same level of welfare as before. This is sometimes referred to as a Cost of Living Index or COLI. It would take account of the fact that households might choose to substitute goods and services whose price rises slowly in the place of goods and services which become more expensive more quickly. One would expect this measure to be lower than CPIH, and indeed work for this review suggests it might be substantially so. We return to the subject of the COLI later.

The third measure is different again and captures the idea behind what some have called a “household index”. The household index

has been put forward by some² as a concept that could be used as a basis for deciding by how much incomes (wages, pensions, benefits) need to rise to compensate recipients for rising living costs. The argument is that indices like CPIH do not take account of things like increases in mortgage interest costs which clearly have an effect on the spending required by some households.

Several differences between a “household index” of this sort and CPIH have been suggested, but the key difference is that the household index would focus on households’ payments for goods and services rather than the price at the point of acquisition (or consumption in the case of owner occupied housing). Relative to CPIH it might focus on gross (rather than net to households) insurance costs and it would probably not include the full effect of Higher Education fees up front (since they don’t impact on household costs for a long while). It would also treat housing costs differently from how they are currently treated in CPIH. In particular, it would include mortgage interest payments (MIPs) and an explicit allowance for renovations and repairs.

The household index and the payments approach

One possible example of a difference between a classic price index and a “household” index is the way insurance is dealt with. In CPIH, the target concept is the net cost for insurance. That is, the difference between premiums paid by households and claims received. This difference is the cost of the insurance service provided. Economically speaking, that is the price³.

A payments approach would measure the gross cost of insurance; that is the premiums paid. That is the cost faced by households

²Leyland (2014): ‘What should an uprating consumer price index look like?’ Available at: <http://www.statsusernet.org.uk/communities/resources/viewdocument/?DocumentKey=0cb5a678-9e41-4a9c-aa39-b35aed53bf7f>

³In practice, insurance is included on a “gross price, new weight” basis as net insurance prices are not known.

which take out insurance and for most might provide a better sense of what it costs them to buy a service – insurance. A change in the premium is a genuine change in costs facing households who want to buy insurance. But if the changes in the premium reflect changes in the amount of money recycled back to households in payments then the price of the service has not changed.

Much more important, potentially, is the treatment of housing costs. It is not easy to capture owner occupiers' housing (OOH) costs in any price index. ONS uses the "rental equivalence" approach in CPIH. A home provides a flow of accommodation services that are consumed by households. The rental equivalence approach estimates the price of consuming these services as being equivalent to what the owner would have to pay if renting the property. Internationally, rental equivalence is the most widely-used method for estimating owner occupiers' housing costs.

Under rental equivalence the estimated rent is assumed to include the costs faced by landlords. To avoid double-counting, goods and services that landlords would pay for are not included separately. For example, landlords pay for buildings insurance and major repairs, so these do not have to be separately priced when rental equivalence is used for OOH costs.

But rental equivalence is an imputed transaction. It does not tell you how much more money households need to spend on specific payments related to owner occupation. The payments approach, by contrast, aims to measure the actual consumption spending of households in relation to occupying the home they live in. That clearly includes mortgage interest payments and the costs of maintenance and repairs.

Capital payments, on the other hand, are generally defined as being out of scope of any kind of consumer price index. This is because they are an investment in an asset, and so add to household wealth, rather than being spending on consumption. For this reason, a payments approach would track house prices much less closely than perhaps users might expect.

However, the inclusion of mortgage interest payments is an obvious immediate attraction to the payments approach. Rising interest rates make those with mortgages worse off by increasing the costs they face. To many, not including this in an inflation measure seems perverse.

But measuring payments is harder than just measuring increases in mortgage interest payments. In particular, major works are difficult to measure. The RPI deals with this by including house depreciation, but as no actual payment is made, this is a departure from the payments approach. The payments approach is not a simple alternative to the rental equivalence approach.

In addition, rather as in the case of insurance payments, it is also important to understand that changes in interest rates create redistribution within the household sector. If I'm paying a higher interest rate on my mortgage, you're receiving more interest on your savings.

A second measure?

And there, perhaps, lies the flaw in the concept of a single "household" index. The idea that there is one measure of inflation which tells us how much costs are changing for all different households is clearly absurd. Suppose one were to include mortgage interest payments, or some wider measure of the cost of credit, in an index covering all households, aimed at measuring household living costs. This might increase the value of such an index when thinking about the impact of price changes on working age households and those in debt. But it would actually have perverse effects when considering other groups, such as pensioner households, and those with net savings.

Is that not also true of any price index? Different households face different price changes depending on the basket of goods they consume. But a price index such as CPIH is a statistically coherent measure of the changing level of prices across all household

spending on consumption. Its definitions are designed with this in mind. So aspects of the measurement make sense at an aggregate level.

The conclusion we draw is that there is not a case for publishing, alongside CPIH, a single monthly “household index”.

- It could create confusion and inflation rate “shopping”, where users may seek the rate of inflation that gives the right number, rather than the appropriate measure;
- Advocates of the uprating index argue such a measure would be appropriate for uprating wages and benefits. But it would not be. It would certainly not be appropriate for uprating pensions or other benefits;
- It would be no better than CPIH as a measure of prices faced by any individual group and could be misleading for some if taken as the “household cost measure”.

These are powerful arguments and no doubt help explain why, to our knowledge, a population wide index of this type is not produced by any national statistics institute in the world. Only in Ireland, so far as we are aware, is a population wide index including the payments approach to owner occupiers’ housing costs produced.

That said households, looking at their budgets, perceive certain costs, particularly mortgage interest payments, differently to how they are treated in consumer price statistics. There is a case for producing measures that reflect these costs. But these are not meaningful in isolation. They must be accompanied by measures that also capture the changes to household income. And the focus of these measures should be on subgroups of the population, not households as a whole.

The Australian Bureau of Statistics produces measures of inflation following the payments approach for four subgroups: working households, self-funded retirees, working age households supported by benefits, and pensioner households mainly supported by benefits.

The last two groups are combined into the Pensioner and Beneficiary Living Cost Index. This has been one of the indices used to increase the Age Pension in Australia, although the 2014-15 Budget⁴ proposes to end this. New Zealand has stated an intention to produce similar subgroup indices from 2015. But notably neither produces an aggregate index across all households following this approach, to avoid competing with their headline CPI.

Conclusions

There are different ways to measure consumer price inflation.

CPIH provides a good estimate of price changes across the economy. It should be the main headline index produced by ONS. In addition, ONS would better address user needs by publishing a set of measures on an annual basis to provide more complete information on the change in costs households face to maintain their standard of living. These should be published for specific groups of the population and it should be made clear what the measures of income are with which those measures should be compared. Such a set of measures would inform users and enhance the debate around the cost of living.

Recommendations

- 1. ONS should move towards making CPIH its main measure of inflation. In the meantime, the CPI should continue to be the main measure of inflation.**
- 2. ONS should develop an annual analytical publication that produces inflation indices as experienced by a range of different household types, along with appropriate advice on what income measures these analytical indices can be compared to.**

⁴Klapdor (2014): 'Changed indexation of pensions and tightened eligibility for all benefits', Parliament of Australia. Available at: http://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/BudgetReview201415/Indexation

Towards CPIH as the main measure of inflation

CPIH is conceptually the best overall measure of inflation in the UK. It is however not widely used at the moment, for a variety of reasons. This may be in part because CPIH is still relatively new. The shortcomings recently identified in the way the private rents data are processed to measure owner occupiers' housing costs may also be a factor.

Looking forward, the lack of statutory underpinning for CPIH may be an important barrier to greater use. UK legislation sets out the process for approving major changes to the RPI. Through its link to HICP, the production and scope of the CPI is governed by EU regulations. CPIH currently uses the concepts and definitions of HICP (except for owner occupiers' housing costs), but it is not bound by the same legislation. This provides ONS with flexibility – for example to include council tax (see **recommendation 22**). But this flexibility may be an important disadvantage for potential users.

One complication is the decision of Eurostat (the EU's statistical office) to use the net acquisitions approach in developing the HICP – and hence the CPI – to include OOH. This approach was rejected by the Authority for CPIH because the data available to ONS did not allow the correct calculation of a net acquisitions measure, in particular a price for housing excluding land⁵.

That CPIH is controlled by the UK statistical system is therefore a distinct advantage over the CPI. Over time, CPIH will continue to evolve to meet user needs in the UK. The UK will need to continue to produce an index meeting the HICP regulations, and this will be the best measure for comparing inflation between countries, but it should no longer be the UK's main measure of inflation.

⁵Eurostat are requiring EU member states to produce measures of owner-occupier's housing costs using this approach and including the price of land. See ONS (2014): 'Owner Occupiers' Housing Costs using the Net Acquisitions Approach'. Available at: <http://www.ons.gov.uk/ons/guide-method/user-guidance/prices/cpi-and-rpi/owner-occupiers--housing-costs-using-the-net-acquisitions-approach/index.html>

CPIH will soon be supported by the two new Advisory Panels on Consumer Prices recommended by the Authority's recent review of governance⁶. However, CPIH would meet user needs more fully if stronger, perhaps legally binding, arrangements were put in place. The requirement to produce CPIH could be established in law, alongside an outline of the process for making major changes to it.

Recommendation

- 3. The Authority should consider making the case for legislation governing the production of CPIH, guaranteeing its production and setting out the process for making major methodological changes.**

⁶UK Statistics Authority (2014): 'Review of the Governance of Prices Statistics'. Available at: <http://www.statisticsauthority.gov.uk/reports---correspondence/current-reviews/governance-of-prices-statistics.html>

The future of the RPI

In 2013 the UK Statistics Authority stripped the RPI of its status as a National Statistic. This followed the outcome of the then National Statistician's consultation on whether the way price quotes are aggregated together in the RPI should change.

Specifically, there is a difficulty about how to produce an average price change for basic items like shirts or vacuum cleaners when there is quite a range of prices but you don't have any information about how many of each is bought. You don't know how much weight to place on each price collected. For many items the RPI uses the Carli formula. This is an arithmetic average of price relatives, or the average change in price since the beginning of the year. In the CPI, and in almost all other consumer price indices produced by national statistical institutes around the world, the Carli formula is eschewed entirely in favour of the geometric average price change (Jevons formula) and arithmetic average of prices now compared with those at the beginning of the year (Dutot formula).

This review concurs with the Authority's conclusion that the use of the Carli is statistically flawed and can result in an upward bias in recorded inflation. This is not essentially, as some have argued, because the Jevons method takes account of substitution between goods. Rather it is because there are basic statistical flaws and biases in using the Carli formula. As we stressed above it is generally hard in this area to come to absolute conclusions. But it is our strong view that the use of the Carli is inappropriate and that the RPI is upwardly biased because of its use. In light of this, ONS has introduced an additional inflation measure – RPIJ – which is essentially the same as the RPI except that it uses the Jevons method wherever the RPI uses the Carli.

RPIJ corrects the inadequacies of the formula used in the RPI and keeps the rest of the methodology untouched. But it is not just the use of the Carli which is problematic in the construction of the RPI as a measure of consumer price inflation. Issues with the data source

of the weights, population coverage and treatment of some goods (like insurance and owner occupiers housing costs) make the RPI less suitable as a measure of overall inflation. RPIJ is problematic for all the same reasons.

The RPI is still used in large numbers of commercial contracts, including in £470 billion⁷ worth of index linked gilts. The sale of these gilts is used by the government to fund part of the national budget deficit. Some of these gilts will not be redeemed until 2068 and in future new gilts may be issued with even longer terms. And the continued existence of long-term liabilities linked to the RPI continues to create demand for assets that provide returns also linked to the RPI, regardless of the statistical issues.

So despite its statistical inadequacy, the RPI cannot simply be discontinued. Indeed, cognisant of these needs, ONS also noted that there is 'significant value to users in maintaining the continuity of the existing RPI's long time series without major change'⁸. It was with this in mind that the National Statistician recommended that the formulae used at the elementary aggregate level in the RPI should remain unchanged.

To continue to do so would meet the needs of users tied into long term contracts. But there are significant problems with this stance:

- The RPI has a long history and public recognition; it continues to be used widely;
- So long as the RPI continues to be produced, many users may still refer to it as the main measure of inflation despite its known problems;
- There is ambiguity about the National Statistician's commitment to "no major change" – which aspects of the calculation of the

⁷Total market value of index-linked gilts at the time of writing

⁸ONS (2013): 'Response to National Statistician's consultation on options for improving the Retail Prices Index'. Available at: <http://www.ons.gov.uk/ons/about-ons/get-involved/consultations/archived-consultations/2012/national-statistician-s-consultation-on-options-for-improving-the-retail-prices-index/index.html>

RPI are able to change as the available data sources and methods develop? The timescales involved are very long indeed;

- Most seriously, the maintenance of the RPI on its current basis creates risks for the integrity of other inflation measures and/or for the public finances.

This last risk is worth dwelling on. Suppose, as is entirely plausible, it is determined that changes need to be made to how price information is collected and compared in order to get a better measure of CPIH. This is essentially what happened in 2010 when the way in which clothing prices were collected was changed – more items of clothing were deemed “comparable”. Because of the underlying statistical methodology this had a much bigger effect on the RPI than on the CPI and CPIH – the “formula effect” grew. Further changes of this kind could further increase (or decrease) the formula effect and the wedge between CPIH and the RPI (and between RPIJ and the RPI).

In the situation of such a change arising, the Authority would be left to choose between three difficult options:

- Make the change and allow the “formula effect” to change. An increase in the effect would offer a windfall gain to some (for example holders of index linked gilts) and a loss to others (for example the taxpayer);
- Make no change and hence leave the CPI and CPIH less good than it should be – though in many cases that would not be compliant with EU legislation;
- Make the change for the CPI and CPIH only, thereby resulting in supplementary data collection or possible parallel running for the RPI, with associated costs and potential for confusion.

Producing the CPI and CPIH to the best possible statistical standard is the first priority. The logic of the current situation is that the RPI is purely a “legacy” measure produced because of the needs of users who have long term contracts. By not changing its calculation to make it a more “correct” measure of inflation in the face of clear

evidence that the current methodology is flawed, the Authority has set a clear precedent. The National Statistician recognised that by stating that the methodology of the RPI would remain unchanged. This means that improvements to the methodology of the CPI and CPIH will not be carried over to the RPI.

That is a coherent (if uncomfortable) place to be. No further changes should be made to the RPI methodology other than those that ensure its continued functionality, for example the update of the basket or annual weights change.

This will over time likely result in parallel collection for, and production of, the RPI and reduce its appropriateness as a measure of inflation even further. The cost of production will rise. The usefulness of the measure will diminish. The logical outcome must be the eventual discontinuation of the RPI, although this would require the Statistics and Registration Service Act 2007 (which requires the production of the RPI) to be amended. Given the existence of so many long term contracts this will obviously need to be carefully managed over an extended period.

The Authority and ONS should make it clear to users that the RPI is not a credible measure of consumer price change. The RPI should not be used for new contracts. Taxes, benefits and regulated prices should not be linked to the RPI. The RPI should also not be used as the measure of inflation when comparing living standards over time, at least for recent years where better consumer price indices are available. The issuance of index-linked gilts is more complex, but government should move away from selling gilts linked to the RPI, subject to consultation and assurance about the demand for CPI or CPIH linked gilts.

As the headline RPI is not a robust measure of inflation, it makes little sense to continue to produce analytical indices, such as the Pensioner Price Indices and the Tax and Price Index, which are based on the RPI. Where there is demand for analyses of this type to continue, these can be replicated on a CPIH basis (where they are not already),

or within the scope of the subgroups analysis set out in **recommendation 2**.

What then of RPIJ, the fourth and final current main measure? It was produced to provide to users a form of the RPI that replaces the flawed Carli index with an index in line with best practice. However, RPIJ is not widely used. In fact, it seems to cause confusion, with users not clear whether they should move to RPIJ or CPIH. Ultimately, RPIJ should be discontinued.

Recommendations

- 4. ONS and the UK Statistics Authority should re-state its position that the RPI is a flawed statistical measure of inflation which should not be used for new purposes and whose use should be discontinued for all purposes unless there are contractual commitments at stake.**
- 5. Government and regulators should work towards ending the use of the RPI as soon as practicable. Where they decide to keep using it the UK Statistics Authority should ask them to set out clearly and publicly their reasons for doing so. Where the Authority judges the continued use of the RPI to be inappropriate, it should say so.**
- 6. ONS should consult users on discontinuing the analytical series it publishes that are based on the RPI, such as the pensioner indices and the Tax and Price Index. Where there is a strong user need for such analyses to continue, the series should be recreated using the CPIH framework.**
- 7. We have noted that producing the CPI and CPIH to the best possible statistical standard is the first priority. The UK Statistics Authority should ensure that this priority is reflected in a work programme for the CPI and CPIH that allows each to be improved with best statistical practice.**

- 8. The logic of the National Statistician's recent decisions is that the RPI should be considered a legacy measure to be used only where contractually required. No further changes should be made to the RPI. If a change is made to the CPI and CPIH that would affect the RPI, the production of the indices should be split to retain the best practice of the CPI and CPIH and the constancy of the RPI. Over the long term the Authority should look to phase out production of the RPI in consultation with users, amending the law (the Statistics and Registration Service Act 2007) as necessary.**
- 9. ONS should consult on discontinuing RPIJ. ONS should continue to publish an estimate of the "formula effect" between the RPI and the main measure of inflation.**

The Cost of Living and Cost of Goods concepts

Current price indices measure the change in the price of a basket of goods over time. They do not measure changes in the “cost of living” – the amount by which spending would have to change to maintain living standards. That is essentially because the indices are not constructed to take account of substitution behaviour – they do not take account of the fact that if the cost of meat rises a household may buy less meat and more beans. They effectively assume the household continues to buy just as much meat throughout the year, independent of any change in price.

A Cost of Living Index (COLI) theoretically reflects substitution behaviour which can be approximated through use of a superlative index number formula. Such a measure cannot be published in a timely fashion, but can be published at a substantial lag. ONS has carried out research into what a lagged superlative index might look like. This work suggests that such an index could be significantly lower than standard price indices – that the cost of living rises measurably less quickly than prices. Research in this area should continue.

Recommendation

- 10. ONS should continue its research on producing an experimental superlative index for the UK and should aim to publish such an index annually in arrears once that work is complete and has been fully quality assured.**

How should we be measuring?

So far we have addressed the question of what consumer price inflation statistics should be measuring. While it is not always easy to make a sharp distinction, we now move to the question of how the ONS should go about measuring inflation. We clearly cannot be comprehensive, and do not here comment on the many areas where current ONS practice is good. We focus here on areas where there may be issues to address and where ONS is not currently engaged in making significant progress.

Sources and aggregation of price data

Price data is currently collected through a combination of central and local collection. Around 110,000 price quotes, from around 140 locations, are collected by contracted price collectors visiting shops and other outlets. The prices are collected once a month, at the same time each month. ONS has been piloting work looking at the impact of collecting prices on more days for items where prices are volatile and is also already reviewing the boundaries of the locations used for local price collections. This process will update where the prices are collected to better reflect current consumer behaviour. These are important exercises.

A further 70,000 price quotes are collected centrally by ONS staff, from web sites, telephone calls, catalogues and brochures. In some cases the choice of data collection method owes more to history than a consistent reflection of how these items are purchased by consumers. This process could usefully be set out more robustly and reviewed.

Once price quotes have been collected, they are combined together. Weights are used where available; where they are not, a Dutot or Jevons formula is used to combine the price quotes (Carli or Dutot in the case of the RPI). ONS could usefully review and set out clear

criteria for choosing between the use of Dutot and Jevons in combining price quotes in the CPI and CPIH.

Developments in technology are creating new ways of collecting data for consumer price statistics. Web sites can be 'scraped' by computer programmes to automatically collect price quotes for a large number of items. 'Scanner' systems used by supermarkets and other large retailers at the point of sale create records of the price paid for products and the quantities purchased.

These alternative sources of data have the potential greatly to improve the quality of consumer price statistics. Leading countries are already making use of scanner data in their consumer price statistics, and several others are ahead of ONS in acquiring and experimenting with such data. These countries have faced difficulties in working with scanner data however, and ONS can catch up by learning from these experiences.

There seem to be particular challenges in persuading UK retailers to provide scanner data, which has not proved problematic in other countries. Retailers should work with ONS towards providing data that can serve the public good.

ONS has been 'scraping' data from a small number of supermarket websites over the last year, and is starting to analyse the prices it is collecting. Web scraping does not have quite the same potential as scanner data, as it does not collect information on quantities purchased. It does however have the potential to be a useful additional price collection tool for ONS, and work with web scraping should continue.

Recommendations

- 11. ONS should set out a transparent, regular and frequent process for reviewing which individual items in the basket are collected by local price collectors and which are collected from web sites, catalogues and brochures,**

to ensure this reflects how different items are purchased in practice.

- 12. ONS should review and publish its criteria for choosing how to combine price quotes at the lowest stage of aggregation.**
- 13. ONS should give priority to developing the use of point of sale scanner data and web scraping techniques. ONS should set out a detailed plan for working towards greater use of these techniques in its consumer price statistics over the coming years.**

Weighting of consumer price statistics

There are two fundamental inputs into a price index – the prices of goods and services, and the weights attached to them. Weights in consumer price statistics are based on relative expenditure shares to ensure that the price quotes have the appropriate impact on the final index.

The CPI and CPIH derive weights from the National Accounts. These draw on the best available source for each area of spending and as such would appear to be the best source of weights data. In some cases, these are business surveys (such as the Retail Sales Inquiry) or data from Government and industry associations.

However, the single biggest source of weights in the National Accounts is the Living Costs and Food Survey (LCF), ONS's household spending survey. The LCF is even more important in compiling the RPI, where it is used for almost all the weights. In common with similar surveys in other countries, the LCF suffers from low response rates and (often significant) under-reporting of household spending. Both of these problems have been getting worse over time.

In addition there have been long periods when weights for particular items (for example, internet subscriptions) have continued to be based on LCF data even when it has been clear that the LCF has been picking up only a very small fraction of overall spending. ONS has been slow to identify these issues and make appropriate changes either to the data collection or weights used in construction of the RPI.

To support **recommendation 2**, above, where we suggest that it would be useful to produce consumer inflation statistics for different population subgroups, it will be important to collect high quality data on consumption patterns for different groups of households.

National Accounts estimates are frequently revised. Price indices, on the other hand, tend not to be revised once published. At times this can lead to very big year to year swings in the weights used due to

revisions. An example is the owner occupiers' housing component of CPIH between 2010 and 2014. This means that while the latest CPIH weights give the best estimates of how households on average spend their money, they do not support comparisons over time. This point could usefully be made clear to users.

The lag at which spending data are available means that the CPIH weights reflect spending patterns two years ago. This is unavoidable and in most cases tolerable. However, in the case of gas and electricity, this has the odd effect that the severity of the winter two years ago impacts the current weight. In such cases, the weights used in the CPI and CPIH should use an average of more than one year of National Accounts data.

One consequence of publishing the RPI and CPI using different data sources is that different weights are used. For important items of spending these can be quite different in each index, and indeed move in different directions. This can be highly confusing for users. ONS publishes an annual article on changes in the weights used in its consumer price statistics, and this provides useful information to users. However, it should include more explanation as to why the RPI and CPI/CPIH weights differ. Ideally, it would also be published alongside the introduction of the new weights; at present it usually follows later.

Recommendations

- 14. ONS should review the Living Costs and Food Survey (LCF) in light of the need to have good consumption data at a household level both to inform the National Accounts and to help with the creation of reliable estimates of the inflation experience of different population groups. External experts should be involved. More resource should be devoted to the LCF if ONS deems that necessary for the provision of high quality, reliable data on household spending.**

- 15. ONS should use more than one year of National Accounts data in cases where the weights are particularly volatile, or reflect particular circumstances in the latest year available (such as the weight for gas spending).**
- 16. ONS should improve its commentary on the weights tables that accompany the RPI and CPIH, so that it explains why weights differ and/or move in different directions in the RPI and CPIH. ONS should aim to publish the annual article on the updated weights at the time the weights change.**

Outlet substitution

In constructing a price index one considers the change in price of a good or service bought from a particular outlet – a supermarket, an independent retailer or over the internet for example. Month by month the price index is constructed by comparing the price of the same good bought in the same outlet. This is to ensure that the index does not create a price change across non-comparable items. However to weight the index at this level, first, we would want to know what weight to apply to purchases from each outlet and, second, the change in these weights.

Unfortunately ONS has little or no information about what proportion of goods are bought from outlets of different types. Shop type weights have not been reviewed since 2006, because the survey that provided them has been discontinued.

In addition it is clear that there have been very big changes in use of outlets. As consumers have moved from corner shops to supermarkets and from supermarkets to online providers the prices they will have paid for the same goods will have fallen. ONS's consumer price statistics will place increasing importance on outlets that account for more sales, but they do not take into account the compositional impact on prices paid.

There would be practical problems in producing a measure of inflation that reflected the average price paid for an item across outlets, rather than the current practice of aggregating changes in price across outlets. However, this is an area that merits further investigation, to determine whether the effect can be measured and how large it is.

Recommendations

- 17. ONS should review the stratification of consumer price statistics by shop type. The aim should be to introduce an appropriate stratification where weights for the different types of shops are available and can be updated.**
- 18. ONS should assess the impact of outlet substitution on price indices and, in the light of that work, should consider whether substitution between different outlets (for example, from shops to the internet) should be reflected in any of its statistics.**

The treatment of quality change and new goods and services

Goods and services change over time. A new car now is very different to a new car 20 years ago. Televisions available in shops now are quite different from televisions just a few years ago. And some products, such as smartphones and tablet computers, did not even exist 20 or even 10 years ago. How consumer price indices adjust for these changes is vital.

ONS has procedures for handling these issues. They comply with international best practice. There is, for example, a clear process for deciding what should be in the basket of goods and services, and ensuring that this remains representative of what consumers are spending their money on. This means that different years are not directly comparable with each other. This is dealt with by chain-linking years together.

Within years, quality adjustment is an issue when new products are chosen to replace products that are no longer available. The price collector must select a replacement product, and then make a judgement as to whether the replacement is close enough to the original to be considered comparable. If they do not consider it to be comparable then the price of the new model and the price of the old are not directly compared. Instead, the new model has a base price imputed using the price change of similar items.

For items that are being improved over time, such as technology goods, the impact is that average price actually paid for an item broadly defined (“a television”, “a vacuum cleaner”) will tend to rise more quickly than the price index for that good. In some instances we have shown in this report that the differences can be very substantial. For example between 1996 and 2013 the average observed price for a vacuum cleaner rose by about 50% while the implied price index for vacuum cleaners fell by about 40%. Implicitly, the difference between the average price of goods and services and the price index is attributed to differences in quality.

This is how in effect nearly all adjustment for quality actually occurs within years. Over time the index can be sensitive to exactly what counts as “comparable” for these purposes. Some products are sold at a discount towards the end of their life. When the product is no longer widely available it will be replaced by a similar one, often at an earlier point in its life cycle and not at a discount. The fall in the price of the discontinued product will be included in the price index. But if the discontinued and replacement products are not considered comparable, there is a risk that any price increase not due to quality differences between the two will be missed.

Clearly, the difference in price between two products should not enter the price index if the two products are not comparable. In the course of the review we have seen no evidence to suggest that there is a major problem in the way that goods and services are compared. However, further reassurance could be provided by ONS actively monitoring the use of the non-comparable marker in future. This would highlight goods and services where products were frequently found to be non-comparable, and be a starting point for further investigation.

Recommendation

- 19. ONS should introduce regular monitoring of the impact of quality adjustment on its consumer price statistics. This includes monitoring how often non-comparable replacements occur for each item in the basket of goods and services, and investigating those items where this is frequent. ONS should particularly seek to understand cases where the relevant price index deviates substantially from the average price collected.**

Owner occupiers' housing costs and council tax

Housing costs are among the most important of all consumer expenditures. But, for owner occupiers especially, taking account of housing costs in a consumer price index is uniquely challenging.

As we have already seen, from the perspective of an individual household, an approach based on the payments they make (excluding capital payments that increase their wealth) makes intuitive sense. It is useful for understanding the costs faced by households if there are accompanying measures of income that also reflect interest received. But the payments approach is not suitable as an overall measure of inflation.

The best approach available to ONS for measuring the price of owner occupied housing is to calculate what the occupier would have had to have paid to rent the property. This is the cost of the consumption part of owning the property, and is approximated by what the owner occupier would have to pay in rent for their home. This is the "rental equivalence" method used in calculating CPIH.

Unfortunately shortcomings have been identified with the processing of private rents data since the implementation of CPIH resulting in an understatement of owner occupiers' housing costs. This has led to the National Statistics status of CPIH being suspended by the UK Statistics Authority. ONS is working with the Valuation Office Agency (VOA) towards fixing the problems.

The price index for private rents has risen much less quickly than the simple observed average for private rents for a long period. The explanation for most items in the basket would be implicit quality change; that is, that the houses available on the market today are of higher quality than those several years ago. ONS and VOA are continuing to investigate. This work is essential in establishing the credibility of the data underpinning the estimate of owner occupiers' housing costs. ONS is expected to publish its findings in early 2015.

One element of what might appear to most to be part of housing costs is not taken into account at all in either the CPI or CPIH – namely council tax. The reason is that direct taxes (like income tax) should not appear in a price index and council tax is, for this purpose, classified as a direct tax. But one could equally see council tax as standing in place of VAT on housing – a view argued for strongly in the Mirrlees Review, for example. The UK cannot include council tax in the CPI but can include it in CPIH. There is space for disagreement over exactly how council tax should be treated in consumer price statistics. On balance our view is that it should be included in CPIH.

Recommendations

- 20. ONS should continue to produce CPIH using “rental equivalence” as the method for calculating owner occupiers housing costs.**
- 21. ONS should produce a full explanation of the difference between the rise in the owner occupiers’ housing costs component and the larger rise in private rents measured by the VOA and other sources.**
- 22. The UK Statistics Authority should consult on including council tax in CPIH.**

The treatment of discounts

UK retailers use an increasing array of discounts and incentives to encourage consumers to shop in their stores. Price reductions are included in consumer price statistics, but most other offers, such as multi-buy discounts, loyalty card schemes and vouchers are not included. If the take-up of such offers increases over time then inflation statistics will overestimate actual inflation. ONS has limited information on the degree to which this is happening.

Reflecting this accurately in a consumer price statistic is challenging. Consider a product on a “buy one, get one free” offer. ONS’s current procedures effectively assume the customer wants only one item, and places no value on the second item at all; the price for the single item is collected. The other extreme would be to assume the customer always takes the second item, suggesting the correct price is half the price of the single item. The truth is likely to be somewhere in between, and will vary depending on consumer preferences.

Of course, many discounts are more complex than this. A deal where a product costs £2.50 individually but where two can be had for £4.00 will likely not be taken up by all consumers. The impact of loyalty card schemes and vouchers would be even harder to measure.

Ideally, one would produce a ‘unit price’ measure, where the price collected is the average price paid per item. However, such a measure would require detailed information on sales and transactions. Scanner data can potentially provide this, but this is not currently available to ONS. However, ONS’s current data collection procedures could be adapted to reflect a wider range of discounts, particularly multi-buy discounts.

Recommendations

- 23. ONS needs to continue to examine the range and scale of different types of discounting and the extent to which this has been changing over time. It should publish estimates of the likely effects on CPIH of different ways of dealing with these discounts.**
- 24. ONS should seek to reflect a wider range of discounts, such as multi-buy discounts, in its consumer price statistics, based on the outcome of its studies.**

Conclusion

There is an unhelpful proliferation of price indices in the UK at present. The current situation is causing confusion, and as a result many users are still using the RPI, a statistic that is no longer fit for purpose.

There is a strong case for adopting CPIH as the main price index. Subject to some of the specific issues raised here, it is a good measure of price inflation across the economy. To ensure that it is durable and credible as a price statistic, a clear and strong governance structure needs to be built around it.

The UK Statistics Authority and ONS have important roles to play in communicating the primacy of CPIH, explaining what it is measuring and how it should be used. The Authority and ONS should also be very clear in explaining that the RPI is not a credible measure of consumer price change. They should make it clear that the RPI is not fit for purpose and should not be used except where existing legal contracts – for example index-linked gilts – demand it. If a way can be found to discontinue the production of the RPI while maintaining the integrity of these legal contracts then it should be pursued. In the course of the review we have not found a satisfactory solution to this conundrum.

Others, including government, also have a responsibility to use and communicate price statistics appropriately. No taxes, benefits or regulated prices should be linked to the RPI. While there are additional complications here, the government should aim to move away from selling gilts linked to the RPI, subject to consultation and assurance about the demand for CPI or CPIH linked gilts.

CPIH measures the changes in price of consumer goods and services, rather than changes in payments made by households or the change in spending required to maintain living standards. As a single

economy wide measure of inflation, it does not measure the change in prices faced by specific groups of the population. These vary.

There is a strong case, therefore, for ONS to publish more information about what is happening to prices and costs faced by households, probably on an annual basis. This would provide, for different population subgroups, information on how the prices and costs had risen. A detailed consultation would need to be carried out over the precise contents of such a publication. It has the potential to add significantly to understanding of what is actually happening to prices faced by, and living standards of, different population groups.

Beyond that, there are important developments ONS should consider to some elements of its methodology and use of data. It needs to follow potential developments in the use and availability of data direct from retailers and from the internet, and be ready to respond to opportunities.

ONS needs to ensure that its data sources, such as the LCF, are as robust as possible for understanding spending behaviour and levels and for feeding in to the National Accounts. A specific review of these data sources is recommended.

There is also a series of specific areas where it would be useful for ONS to update, review or modify its procedures. Examples include monitoring quality change and “non-comparable” replacement products over time, incorporating a wider range of discounting into price statistics, instituting regular reviews of sources for price data on specific products, and reviewing stratification by shop type. ONS and the Authority between them should also have a more robust system for sense checking the impact of changes in the method for calculating, or the sources used for, important sub-components of the overall index. They should, for example, have been alert earlier to problems in the measurement of rents which resulted in CPIH having its National Statistics status suspended.

Annex: Organisations that have contributed to the Review

Bank of England

Consumers' Association (Which?)

Debt Management Office

Department for Business, Innovation and Skills

Department for Transport

Department for Work and Pensions

HM Treasury

Low Pay Commission

Ministry of Defence

National Association of Pension Funds

Office for National Statistics

Office of Communications (Ofcom)

Royal Statistical Society

RPI / CPI User Group

Water Services Regulation Authority (Ofwat)



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