Addressing the formula effect gap between the UK's two primary measures of consumer price inflation

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Abstract

This paper looks at the differences between the UK's two primary measures of consumer price inflation and considers the issues that bringing proposals for change to the Retail Prices Index (RPI), the UK's 'legacy' price index, raised. The first section looks at the recent history of inflation measurement by the Office for National Statistics (ONS), especially in respect of the formulae used at the elementary level and gives the context for the governance of and specifications for the RPI, and the impact that European (and wider) developments had. The next section reviews the differences between the RPI and the UK's primary inflation measure, the Consumer Prices Index (CPI), which is also its harmonised index of consumer prices (HICP). The paper then goes on to look at the consequences of changes that were made to price collection procedures in 2010, together with an assessment of the reasons why the impact was different in respect of the RPI and CPI. Given these differences, user focus on price indices increased and the next section considers both uses and users' needs. The final section looks at the National Statistician's consultation on options for improving the RPI and its outcome, which has led to the removal of the National Statistics designation from the RPI and the creation of a new analytical series to aid users understand the impact that the formulae used can have.

Introduction

This section reviews recent history in respect of consumer price indices. It is important because it established the conditions in which a significant statistical and policy issue arose.

There is a long history in measuring inflation in the UK, starting with occasional official comparisons of food prices in the late 19th century and early 20th century. However, the Government first began a systematic, continuous check on the increase in prices in 1914. The new index was accepted as a valuable aid towards protecting ordinary workers from what were initially expected to be temporary economic consequences of the First World War. The 'cost of living index', with unchanged weights, was produced throughout the 1920s and 1930s but criticism mounted, especially in relation to its out-of-date weights. In 1936, the Ministry of Labour announced the introduction of a large-scale household expenditure inquiry to update the weights; this was carried out in 1937-8. However, by the time the results became available, war had broken out and further action on the revisions was deferred.

In 1946 a new committee, the Cost of Living Advisory Committee, was set up. An interim report in 1947 recommended the removal of the name 'cost of living index' and the associations it implied. It resulted in a new index, the Interim Index of Retail Prices, which started in June 1947.

The RPI as it is currently composed began in 1956. It was initiated as a costs of goods index (COGI) rather than a cost of living index (COLI). Governance was provided by the Cost of Living Advisory

[1] The author acknowledges contributions to this article made by a number of colleagues in ONS, but in particular from Ainslie Restieaux and Richard Campbell also of Prices Division.

Committee, which became the RPI Advisory Committee (RPIAC) in an effort to move people away from the perception that the index was a COLI. Original decisions on the formulae to use for items at the elementary aggregate level (where no weights were available) were taken by the Technical Working Party of the RPIAC. From the outset the options appear to have been between the ratio of averages (Dutot) and average of price relatives (Carli) – see Annex A.

There is little record of any consideration within the Central Statistical Office (CSO), which was the forerunner to the ONS, of the appropriateness of the respective arithmetic averages until 1977, when a problem with using the arithmetic mean of price relatives in elementary aggregates was recognized by RPIAC. However, little was done to remedy this issue since the committee "noted at the outset that the choice of elementary formula does not make a large difference to the index". The retail sector and consumer behaviour in 1977 was very different to that apparent in the last decade or so (see the section on clothing prices below for further expansion on these issues).

By the early 1980s RPIAC had been reconvened to review the RPI, but did not consider the elementary aggregate issue. The Wilson Report[2] published in 1980 recommended that the UK government issues index linked (to the RPI) gilts for pension funds and these were introduced in 1981.

At the end of the 1980s responsibility for the RPI transferred from the Employment Department to the CSO, but importantly, responsibility for the scope and definition of the index remained under the control of Ministers (the Chancellor instead of the Secretary of State for Employment), not the Director of the CSO.

In 1994 RPIAC met for the last time and published a report relating to the house depreciation costs component of the RPI. In the same year, Bohdan Szulc, from Statistics Canada's Prices Division submitted a paper[3] to the first meeting of the Ottawa Group, highlighting the real problems that using the Carli can create in a consumer price index. The next year the European Union introduced regulations providing for the construction of a harmonised index of consumer prices, the development of which occupied NSIs around Europe (the HICP was first published in 1996). The regulation effectively bans the use of the Carli formula in the HICP and official documentation states "the decision to rule out its use was not taken on the grounds that it is generally accepted as wrong, but rather that it does not give results which are 'comparable' to those given by other formulae." It seems that participants from Eurostat at the first meeting of the Ottawa group took the advice from Szulc to heart and banned the use of the Carli index in the HICP due to its built in upward bias.

In 1996 the CSO morphed into ONS but again governance of the RPI remained unchanged, with scope and definition remaining with the Chancellor. At the same time, the US saw the publication of the Boskin Report[4]. This increased debate internationally on measurement bias in consumer price statistics and reignited COGI or COLI arguments (Boskin favoured the latter). Given this, ONS published a couple of documents looking at the implications of Boskin for the UK's RPI. Boskin estimated a formula bias of 0.25 percentage points in the US CPI. ONS statisticians thought the effect of moving to Jevons in the UK was likely to be lower because the Dutot formula (rather than

[2] Committee to Review the Functioning of Financial Institutions, HMSO, 1980
[3] Choice of Price Index Formulae at the Micro-Aggregation Level: The Canadian Empirical Evidence, Statistics Canada, 1994
[4] Toward A More Accurate Measure Of The Cost Of Living, US Senate Finance Committee, 1996

Carli) was used for a substantial number of items. Further research was proposed to investigate the true impact.

So, by 1996, with the advent of the HICP, the UK had two measures of inflation. The RPI had 50 years' of history and use where there had been extensive efforts to reinforce it as a COGI. The CPI (at that point it was still the HICP) had no history but there was a much stronger implied connection with COLIs given the preference for the use of the Jevons and its association with substitution effects, in that the geometric mean is assumed to reflect changes in consumer spending patterns relative to changes in the price of goods and services.

RPI and CPI compared

The result of having two measures that produced different growth rates was a growing concern among users about which was 'best' or more suitable for their use; concerns that were increasingly attributed to the 'formula effect'; the gap between the RPI and CPI that is attributable to the use of the different formulae at the elementary aggregate level, rather than other differences.

The basic approach to the measurement of inflation adopted by both the CPI and RPI is the same. Both track the changing cost of a fixed basket of goods and services over time and both are produced by combining together around 180,000 individual prices for over 650 representative items. Differences arise due to coverage, the population base of the indices and the way in which individual price quotes are combined at the first stage of aggregation. In summary:

	RPI	CPI
Coverage – the actual goods and services included in the indices.	The RPI covers a range of costs excluded from the CPI, including: • Mortgage interest payments (MIPs) • Council tax • House depreciation • Buildings insurance • House purchase costs, e.g. estate agent fees • TV licence • Road fund licence • Trades union subscriptions The RPI includes a price index for cars which is based entirely on used car prices.	The CPI covers certain charges and fees excluded from the RPI, including: • Stockbroker fees • University accommodation fees • Foreign student tuition fees • Unit trust fees The Index for the purchase of new cars in the CPI is quality adjusted and based on actual published prices for new cars.
Population Base – the expenditure, as covered by the index and, the source for the expenditure data.	The RPI is representative of the majority of private UK households, but excludes the highest earners and pensioner households dependent mainly on state benefits. It includes expenditure both within the UK and abroad by UK	The CPI is representative of all private UK households, and also includes the expenditure of institutional households (nursing homes for example) and foreign visitors to the UK. Only expenditure within the UK is covered.

	households. Expenditure data (or 'weights') used to represent this population are derived from a number of sources but mainly from ONS's Living Costs and Food Survey.	Expenditure data (or 'weights') used to represent this population are derived from National Accounts data and can therefore differ in magnitude from the RPI weights for similar components.
Index Construction Formulae (How the index is calculated)	At the first stage of aggregation, the RPI is constructed using an arithmetic mean (AM). There are two different methods, the Carli and Dutot, applied to different items.	At the same level, the CPI uses a geometric mean (GM) in most cases.

In light of these emerging concerns, ONS began research looking at the factors driving the gap, with the main work starting towards the end of the 1990s. The status of the HICP increased at the start of 1999 when it was used to meet the requirements of the Maastricht Treaty and subsequently for the measurement of price stability across the euro area by the European Central bank (ECB).

In 2000 the Framework for National Statistics was published[5], but again, responsibility for RPI remained unchanged. That year, ONS produced an internal paper with a recommendation not to use the Carli, or at the very least to produce a statistical design that reduces the impact of its use, and started to look at issues around the substitution effect. Over the next couple of years ONS looked at the impact of switching the formula away from the Carli. The pervading governance arrangements for the RPI at that time are important, since they might be seen as inhibiting action on the Carli. That is because a switch from Carli to Jevons was deemed to be one that would change the nature of the index away from a COGI, (with the economic argument suggesting that Jevons compensated for substitution bias better than the Carli). As such, this would be an issue for the Chancellor, and it appears that ONS did not consider pressing the argument for a change. By 2002 ONS had concluded that the use of the Jevons should be ruled out because "taking into account substitution that takes place within an elementary aggregate within a chain is 'alien to a fixed basket index'". This was supplemented by some work that concluded that the COLI approach could (but should not) be adopted as a conceptual basis for the UK RPI. A line was drawn in the sand when ONS concluded that "there should be no more work on elementary aggregation until a decision has been reached on whether GM may be used. If so, it should be. If not, RA (Dutot) should be used".

Developments outside of ONS moved on, with the UK's HICP being renamed the Consumer Prices Index (CPI) and the Chancellor of the Exchequer's Pre-Budget Report 2003 announcing that the UK inflation target would in future be based on the CPI. So the target rate was revised from 2.5 per cent (RPI) to 2.0 per cent (CPI) in recognition of the long-run difference between the RPI and CPI measures arising from the differences between their formulae. It explicitly recognised the CPI as the 'most relevant and accurate measure of inflation' upon which to base monetary policy decisions. Within ONS, work on the RPI was focussed on improving item descriptions to mitigate some of the

[5] Framework for National Statistics, Office for National Statistics, 2000

impacts of the use of the Carli and in developing hedonic approaches to quality adjustment for a range of items. Resources were allocated to work on the CPI, including participation in Eurostat led task forces.

The governance of RPI began to take a turn in 2004 when a Statistics Commission report[6] recommended "that, in a revised *Framework*, the Chancellor should no longer be responsible for the scope and definition of the RPI but that these should instead be the responsibility of the National Statistician, along with methodology." At the same time, ONS began to look in earnest at the causes of the gap between RPI and CPI, and in particular to investigate the contribution to the gap being made by clothing items. In 2005 an internal report revisited decisions and analyses set out in 2002, and again concluded that the Carli should not be used. It identified weaknesses in the criteria for assessing the use of the Carli and proposed new measures. It concluded that the formula effect was generating about 0.6 percentage points difference between the two.

Over the next couple of years work centred around the transfer of responsibilities for price statistics from London to Newport, and the expectation of a new computer system. This was coincident with the creation of the UK Statistics Authority and issues around RPI were focussed on policy and governance rather than methodology. The legal and policy issues were resolved in 2007 with the enactment of the Statistics and Registration Services Act, which established new arrangements for the governance of the RPI. These placed responsibility with the UK Statistics Authority Board to compile and maintain the RPI and publish it each month. It also required that the Board consult the Bank of England and ultimately the Chancellor before making any change to the coverage or the basic calculation of the index that was judged to be fundamental and materially detrimental to holders of index linked gilts. This requirement was in recognition of the links between RPI and government debt and the potential economic consequences of change.

Around a year later, in January 2009, it was acknowledged that the current RPI statistical methodology was out of date and in need of review. It was also noted that the RPI governance issues would be barriers to change in the CPI. The governance issues were resolved in July 2009 with the formation of the Consumer Prices Advisory Committee (CPAC) and in December 2009 CPAC considered the formula effect. However, including Owner Occupiers' Housing costs (OOH) in the CPI was seen as the top priority and addressing the formula differences between CPI and RPI was listed as an item for review in 2011 or later.

The collection of prices for clothing

In early 2010 ONS implemented changes to the way prices for clothing were collected. The changes were introduced to improve the measurement of clothing, since in the (long) period prior to 2010 clothing inflation rates were negative for both the CPI and RPI. Indeed, the persistence of the negative growth rates was the subject of a compliance monitoring assessment by Eurostat in autumn 2008. As noted above, the retail sector for clothes (and most other products) had changed radically since the inception of the RPI. Strategies and tactics for pricing products have evolved into various models that are now well documented in marketing literature. Examples include loss leader pricing, predatory pricing and limit pricing. In today's supermarkets a range of items will be on offer at temporarily reduced prices to attract customers, before returning to full price days, hours, or

[6] Changes in the Calculation of the RPI and RPI Governance, Statistics Commission, Report no 20, Sept 2004

possibly minutes later. The clothing industry in particular has changed dramatically since the RPI was first published in 1956. Ready-made clothing using synthetic and easy-care fabrics was a relatively new phenomenon in the 1950s. A large segment of the fashion industry now relies on mass market sales, catering for as many customers as possible. In order to save money and time, cheap fabrics and simpler production techniques are used which can easily be done by machine. The final product can therefore be sold much more cheaply. At the end of the season products are sold at dramatically reduced prices to make way for new stock. These behaviours feed into the variability of clothing prices in the indices and are relevant in the context of the changes introduced to the UK's price collection process in 2010.

The improvements to the measurement of clothing inflation were:

• increased sample size each month:

> Prior to the change when a clothing product was replaced with new stock, small changes to the composition of the garment were treated as a quality change and the price quote was excluded from the index calculation. As quality change between an old and new garment cannot easily be measured, small changes in composition and style were accepted (as such changes are unlikely to be considered by consumers as a change in quality) and the prices of garments which change in this way were now included in the index calculation. This improved approach increased the sample size used each month in the construction of the clothing index

• prices collected in the base period (January) now better reflected consumer spending patterns:

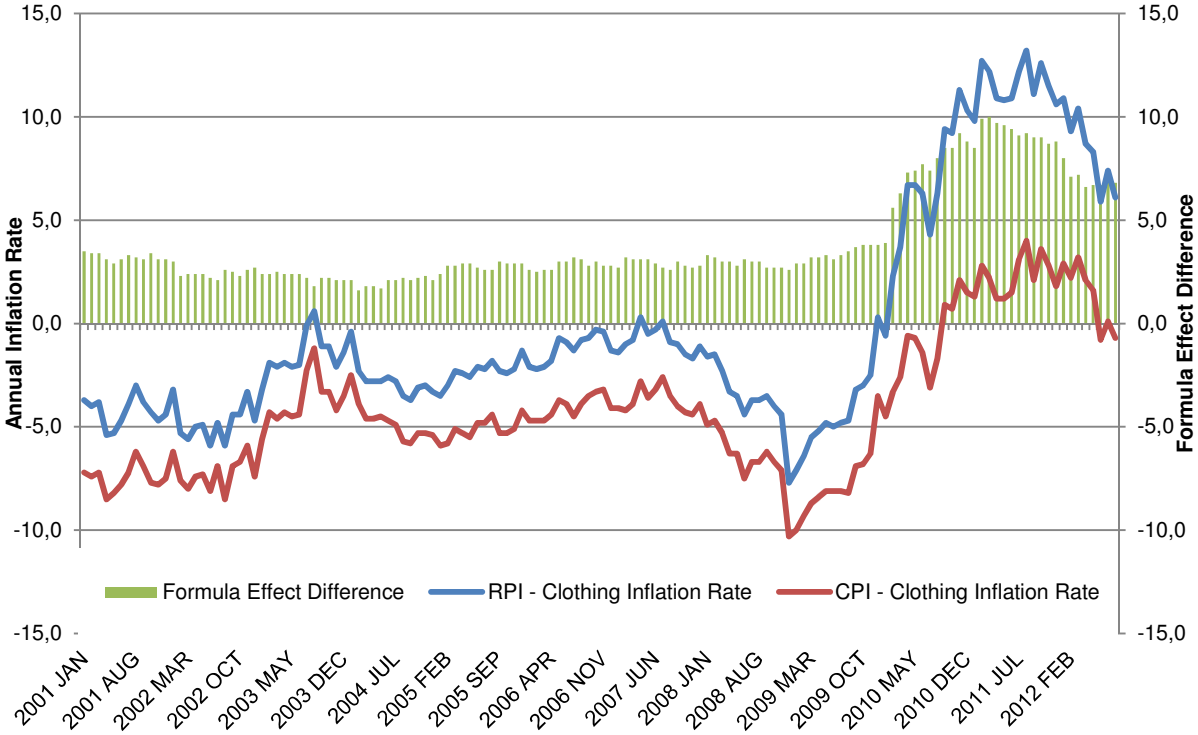
> Clothing products that were in a sale we collected in January, in those locations and for those products where prices were being collected for the first time. Previously, price collectors were encouraged to select items that were not in a sale. The new approach better reflected consumer spending patterns

• increased number of price quotes used in the calculation of the base period index:

> Prices were collected for all available products in the base period. Previously if a product that was priced in December was unavailable in January there was the potential to 'mark' the product temporarily out of stock, not collect a price and wait until February to review if the item was back in stock (which tended to be rare due to the sales season). The new approach meant that the sample size used in the construction of the base period index increased.

The measurement improvements implemented for clothing impacted on the CPI and RPI measures of inflation, see Figure 1 below. Annual clothing and footwear inflation between 1997 and 2009 as measured by the CPI fell by 5.3 per cent on average and, as measured by the RPI, fell by 2.5 per cent on average. In 2010, the average annual clothing and footwear inflation as measured by the CPI fell by 1.0 per cent and as measured by the RPI rose by 6.3 per cent.

Figure 1: Clothing Inflation Rates in the CPI and RPI: January 1997- July 2012



These changes were not brought to CPAC for approval. The question of whether the change was fundamental was considered by a meeting of officials, but it was accepted that as this was a change to collection guidelines it was not a fundamental change. Prior to its implementation the analysis of the impact of the change focussed on the CPI only, since the driver for the change was the Eurostat assessment and increasing concern from users for the continued and prolonged period during which inflation rates for clothing were negative. There was no assessment of the impact the change might have on the formula effect. After the changes to the collection guidelines were made, estimates of inflation in clothing in the CPI switched from negative to positive (so delivered the intended outcome) but the gap between CPI and RPI widened from around 0.5 percentage points to an average of 0.9 percentage points. In retrospect this should not have been unexpected, since the relationship between the Carli and the Jevons[7] yields a widening of the gap when the variance of price relatives increases, and the changes in procedures yielded more volatile clothing prices. The charts at Annex F of the ONS consultation document[8] illustrated how the variance of the price relatives for clothing items increased following the changes made in 2010.

In late April 2010 an assessment of consumer price statistics began and progress on this was reported to CPAC in July alongside an update on the CPI and RPI development plans, but the formula issues had slipped off the list. CPAC accepted that a higher priority was attached to the need to continuously improve the CPI compared with the RPI. In part this probably reflected developments

[7] See 'Consumer Price Statistics in the UK', Diewert WE, 2012 (http://www.ons.gov.uk/ons/guide-method/userguidance/prices/cpi-and-rpi/index.html) for a methodological description of the relationship between the Carli and Jevons.

[8] National Statistician's consultation on options for improving the Retail Prices Index, ONS, 2012 (see: http://www.ons.gov.uk/ons/about-ons/user-engagement/consultations-and-surveys/archived-consultations/2012/national-statistician-s-consultation-on-options-for-improving-the-retail-prices-index/index.html)

from the June Budget, where the Chancellor announced that the government would adopt the CPI for the indexation of benefits, tax credits and public service pensions.

CPAC examines the formula effect

In August 2010 the President of the Royal Statistical Society expressed concerns around the widening formula effect. CPAC was updated on these developments and a programme of work instigated. CPAC first received a paper on the formula effect, focussing on the clothing issues, at its meeting in May 2011, though development work within ONS was under way ahead of this date. At the end of 2010 the assessment of consumer price statistics noted that it was not always clear whether the different approaches that had been adopted in the past for the RPI remain appropriate today. For example, the use of the arithmetic mean to combine individual prices rather than the geometric mean. The focus of investigation by ONS, under the guidance of CPAC, was to look at the clothing collection guideline changes in 2010. However, that work was widened to look at the formulae used by other statistics offices, which showed[9] that the UK was the only nation that retained the Carli. The focus of the development programme therefore changed, and on the back of a significant amount of new research and analysis a tentative position was reached on the formulae that are best suited for consumer inflation purposes.

This found there were a number of reasons why the time was right to consider whether a change in elementary aggregate formula should be instigated (the statistical arguments for and against the Carli are set out elsewhere, see for example Diewert[10]). Today's consumer market conditions create an environment where a variety of products are available at a range of prices for any one item in the CPI or RPI basket, making the items and prices more heterogeneous over time. Products are frequently on and off sale, and in the case of clothing, items will need to be replaced by a comparable product if no longer available. This is the type of everyday pricing behaviour which fuels an upward 'bias' in the Carli formula. It can be managed to a degree by refining item descriptions and comparability rules over time but is this not a means to an end.

The formula effect became more important than ever before. The rate of inflation in the UK abated substantially in the 1990s. As a result, a bias that might have contributed a fraction of the total annual change in prices was a significant portion of the entire change. In response to the CPI being used for the indexation of benefits, tax credits and public sector pensions there was an increased focus on the formula effect from the public and other users. This environment and the work undertaken in response helped ONS build recommendations for change that were presented in a consultation undertaken by the National Statistician in October 2012.

National Statistician's consultation on options for improving the Retail Prices Index

The consultation allowed users to interact with ONS and explain how each of the measures and the nature of the index construction are factored into their use. It showed there was a reasonably good degree of understanding by users of the different formulae and their impact on growth rates. The RPI's use of the Carli was defended by most respondents; though the degree to which the responses

[9] See "International Comparison of the Formula Effect between the CPI and RPI", Evans B, ONS 2012

[10] Available here: http://www.ons.gov.uk/ons/about-ons/user-engagement/consultations-and-surveys/archived-consultations/2012/national-statistician-s-consultation-on-options-for-improving-the-retail-prices-index/index.html

reflected self interest over statistical purity is difficult to unravel. There were arguments made against the use of the geometric mean, because behavioural (substitution) responses are unacceptable attributes of a consumer price index – essentially, some users argued that consumers did not substitute in response to price change (many of the respondents were pensioners) and so the geometric approach would be unsuitable. Others identified the nature of the contract that they had entered into when they obtained their assets (or liabilities) in the form of index linked gilts or bonds. The argument here was that investment decisions were taken with reference to the known relationship between the RPI and the CPI, which derived from the use of the arithmetic and geometric approaches for elementary aggregates. Given the known relationship, that RPI growth rates are higher than those from the CPI, and the UK government's economic policy of setting an inflation target based on the CPI, any switch in the formulation of the RPI would be a breach of contract. Since the UK's inflation target is 2 per cent, rational expectations for long-run inflation rates were around 3 per cent per annum for the RPI (1 percentage point higher than the CPI since 2010) and the price and yield of assets would have been set in light of this expectation.

Index linked gilt holders might be judged to have less of a case to make on this element than others, since clauses in a number of gilts assured investors that they could redeem their gilt at inflation uprated par if any change that were deemed material and detrimental were approved by the Chancellor. Other institutional users, for example regulators of utilities or telecommunications, where price increases are linked to the RPI, were equally interested. For them however, the bigger issue was one of clarity and absence of uncertainty, though it's fair to say that market dealers were also concerned that one of the primary outcomes should be a long-term solution that brought a conclusion to the issues that the consultation had raised. The position taken by central government, and in particular HM Treasury and the Bank of England, was one of letting the independent statistical institution undertake a consultation about statistical issues. Nevertheless, there were plenty of accusations of political interference and bias on the part of the ONS, from the media and more widely from groups that would potentially be affected by a change.

There were few new methodological issues identified by respondents to the consultation, though some set out arguments that challenged both the position taken by ONS and current thinking around consumer price indexation, and these will be considered further when ONS establishes its work programme in response to the consultation. The statistical issues identified can be classified into the following main groups:

- the need for a consistent long-run historical time series of the RPI
- whether the Jevons implies substitution behaviour and if that is unrealistic or means that their utility would be diminished.
- Whether price bouncing across a chain link is significant.
- Whether the time reversal axiom is important.
- what is meant by bias when discussing the Carli and Jevons.

In developing its position following the consultation, ONS involved a group of independent experts to review its analysis. The aim was to ensure that ONS systematically and thoroughly addressed all of the statistical issues raised in response to the consultation and that the analysis that underpinned its recommendations was comprehensive.

As well as pressing ONS on the statistical/methodological issues the responses also allowed ONS to obtain a clearer understanding of the uses that are made of the RPI, which will be beneficial when future developments are being considered.

In reaching concluding recommendations ONS found that the recent (over the last two or so years) programme to investigate the formula effect had been beneficial. ONS listened to user feedback, investigated its own statistical concerns, built up an evidence base through original research, listened to world experts, learned from other NSIs, carefully reviewed the evidence, and arrived at a position to make informed decisions that will improve the use of some of the most important statistics produced in the UK.

It has shown, with echoes of the evidence presented to the US Senate at the time of the Boskin Commission, that there is no simple right/wrong answer when it comes to the choice of elementary aggregate formulae. There is no formula or rule to determine the most appropriate formula. One must use the evidence available, and or (as ONS has done) undertake research to develop more evidence to make an informed judgement. Finally, as in any other field of science, it has reinforced the finding that the evidence base in statistics moves on over time. This is true for determining the most appropriate formulae, where the data available today (eg consumer panel data) allow us to make more informed judgements than we could have made in the past but that we must continue to develop. If we were to have this debate in ten years' time, it is likely that it would not be about a choice of Carli or Jevons but GEKS v RYGEKS v Country Time Product Dummy method etc.

Conclusion

The outcome from the consultation was unequivocal in respect of the statistics. The findings of ONS were that the use of the Carli does not meet international standards and were ONS to establish a new index to day it would not choose to use the Carli at the elementary level. However, the consultation also identified the tensions that exist when a single, long-established statistic is used for a large number of purposes and the requirement to find a balance between aspects of user needs, continuity, and methodological considerations.

ONS is required to comply with the Code of Practice for Official Statistics[11]. The Code covers issues around both user needs and quality, and states that "statistical methods should be consistent with scientific principles and internationally recognised best practices" (Principle 4, page 8). These methods have to be used to support the production of statistics that "…meet the requirements of informed decision-making by government, public services, business, researchers and the public." (Principle 1, page 5). The responses to the consultation have demonstrated the breadth of uses of the RPI and identified a broad range of user requirements. Similarly, the Code requires producers to "provide users with information about the quality of statistics" (Protocol 1.4, page 13). The research programme undertaken in response to the gap between the CPI and RPI that is due to formula differences has considered detailed methodological issues and drawn on international best practice. In particular, the need for an explicit target statistic has been identified. That is, it is not sufficient to describe a consumer price index as, for example, "an average measure of change in the prices of goods and services bought for the purpose of consumption by households"[12].The target should also

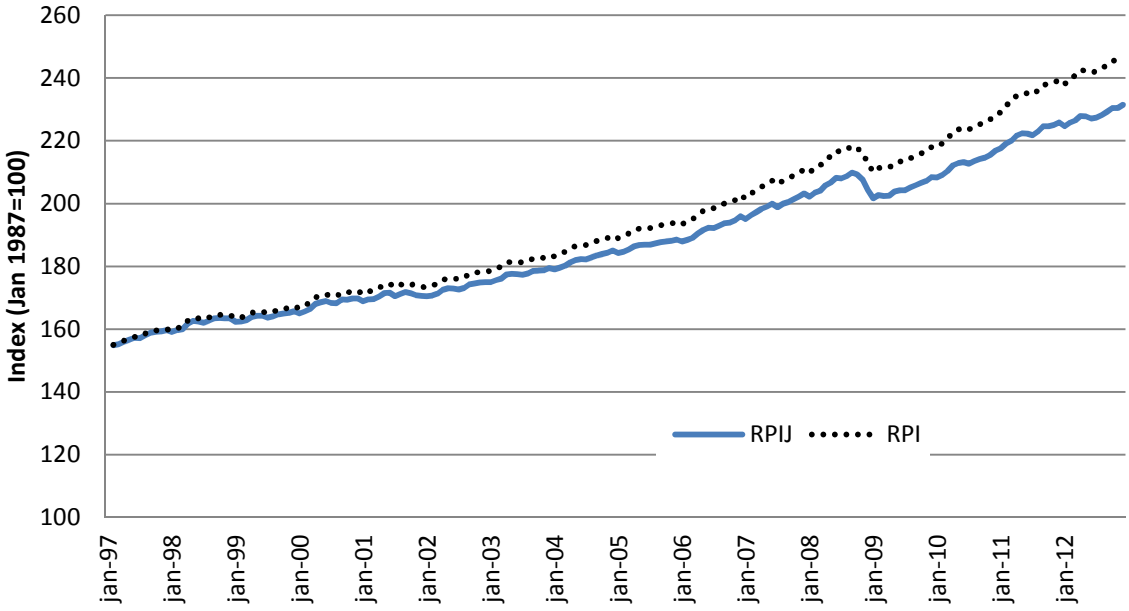
[11] http://www.statisticsauthority.gov.uk/assessment/code-of-practice/

[12] Consumer Price Indices Technical Manual – 2012, page 4. See: http://www.ons.gov.uk/ons/dcp19975_258210.xml

be defined in statistical terms, and this topic will be included as part of ONS's research programme for consumer price statistics.

In light of the conclusion about the use of the Carli ONS has produced a new RPI-based index, called RPIJ, with effect from March 2013. RPIJ uses the Jevons in place of the Carli. Since the announcement some commentators have questioned whether RPIJ will have a use. But it is important to reflect on the Code, and for ONS to meet the requirement set out above, to "provide users with information about the quality of statistics". RPIJ shows, in Figure 2[13], what impact using the Jevons in place of the Carli in the RPI has and users will be better informed than currently.

Figure 2: RPIJ and RPI index (Jan 1987 = 100), 1997-2012



In developing her recommendations the National Statistician also noted that there is significant value to users in maintaining the continuity of the existing RPI's long time series without major change, so that it may continue to be used for long-term indexation and for index-linked gilts and bonds in accordance with user expectations.

Therefore, the National Statistician also recommended that the formulae used at the elementary aggregate level in the RPI should remain unchanged. In response, the UK Statistics Authority announced that the RPI would be re-assessed to determine whether or not they merit continued designation as National Statistics. The Authority also announced that it would "undertake a wider review of the governance arrangements and structures supporting the production of price indices to ensure that these statistics best meet user needs in the future". This wider review is expected to be initiated by the Authority during early 2013 but in the meantime the outcome from the assessment was published[14] by the Authority on 14 March 2013. It concluded that RPI statistics will no longer be designated as National Statistics and with effect from the March 2013 publication of the consumer prices statistical bulletin the removal of the designation has been reported by ONS. Ultimately however, it will be for users to decide whether they maintain their use of the RPI.

[13] Taken from "Introducing the New RPIJ Measure of Consumer Price Inflation", Bird D, ONS, 2013, see here.
[14] See: http://www.statisticsauthority.gov.uk/news/index.html

Annex A

Formulae

For n goods, the relevant elementary aggregation formulae for period t relative to a base period 0 are:

Carli:

$$I_{t,0}^{C} = \frac{1}{n}\sum_{i=1}^{n}\frac{p_i, t}{p_i, 0}$$

Dutot:

$$I_{t,0}^{D} = \frac{\sum_{i=1}^{n} p_{i,t}/n}{\sum_{i=1}^{n} p_{i,0}/n} = \frac{\sum_{i=1}^{n} p_{i,t}}{\sum_{i=1}^{n} p_{i,0}}$$

Jevons:

$$I_{t,0}^{J} = \sqrt[n]{\prod_{i=1}^{n}\frac{p_{i,t}}{p_{i,0}}} = \frac{\sqrt[n]{\prod_{i=1}^{n} p_{i,t}}}{\sqrt[n]{\prod_{i=1}^{n} p_{i,0}}}$$