

Note on the minutes of the Technical Advisory Panel on Consumer Prices, held on 22nd January 2016

The minutes for the Technical Advisory Panel on Consumer Prices (APCP-T) 22nd January 2016 reported on an item to discuss Dr Courtney's paper, 'Consumer Price Indices in the UK'. Dr Courtney attended the panel to present his paper and discuss his conclusions with the panel members.

When the minutes - which had been agreed by the panel but not by Dr Courtney - were published in April, Dr Courtney wrote to ONS welcoming the conclusion of the Panel that, "Panel members agreed that the relative merits of the mathematical properties of elementary aggregate formulae were finely balanced. However, the performance of each formula in practice is an important consideration for use." However, Dr Courtney complained that the published minutes for this item were so brief as to give little indication of how the overall judgement was arrived at and, by not reporting large parts of the discussion, gave the impression of disagreements that did not exist. He therefore attached comments, based on the notes he had taken at the meeting, of how he thought the minutes might be revised and expanded in line with the government's *Code of Practice for Scientific Advisory Committees*¹.

At its meeting on 10th May, the Panel welcomed Dr Courtney's comments but agreed that rather than changing the published minutes, a short note should be written that summarised the panel's response. This note, therefore, is intended to put forward Dr Courtney's view of the discussion, and to reiterate APCP-T's position on the issues raised in Dr Courtney's paper.

Of the 5 paragraphs in section 3 of the minutes, Dr Courtney provided textual changes for paragraph 3.1, and detailed comments for paragraphs 3.4, and 3.2 and 3.3. Dr Courtney also noted that the discussions represented in paragraph 3.4 came before those represented in paragraphs 3.2 and 3.3. In this note we will use the ordering put forward by Dr Courtney. He also pointed out comments made by Professor Balk, which he considered to be significant, but which were not directly recorded in the minutes.

Below we present the original minutes, Dr Courtney's viewpoint, and the panel's viewpoint for each of the paragraphs in section 3 (excepting 3.1 where we accept Dr Courtney's textual changes and 3.5, where Dr Courtney made no comments).

3. Discussion of Dr Courtney's paper 'Consumer Price Indices in the UK'

Paragraph 3.1 from the minutes of the APCP-T 22nd January 2016, incorporating textual changes suggested by Dr Courtney

3.1. Dr Courtney joined the meeting and presented his paper 'Consumer Price Indices in the UK'. He provided an overview of his perspective on consumer price inflation measures in the UK and summarised his conclusions on research into the choice of elementary aggregate formula (specifically, the choice between Carli and Jevons). He talked in detail about the supply and demand effects which influence price and quantity changes and which, he feels, are relevant to the choice of elementary aggregate formula. In particular, he suggests that once demand side effects are taken into account, there cannot be a presumption of a negative association between price and quantity. He argues that this justifies the use of the Carli formula when the Laspeyres index is the target, while leaving the choice of formula data-dependent when the Fisher index is the target.

¹ <https://www.gov.uk/government/publications/scientific-advisory-committees-code-of-practice>

Paragraph 3.4 from the minutes of the APCP-T 22nd January 2016

3.4. Finally, there was some discussion on the usefulness of considering aggregate demand effects (rather than a household or individual level demand effect) in the context of elementary aggregates. Dr Courtney feels that these demand effects are particularly important in the context of clothing. Panel members concluded that aggregate demand effects could not be used to inform the choice of elementary aggregate formula. The ONS expert on the panel commented that Dr Courtney's conclusions from ONS research on supply and demand effects differed from ONS's own conclusions.

Comments by Dr Courtney on paragraph 3.4

On the final sentence of paragraph 3.4, Dr Courtney commented that what the ONS expert (Dr Ralph) had actually said was that the ONS conclusions on this research differed from his because the ONS had concluded that the Economic Approach could not be used to determine the choice of aggregation index. Dr Courtney had agreed with him: if one took the target index as the Fisher Index (as Dr Ralph had), then there was nothing to choose between the Jevons and Carli, but if as Dr Courtney preferred, one took the Laspeyres Index as the target, then the Carli performed better, as the paper on the stochastic approach co-authored by Dr Ralph showed.

Dr Courtney explains that the reason why the Economic Approach cannot be used is that, since prices are determined by both demand and supply, the demand curve cannot be identified and the consumer substitution elasticity cannot be calculated reliably². Dr Courtney therefore felt that the third sentence in Paragraph 3.4, "Panel members concluded that aggregate demand effects could not be used to inform the choice of elementary aggregate formula," implies a non-existent disagreement. Dr Courtney had not claimed that aggregate demand effects could determine the choice of aggregation formula, only that they were *relevant* to that choice. Dr Ralph's position was in line with this, since it is only the existence of widespread, micro-level, demand shifts that prevent an accurate estimate of a stable aggregate demand curve, which would allow the Economic Approach to be used and for the choice between Carli and Jevons to be made on the basis of its estimated elasticity. Dr Weale commented that demand effects needed to be addressed, and Professor Nickell did not dismiss them entirely, although he thought there were many occasions when supply changes would dominate (which would allow a rehabilitation of the Economic Approach).

APCP-T view

At the meeting, Dr Ralph commented that the ONS conclusions on the research carried out on panel data differed from those of Dr Courtney. Dr Ralph's comment referred to the interpretation of the results of ONS work on both the sampling approach and the economic approach to index numbers.

For the work on the sampling approach, the ability of a variety of elementary aggregate formulas to approximate weighted formulas was explored using several metrics. The work was based on data for one expenditure class – alcoholic beverages from one panel dataset. The results showed that the best sample estimator of a population parameter varied according to the target. One result showed that the Carli sample estimator was the best for the Laspeyres target. The conclusion was that, given the limited data and choice of metrics, the analysis represented weak evidence of a link between sample estimators and targets. The important conclusion from this empirical analysis is not whether one sample estimator may better estimate a target than another but that no un-weighted elementary aggregate formula provides a good approximation to a weighted target.

² This is explained at length in the companion ONS research paper published as CPAC12(15) Annex A, which cites an earlier paper of Dr Courtney's in this context

For the work on the economic approach, ONS research investigated methods for estimating the elasticity of substitution from panel data and found a satisfactory method. Using this method, the traditional link between elementary aggregate formula and value of elasticity of substitution based on very simple economic models was shown not to hold. This was based on limited data but suggested that the economic approach was not a good guide to identifying an appropriate formula at the elementary aggregate level. Further work using simulations with simple economic models suggested that, by varying a mixture of demand and supply effects, any formula could come out as “best”. Two points should be noted. Firstly, while the models used were based on economic theory, their simplicity means they cannot be considered as good representation of the real world. Secondly, this work considered just data for alcohol products in one dataset for a specific time period.

Paragraphs 3.2 and 3.3 from the minutes of the APCP-T 22nd January 2016

3.2. Panel members agreed that the relative merits of the mathematical properties of elementary aggregate formulae were finely balanced when considered from a theoretical standpoint. However, the performance of each formula in practice is an important consideration for use. The changes made to the collection of clothing prices in 2010, and the resulting large impact on the RPI, suggest that the Carli index is less suitable than the Jevons and Dutot formula (both of which had similar results to each other before and after the changes to the clothing collection). ONS research has shown that the Jevons and Dutot formulae typically produce comparable results while the Carli index is usually higher.

3.3. Changes made to the clothing collection were discussed in further detail with some specific examples provided of clothing items that have the largest contribution to the formula effect. The panel concluded that the elementary aggregate formula used needs to be considered in the context of the mechanics of carrying out a price collection in practice. For example, the use of comparable replacements, which can result in more dispersed price relatives (especially for clothing items), makes the Carli formula unsuitable. Research could also be conducted on price changes for standard items of clothing such as uniforms, which could proxy more stable price change for all clothing items.

Comments by Dr Courtney on paragraphs 3.2 and 3.3

In the discussion of clothing inflation there were extensive comments by ONS members in support of using the Jevons, with particular emphasis being laid on recent movements of the RPI and CPI clothing price indices, where the CPI results were judged to be much more plausible. Figures for recent price movements were quoted and these comments were supported by Professor Nickell and by a reported internal assessment at the Bank of England. Dr Courtney pointed out at the meeting that if the whole period since 2010 is considered, the relative performance by the RPI looks more plausible. Nevertheless, he feels this remains a powerful argument, with support in the Panel in indicating a practical area where the Jevons may well be the more accurate aggregation formula, given the current clothing price collection procedures. Yet this, the major part of the discussion on clothing inflation, was not, Dr Courtney wrote, reported in the minutes.

Dr Courtney notes a different argument which was hinted at in the minutes but was less explicit in the discussion: the change in clothing price collection procedures had an asymmetric effect, affecting the RPI more than the CPI, and showing up inherent weaknesses in the RPI. Dr Courtney explains that by starting to record the price increases occasioned by the switch to new season ranges and by giving less importance to the price fall evident in end-of-season sales, the change in procedures affected both indices in the same way, changing a secular decline in prices into a secular increase. There was a second effect, from the accompanying increase in the dispersion of price relatives, which increased the divergence between RPI and CPI and, as a matter of arithmetic, lowered the CPI and raised the RPI. In the case of the CPI, these two effects were offsetting, producing a more stable price path, while in the case of the RPI they were reinforcing. This explains why the clothing CPI currently looks more plausible.

Dr Courtney points out that this cannot be generalised. Before 2010 the effects went the other way, with the RPI having a gentler and more plausible decline in prices. In his presentation, Dr Courtney quoted Professor Diewert to say that with any matched-model index, fashion goods would show a tremendous decline, but, as a matter of arithmetic, the Jevons would decline faster than the Carli. That does not mean that in those situations one should therefore choose the Carli as the less bad index: rather, it means that changes should be made to sampling and analytic procedures to remove or at least minimise this downward bias for all indices.

Dr Courtney refers to a second argument that was reported in the minutes, in favour of using the Jevons for clothing inflation, based on the remark by Mr Vaughan that the clothing index calculated with the Jevons is close to the Dutot measure, whereas the Carli measure is further away. Dr Courtney pointed out that the Dutot clothing index suffers from heterogeneity bias (and therefore being close to it is not necessarily an indicator of accuracy³), and also notes that Dr Weale agreed that heterogeneity was a problem, although he thought that the Carli was an odd way to deal with it and that it should be dealt with separately.

APCP-T view

While ONS follows the recommended approach to clothing, it is a very challenging commodity and ONS is aware that this does not capture the behaviour as well as we would like. Research into clothing prices is reflected in the consumer prices work programme.

Comments by Professor Balk, highlighted by Dr Courtney

Dr Courtney noted that extensive and influential comments made by Professor Balk at the start of the discussion seemed not to have been reported. These were to the effect that:

- The hard mathematics is common ground, as set out in his 2008 book.
- On the economic side one has to differentiate between the long term and the short term and decide if we want to look at welfare. His view is that inflation should be measured annually, although if one wants a monthly measure one could perhaps take a rolling twelve-month average,
- It all comes down to what's the target, both for the overall index and at the elementary level, where one has to consider whether we have the data we want or need to sample more.
- There is no single solution, no Holy Grail to be found.

Paragraph 3.5 from the minutes of the APCP-T 22nd January 2016

3.5. The Chair thanked Dr Courtney for his presentation and noted that panel members found the mathematical properties of the elementary aggregate formulae finely balanced. However, their properties also need to be considered in the context of price collection in practice. The evidence based on the clothing shows that the Carli formula is less suitable than the Jevons and Dutot formulae.

³ Except for homogeneous items, for which all three indices tend to be much closer together