ADVISORY PANEL ON CONSUMER PRICES – STAKEHOLDER

Producing population sub-groups for the CPIH and the HCIs

Purpose

1. This paper explores the population sub-groups that ONS are able to produce for both the Consumer Prices Index including owner-occupiers' housing costs (CPIH) and the Household Cost Indices (HCIs; formerly known as the Index of Household Payments). It also describes the different methods of weighting that could be used.

Recommendations

2. Members of the Panel are invited to:
   a) advise ONS on which population sub-groups would benefit users for both the CPIH and the HCIs
   b) discuss whether population sub-group indices should be constructed using plutocratic or democratic weights, and whether these methods should be different for the CPIH and the HCIs

Defining population sub-groups

3. There are two projects on the Consumer prices development plan that involve producing population sub-groups. As such, the ONS are looking to produce population sub-group indices for both the CPIH and the HCIs (formerly known as the Index of Household Payments). These sets of indices should provide more complete information on the change in costs that groups of households face.

4. Previous work carried out by the ONS ('Variation in the inflation experience of UK households', 2014) has demonstrated how inflation rates for sub-groups of the population can be derived that are consistent with the Consumer Prices Index (CPI). The method involves proportionally redistributing total household expenditure used to calculate the CPI expenditure weights (primarily from Household Final Consumption Expenditure - HHFCE) back to individual households from the Living Costs and Food survey (LCF)[1]. Weights for sub-groups of the population can then be calculated on either a plutocratic or democratic basis using the additional information that is available within the LCF.

5. There are a number of variables within the LCF that can be used to define population sub-groups. For example, the population could be grouped into:

   - Income deciles / quintiles
   - Expenditure deciles / quintiles
   - Retired / non-retired households
   - Main source of income (i.e. from benefits / pensions / work)
   - Tenure type
   - Households with and without children

[1] For instance, if an observed household accounts for 0.05% of total expenditure of bread & cereal products in the LCF, it is allocated the same fraction of the CPI expenditure total on bread & cereal.

6. One of the limitations of deriving population sub-groups is that the LCF only has a sample size of around 5000 households per year, and response rates have been declining over time. There are also some items in the CPI basket that are under-covered in the LCF survey (for example, expenditure on health), and this may have greater impact on certain subgroups (for example, retired households). Annex A provides details of the sample sizes when the total LCF sample is stratified into the population groups listed above.

7. A second level of stratification could also be introduced, for example, expenditure quintiles could be further divided into retired and non-retired households. Although analyses at this level may be of interest, the accuracy will be reduced due to depleted sample sizes. Annex B provides examples of how the sample could be stratified using two levels, and the resulting sample sizes.

Weighting method for population sub-groups

8. There are two different methods of weighting that could be used to produce population sub-group indices, plutocratic weighting or democratic weighting.

9. Plutocratic weights aim to measure aggregate expenditure shares of the household sector. They are calculated relative to the total value pounds sterling of all items bought in the economy. In this case, the price movements of items are weighted in proportion to their importance to total household spending. A secondary consequence of this is that high spending households influence the aggregate expenditure weights to a greater extent than low-spending households.

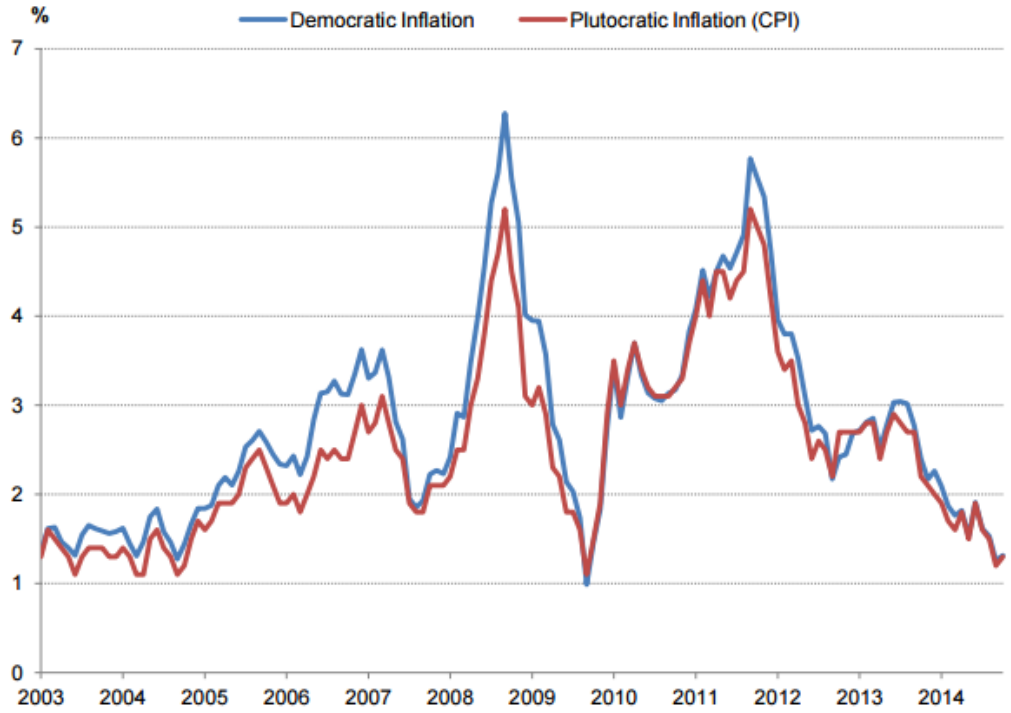
10. Democratic weights instead aim to measure the expenditure of the average household. They are calculated as the average proportion of each household's spending accounted for by each item. Theoretically, the expenditure of each household receives an equal weight.

11. These methods reflect different concepts and fundamentally answer different questions. While plutocratic weighted indices measure the average change in price across all consumption goods and services purchased by households, democratic weighted indices reflect the price experience of each household in the population equally.

12. In populations with homogenous expenditure, where all households purchase goods in equal proportions, these weighting methods would result in identical indices. However, in populations displaying greater variation in expenditure baskets across households (for example, due to income constraints or differing tastes) the difference between these indices becomes more apparent.

13. The ONS (2014) paper "Variation in the inflation experience of UK households" demonstrated the impact of these methods of weighting on the CPI, as shown in Figure 1. This research concluded that a CPI-equivalent democratic price index is around 0.3 percentage points higher on average than the plutocratic price index over the same period. The research also found that the plutocratically weighted CPI is broadly representative of the price experience of households around two-thirds of the way up the expenditure distribution.

14. Figure 1: CPI-consistent democratic and plutocratic inflation rates for all households



Helen Sands
Prices, ONS
January, 2017

List of Annexes

Annex A	Sample sizes for population sub-groups using one level of stratification
Annex B	Sample sizes for population sub-groups using two levels of stratification

Annex A – Sample sizes for population sub-groups using one level of stratification

The statistics presented have been derived from LCF data. Each value represents the number of households to the nearest round number. The LCF sample size has declined over the previous decade, so averages that are presented are expected to be higher than the sample sizes that will be observed in future occurrences of this work (likely to be more accurately reflected by the min value).

Income / Expenditure (2002 – 2014):

	Mean number of households per year	Min	Max
Deciles	599	512	695
Quintiles	1198	1023	1389

Retirement status (2002 – 2014):

	Mean number of households per year	Min	Max
Retired	1654	1475	1823
Non-retired	4338	3592	5127

Main source of income (2002 – 2012):

	Mean number of households per year	Min	Max
Pensions	571	538	599
Benefits	1849	1605	2075
Employment	3585	2869	4116
Other[2]	137	98	175

Tenure type (2002 – 2012):

	Mean number of households per year	Min	Max
Social housing	1122	888	1398
Owned	4317	3542	4926
Rented	629	526	775
Rent Free Accomodation	83	47	108

Households with and without children (2002 – 2014):

	Mean number of households per year	Min	Max
Children	1867	1543	2321
No children	4125	3558	4680

Age Group (2002 – 2012):

	Mean number of households per year	Min	Max
11-30 years	637	513	779
31-40 years	1141	861	1484
41-50 years	1235	998	1384
51-60 years	1103	941	1251
61-70 years	961	925	1024
70+ years	1075	1176	914

[2] Where other includes investment income and income from other sources

Annex B – Sample sizes for population sub-groups using two levels of stratification

1. Quintiles

Chart 1 (2 x 5 categories): Mean number of households (2002 – 2014) with and without children by expenditure quintile

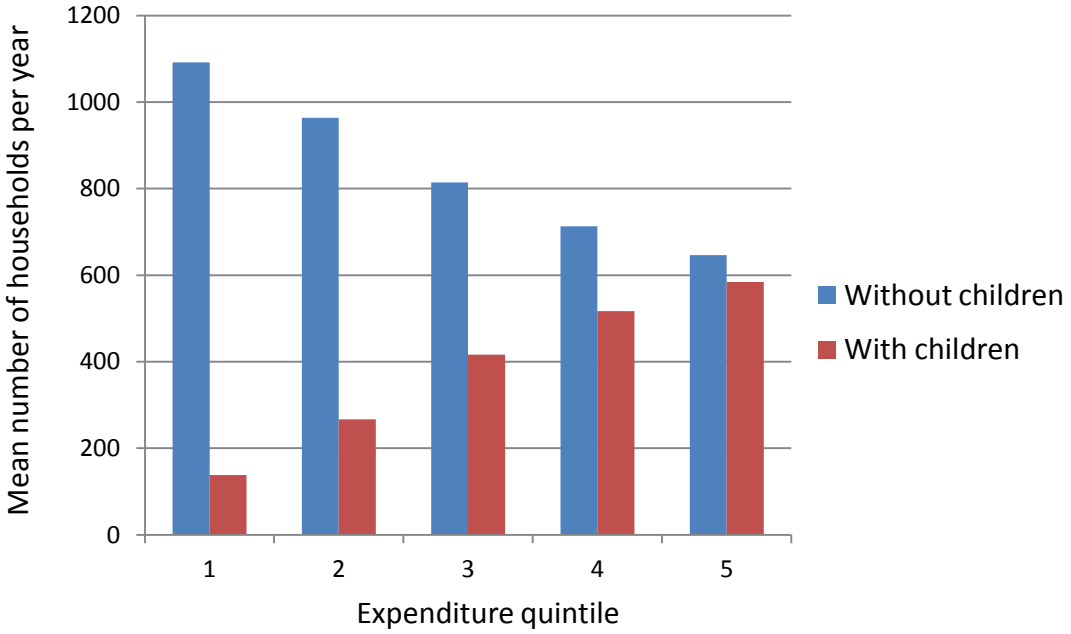
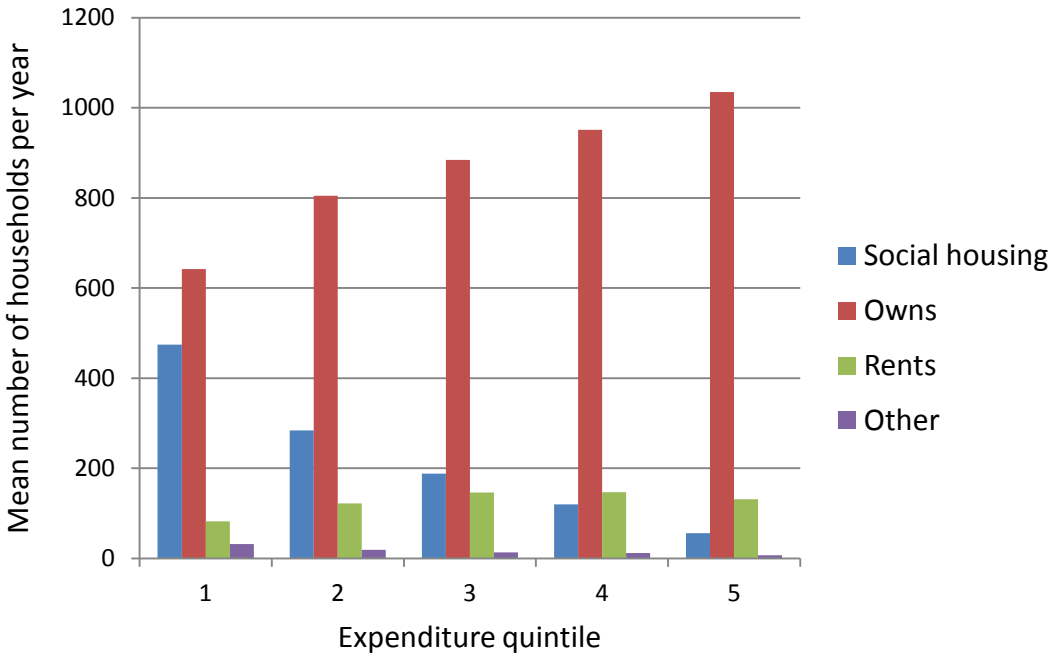


Chart 2 (4 x 5 categories): Mean number of households (2002 – 2012) by tenure type within each expenditure quintile



2. Deciles

Chart 3 (2 x 10 categories): Mean number of retired and non retired households (2002 – 2012) within each expenditure decile

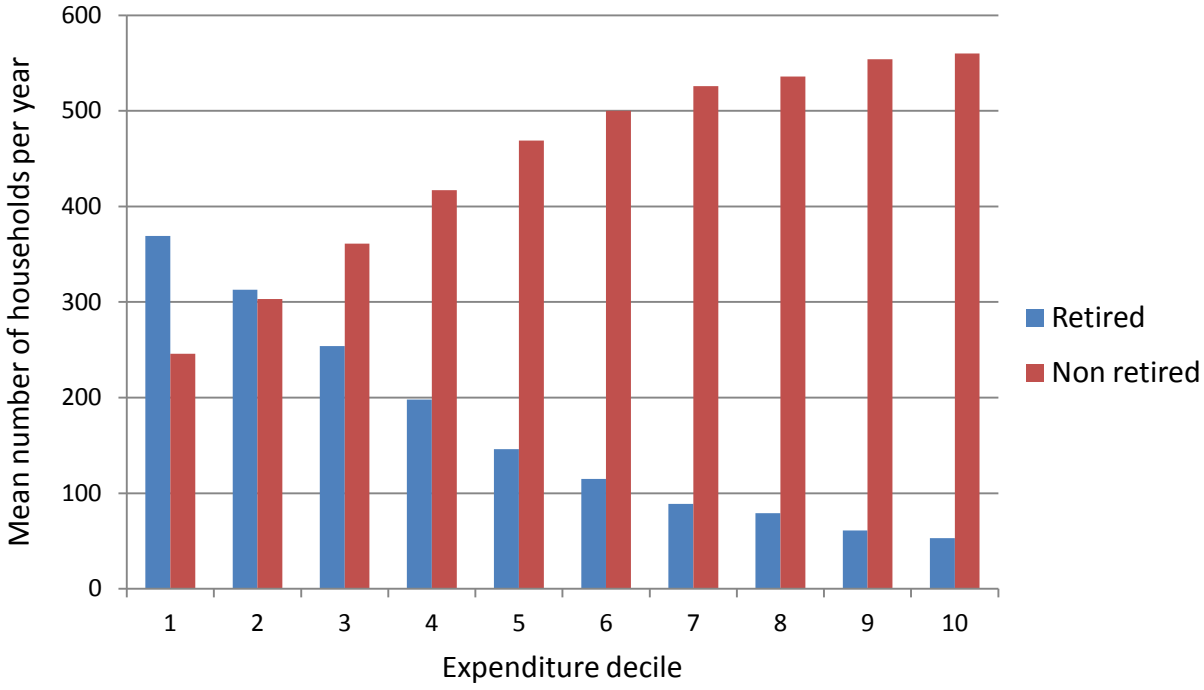


Chart 4 (4 x 10 categories): Mean number of households (2002 – 2012) grouped by main source of income within each expenditure decile