DRIVING RELATIVE REGIONAL CONSUMER PRICE LEVELS OUT OF THE UK PURCHASING POWER PARITIES

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1. <u>Abstract</u>

In July 2011, the UK Office for National Statistics (ONS) published UK Relative Regional Consumer Price Levels (RRCPLs) for Consumer Goods and Services for 2010[1]. These were a welcomed by-product of a project conducted by ONS to calculate UK Spatial Adjustment Factors (SAFs) for Eurostat. These were a requirement by Eurostat under the European Comparison Programme (ECP) of which the UK is a member. The factors are used to adjust the prices of a basket of consumer goods and services collected in London to UK national average prices with the aim of calculating Purchasing Power Parities (PPPs). The project was funded by Eurostat and was successfully delivered in 2011. The downside is that the requirement for the production of updated SAFs is only every six years. This is explained further in section 3 '*Background to the European Comparison Programme'*.

This paper summarises the work involved in calculating the UK RRCPLs, including the use of the UKs existing national Consumer Price Index (CPI) dataset. It explains the current position regarding the development and production of RRCPLs and also considers the development of a work programme investigating the feasibility of producing annually a number of further COICOP[2] divisions, exploiting even further the UK CPI to its full advantage.

2. <u>Introduction</u>

Historically there has been a long standing need for regional price data and one of the findings from a recent assessment of the UK CPI by the UK Statistics Authority[3] was to *'set out a clear official position in relation to developing regional consumer*

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[1] For more detail please refer to the article 'UK Relative Regional Consumer Price Levels for Goods and Services for 2010': http://www.ons.gov.uk/ons/rel/cpi/regional-consumer-price-levels/2010/index/html

[2] The Classification Of Individual Consumption by Purpose, abbreviated as COICOP, is a nomenclature developed by the United Nations Statistics Division to classify and analyse individual consumption expenditures incurred by households, non-profit institutions serving households and general government according to their purpose.

[3] An independent body whose main function is to monitor and assess all official statistics produced in the UK.

price indices.' The production of the RRCPLs goes some way in addressing this need. The dataset that was used to construct the SAFs was used to its full effect and was a welcomed by product of the SAF project.

3. <u>Background to the European Comparison Programme – Spatial Adjustment Factor Project</u>

ONS is required by European regulation to participate in the Purchasing Power Parities (PPPs) programme, which is coordinated by Eurostat in conjunction with the Organisation for Economic Co-operation and Development (OECD). The Eurostat-OECD programme requires the collection of a basket of consumer goods and services in the participating countries for use in the calculation of PPPs. The prices are collected via six consumer surveys over a three year rolling programme, with two surveys being conducted every year. To limit the costs of collection, each country is asked to price 'capital city' prices; in the case of the UK this is London. However, the requirement of the programme is to calculate national PPPs.

In order to satisfy this requirement for national PPPs, every six years participating countries are required to produce SAFs, which are used by Eurostat to adjust the prices collected in capital cities to reflect a national average price, in accordance with the regulation. The national PPPs are not affected by currency differences and can be compared across countries on the same basis. When applied to each country's National Accounts data and official population statistics, GDP per capita is derived which is then compared across all participating countries. An important use of the main derived indicator of GDP per inhabitant is the allocation of Structural Funds within the EU. Regions where GDP per capita is less than 75% of the EU average are eligible for such funds. The UK has been a recipient of such funds.

To enable the UK to produce the SAFs, ONS has to complete an additional UK wide collection, covering in addition to London, regions of England, as well as Wales, Scotland and Northern Ireland. A considerably larger data set is produced as a consequence. ONS recognised that this dataset could be exploited and used to full potential and thereby address user needs. As a consequence, RRCPLs were produced, though there was no legal requirement or obligation to produce these. Importantly, the same dataset was used for both SAFs and RRCPLs, working towards the notion of 'same dataset, many uses'.

4. <u>Production of the UK Relative Regional Comparative Price Levels for Consumer Goods and Services.</u>

In July 2011, ONS published an article giving UK Relative Regional Consumer Price Levels for Consumer Goods and Services for 2010. As its title suggests, the paper presented price levels for five regions for ten COICOP divisions. The paper was accompanied by a News Release, and both attracted wide media coverage, including radio interviews and local and national newspapers. Time had been invested prior to the News Release informing regional offices and devolved country assemblies of the

impending release and ONS's communication division worked with their media and academic contacts. As a consequence coverage was wide, and in the main positive.

As mentioned earlier in the paper, the same dataset that was used for the calculation of the SAFs was used for the calculation of the RRCPLs, therefore exploiting the dataset to its full potential. As a consequence, no additional data source or costs associated with the RRCPLs were incurred.

4.1 Price data sources including the use of the UK Consumer Price Index data

The data for the SAFs and consequently the RRCPLs were sourced from three areas;

1. price data from the national UK Consumer Price Index (CPI).
2. a central collection conducted by ONS staff,
3. a local collection conducted on behalf of ONS by an external contractor TNS-Research International (TNS-RI).

The aim at the start was make full use of and exploit the UK CPI dataset as this would reduce costs and time significantly. Every effort was made to ensure that this happened and as a consequence 42% of the items priced were done so using CPI data. Refer to Graph 1 for the proportion of items allocated to each collection method.

Graph 1: Proportion of items allocated to each collection method
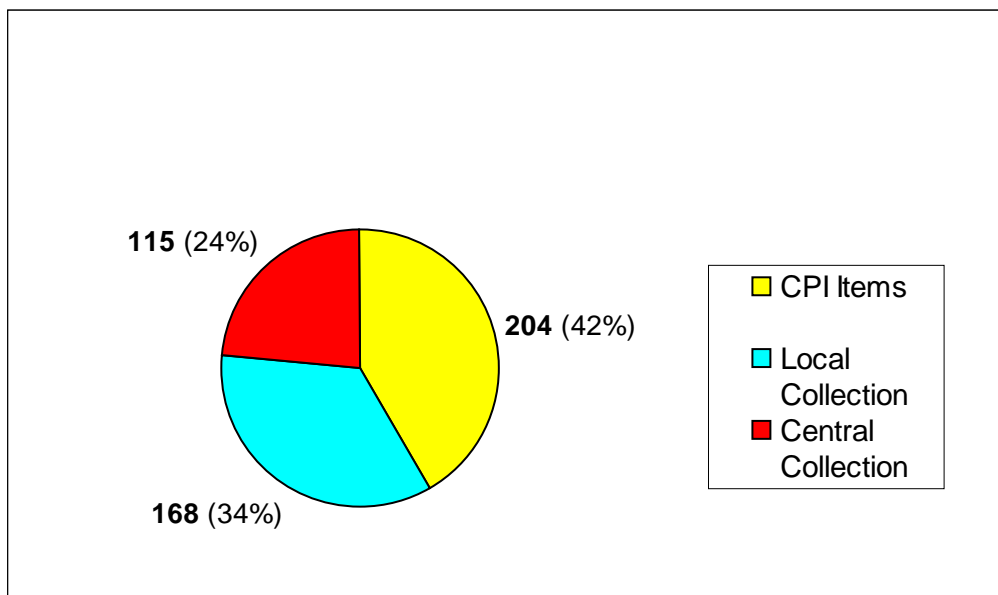

The decision on the mode of collection was made at the individual item level. The first consideration being if it was suitable to use CPI data. If CPI data were deemed unsuitable, but it would be relatively simple to collect prices in the field and regional variation was expected, then local collection for the item was employed. The

remaining items were collected centrally from within ONS as they were either viewed as problematic or had national pricing. The result of these decisions ensured that the various surveys typically had a combination of sources as can be shown in figure 2.

Figure 2 demonstrates the extensive use of CPI for the Food, Beverages and Tobacco survey, where over 80% of the items were priced using CPI data. For Transport, Hotels and Restaurants over 50% of the items were priced using CPI data and in Services the proportion priced was over 40%. Importantly, overall, over 415,000 CPI prices were used.

The CPI data had limited use in the remaining surveys, most notably the Furniture and Health survey, where the majority of items were centrally collected. This was primarily the case for the Health based items and some furniture items where national pricing exists (for example via the large retailer IKEA). The majority of furniture item prices were collected in the field, due mainly to the fact that the CPI item specification is too broad relative to the PPP specification, which is very detailed due of course to the need to be able to compare the prices across member states of the ECP.

Figure 2: Survey by collection method
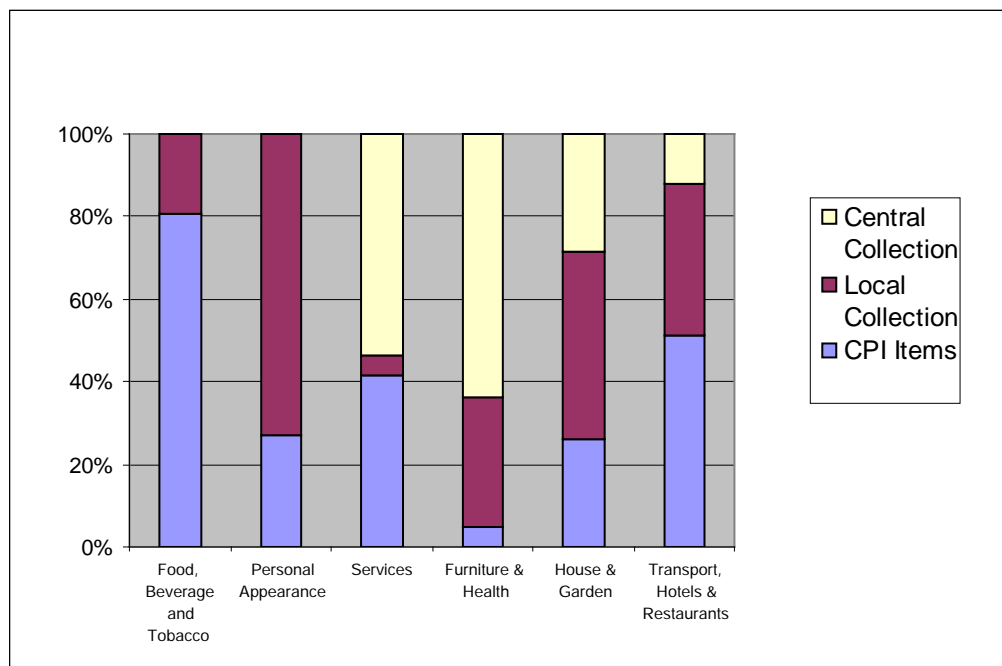
4.1.1 Consumer Price Index

The use of CPI price data formed an important component of the 2010 SAF and RRCPL project. CPI data collection involves collecting the same product each month. If the product matches the CPI item description, the actual quality of the product being priced can deviate from location to location. Spatial collection, on the other

hand, involves collecting prices for a product ensuring comparable quality across regions. It is for this reason that PPP item specifications are much tighter than CPI item descriptions. For the SAF project, CPI data were only used where comparable quality across regions could be ensured for a particular CPI item.

Price data are collected for around 700 items for use in the UK CPI. The initial stage to determine whether the use of CPI data was appropriate was to map CPI items to PPP items. On a case by case basis, the CPI item description was compared with the PPP item specifications. Decisions were made by the UK project team about whether the CPI item description was comparable to the PPP item specifications. Approximately 250 (36 per cent) CPI items were identified as having a sufficiently comparable item description to be considered for use in the SAF project.

In many cases, the decision to use CPI data was relatively straightforward, particularly for food, beverages and alcohol items. For those CPI items where their suitability was not obvious, the Coefficient of Variation (CV) of the arithmetic mean of CPI prices for each item was used to aid in the decision of whether the use of CPI data was appropriate or not. Prior to analysing the CVs, it was important to understand what these values meant for the purpose of the SAF and RRCPL project. The smaller the CV, the lower the variability, or spread of CPI prices. It was not possible to determine whether the spread of prices was due to differences in price levels across regions, or differences in the quality of the item being priced. For example, a high CV indicates a large variability in prices for a particular item, which may be due to differences in price levels, differences in quality, or both. It was for this reason that the value of the CV was not the only criterion used in determining the suitability of the CPI, but it was a useful tool.

Care was taken to use only CPI data where appropriate. On a case by case basis, consideration was given to both the tightness of the CPI item description and the value of the item's CV. The use of CPI data (more than 415,000 prices were used) was appropriate for 204 PPP items. Using the CPI data meant a significant reduction in the number of items that needed to be collected locally, while ensuring the data were fit for purpose in the calculation of SAFs and RRCPLs. This in turn allowed the resources to be employed effectively elsewhere.

To ensure the integrity of the produced statistics, the use of CPI data was limited outside of the Food, Beverages and Tobacco survey. For the other five consumer surveys, in the main, it was felt that the CPI descriptions could not ensure comparisons between items of equal quality. This was especially the case with furniture, where the item specifications needed to be followed very precisely.

4.1.2 Local Collection

The external or local collection was conducted by a company called TNS-Research International (TNS-RI). This company is currently contracted to collect price data for the UK Consumer Price index. TNS-RI was also engaged in the price collection for the 2004 survey. Of the remaining 283 items 168 were allocated to TNS-RI. ONS staff

collected additional prices in London to improve coverage and in Wales where staff could be easily deployed to support the TNS-RI effort.

The collection was complemented by a comprehensive analysis of national pricing and directing the price collection to the areas where coverage was poor. Food, Beverages and Tobacco was the most successful category. This is not unexpected as the items are typically easily sourced and also have some similarity to the items collected for CPI which assisted the collectors. The Services, Personal Appearance, Furniture and particularly Transport, Hotels and Restaurants surveys all proved more challenging in reaching targets. These are the areas that the majority of the price collectors had difficulties with. ONS's interpretation of the reasons for these difficulties lies mainly with the differences between the PPP collection and the CPI collection that the collectors were familiar with, having to collect non-representative items and less availability of items in regional areas.

4.1.3 Central Collection

The final 115 items were collected by ONS staff in an internal, central collection. This collection was reserved for items where it was possible to collect reliable quotes by phone or internet such as in transport or service areas, where it was felt that inexperienced PPP collectors may find it difficult to match detailed specifications in stores such as for televisions, laptops and for items that had national pricing. The central collection was conducted by ONS staff experienced in PPP collection and also used other staff across the Prices division.

Before the collection began, certain items were deemed to have national pricing policies. These included 29 items for cars and motorcycles. This brought the number of items to be collected centrally to 115. Further research was undertaken, firstly on items where national pricing policies were in effect and secondly for those items where prices could not be collected; this ensured a targeted central collection.

Where items had a national price a single price observation was collected and replicated across all regions where the outlet had been sampled. Intelligence on national pricing was collected direct from retailers and through the analysis of prices as they were received from the local collection. In these cases, once national pricing was identified, collection ceased. It was also identified that for the heading 11.04.55.1 - "Heat Energy" it would not be possible to provide UK prices as the PPP descriptions of the product provided did not match anything provided in the UK.

5. Methodology

The methodology used in the calculation of the RRCPLs can be found in Annex 1. In brief, the methodology adopted by ONS is consistent with the approach used by Eurostat in the calculation of the PPPs for the Eurostat-OECD European Comparison, PPP Programme. While RRCPLs compare regions within the UK to each other, the PPP Programme produces PPPs which compare participating countries with each other.

6. Demand for regional data - User consultation findings

The published paper, referred to earlier in this paper, on UK Relative Regional Consumer Price Levels for Consumer Goods and Services for 2010 made a commitment to assess the feasibility and usefulness of developing and publishing annual results for the areas where CPI data could be used for spatial comparison purposes. Currently, this is likely to focus on the two COICOP Divisions *of Food and Non Alcoholic Beverages* and *Alcohol and Tobacco*, where the CPI and PPP item description align very closely. If the findings of the investigations are supportive of this initiative, the aim is to publish 2011 regional data in 2012.

There has been a long standing user demand for UK regional price data. In previous financial budgets by the UK Government of the time, this need was announced and was well published and documented. To this end, face-to-face user consultations have taken place with the devolved administrations of Wales (Welsh Government), Scotland (Scottish Government) and Northern Ireland (Northern Ireland Statistics and Research Agency (NISRA)) and with Department of Business Innovation and Skills (BIS). Further consultations will take place with potential external users identified by BIS as being key users, including the Department for Communities and Local Government, National Institute of Economic and Social Research (NIESR) and London School of Economics (LSE). Within ONS, consultation has taken place with regional economic statistics colleagues with the published paper being presented to members of their Regional Technical Advisory Group, including the devolved assemblies. The paper endorsed the need for regional data.

To date, the findings from the user consultations have been overwhelming in supporting and addressing the need for regional price data. All but one user was able to identify with this need. The Welsh Government and BIS currently use Relative Regional Consumer Price Levels and so an update, albeit, six years after the last publication is a welcome update. However, the demand is for more detailed and regular updates.

7. Limitations of the 2010 dataset of Regional Relative Price Levels

All users felt that the current 2010 regional dataset had 'significant' limitations, most notably the absence of '*Housing Costs'* which they felt should be addressed in any future developments. Importantly, the frequency of the data was important and users would welcome annual updates. All, without exception, commented that the production of just two COICOP divisions would be of little use and they would support the development of further divisions with further breakdown within the divisions.

8. Conclusion

In concluding, consultation with users has identified a need for regional price data; this endorses the perceived need. The current frequency of producing RRCPLS every

six years as a by-product of the SAF project is not adequate. Users would like to see more frequent (annual), detailed regional estimates of price. During 2012, ONS will develop a programme investigating the feasibility of producing additional COICOP divisions each year, using as much as possible the UK's national CPI data. Part of programme will look at using even more CPI data. Where CPI data are not appropriate, it is envisaged that additional field collections will take place.

Should the outcome of the feasibility study recommend producing additional and more detailed COICOP divisional regional price data, significantly more resources will be required. Based on the 2010 study, the minimum amount required would be approximately £60,000.

Should the outcome of the feasibility study <u>not</u> recommend producing more frequent and detailed regional price data, ONS will continue to produce RRCPLs every six years as a by-product of the SAF project.

Annex 1

Methodology used in the calculation of the UK Relative Regional Consumer Price Levels

The methodology adopted by ONS is consistent with the approach used by Eurostat in the calculation of PPPs for the Eurostat-OECD PPP Programme[4] While RRCPLs compare regions within the UK to each other the Programme produces PPPs which compare participating countries to each other.

The basic approach to calculating relative regional consumer price levels is to measure the cost of purchasing a common basket of goods and services in each region and express that cost relative to buying the same basket nationally (where the UK=100). That is, how much more (or less) does it cost to buy the basket in one particular region, compared with a UK average cost for the same basket. Similar to the CPI, it is not feasible to collect prices for every type of good and service that consumers spend their money on. Nor is it possible to collect prices from every single outlet or service provider that consumers make purchases from. Therefore, it is necessary to sample for items, locations, outlets, and service providers. The main difference compared with the CPI, and important to note, is that regional price level comparisons are designed to compare prices of a common basket of goods and services at one particular point in time in different regions in the UK, whereas the CPI measures the difference in prices of the same basket of goods and services throughout the UK over a period of time.

Therefore, to be able to compare prices at a particular point in time, it is important to ensure that an identical basket of goods and services is priced for all of the regions. This is critical in developing comparable outputs and ensures that observed price differences in the regions are due to price alone and not influenced by variability in the quality of items priced across regions. For example, a comparison of an observed price of a branded jacket in one region with the observed price of an unbranded jacket in another region will reflect in part that the items are not comparable and that unbranded items are typically cheaper.

Having collected observed prices for the goods and services included in the basket an average price is calculated in each region for each item. There were then two stages employed to calculate and aggregate the RRCPLs. The first stage was at the elementary aggregate level, referred to here as the basic heading. Basic headings are the building blocks for the RRCPLs and are the lowest level for which expenditure weights can be obtained. A basic heading comprises a group of similar, well-defined goods or services. In total, 111 basic headings have been defined for this process. Two examples of basic headings are *Women's clothing* and *Beef*. Above the basic heading level, RRCPLs were calculated and aggregated using the Classification of

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[4] For further explanation of the methodology in practise please refer to the Eurostat-OECD Methodological Manual on Purchasing Power Parities 2005 edition, Annex V: Calculation and aggregation of PPPs.

Individual Consumption according to Purpose (COICOP) used in the CPI. Regional expenditure was obtained from ONS's Living Costs and Food survey and adapted to create regional weights for the basic headings.

As there is no data available on the expenditure on the individual items below a basic heading, a basic heading RRCPL has to be calculated from price data only. Below the basic heading, price relatives for each pair of regions were first calculated; with five regions (London, England (excl London), Wales, Scotland and Northern Ireland), this resulted in 25 unique price relatives. To combine the price relatives of the items at the basic heading level, an equally weighted geometric mean of these relatives was calculated for each pair of regions.

Once the RRCPLs had been calculated at the basic heading level, regional weights were used to aggregate the basic headings to successive COICOP levels. For each pair of regions, the basic heading RRCPLs are weighted, summed and averaged using first the expenditures on the basic headings of the first region as weights, and then the expenditures on the basic headings of the second region as weights. This gave two weighted RRCPLs: a Laspeyres-like RRCPL and a Paasche-like RRCPL. The geometric mean of these two RRCPLs was then calculated, which produced a single Fisher-like RRCPL between the two regions.

Once each level of aggregation is provided with a matrix of Fisher-like RRCPLs, it was necessary to apply a method to impose transitivity on the Fisher-like RRCPLs. Transitivity is a desirable property for spatial price indices as the same result is obtained when comparing RRCPLs directly between two regions and when comparing the RRCPLs indirectly through the introduction of a third region. Equation one gives an example of where transitivity holds:

Equation one

$$\frac{England_{RRCPL}}{Wales_{RRCPL}} = \frac{England_{RRCPL}}{Scotland_{RRCPL}} \times \frac{Scotland_{RRCPL}}{Wales_{RRCPL}}$$

The method used by Eurostat, and adopted by ONS, to impose transitivity is the EKS (Èltetö-Köves-Szulc) method. The RRCPL that results from application of the EKS method (the EKS RRCPL) is defined as the geometric mean of the direct RRCPL and all the indirect RRCPLs between a pair of regions, with the direct RRCPL having twice the weight of each indirect RRCPL. Equation two expresses this as an example formula, comparing England and Wales directly and comparing indirectly through Scotland. To produce the data in Table 2 England (excl. London) and Wales would need to be compared directly and through London, Scotland and Northern Ireland.

Equation two

$$RRCPL_{EKS}^{England:Wales} = \left\{ \left(RRCPL^{England:Wales} \right)^2 \times \frac{RRCPL^{England:Scotland}}{RRCPL^{Scotland:Wales}} \right\}$$

In addition to being transitive, the resulting EKS RRCPLs differ as little as possible from the original Fisher-like RRCPLs. After applying EKS, we are left with a 5x5 matrix of the bilateral EKS RRCPLs. Standardisation of the EKS RRCPLs is required in order to obtain a set of RRCPLs that has the UK as its base. This is done by dividing each RRCPL by the geometric mean of the RRCPL in its column of the matrix. This results in five EKS RRCPLs, one for each region (all the entries in each row have the same value after standardisation), with the UK as the base, where UK=100.