Compendium

Democratic indices

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1 . Section 7. Democratic indices

In common with many modern price indices, the Consumer Prices Index (CPI) weights the price movements of items in proportion to their importance to total household spending. Price movements for products on which households spend a large fraction of their income are consequently weighted more heavily than items on which households spend relatively little.

As discussed in Section 2, a corollary of this approach is that high-spending households have a greater weight in the CPI than low-spending households. This follows because high-spending households influence total households' spending to a greater extent than low-spending households. However, an alternative to this approach is to calculate a price index in which each household receives an equal weight. These price indices – commonly referred to as 'democratic[1]' price indices – capture a degree of the variation in expenditure weights across households in a population. In populations with homogenous weights – where all households purchase goods in equal proportions – the 'plutocratically' weighted CPI and the democratic index are equal. The more variation there is in expenditure baskets across households – perhaps because of differing tastes, interests or income constraints – the larger the difference between these indices. While the conventional democratic price index is for all households in an economy, the logic applies equally to any chosen sub-group.

To shed some light on this matter in the UK context, this section compares the headline, plutocratically-weighted, CPI with the democratically-weighted index for the UK between 2002 and 2014. It proceeds to present democratic price indices for households with and without children, and retired and non-retired households.

Notes for section 7. Democratic indices:

1. Note that the naming convention here can be misleading: In a 'democratic' index, each household is given an equal weight, rather than each individual, which might be implied from its name. A 'truly' democratic index would weight each person in an economy equally, and would deviate from the popular convention of a democratic index to the extent of variation in household size. Arguably, a still 'truer' index would use longitudinal data to observe movements in expenditure patterns for the same individuals through time, however, this approach is data-intensive, challenging to implement, and its interpretation not straightforward.

2 . 7.1 Results

7.2.1 All households

Weighting households equally – rather than according to their expenditure (see Section 2) – means that a democratic price index will more closely reflect the price experience of low expenditure households than a conventional plutocratically-weighted index. As the results presented in Section 5 suggest that low-expenditure households have typically experienced higher rates of inflation than high-expenditure households over the last decade, it should come as little surprise that the democratic index shows a higher rate of inflation than the CPI. This is shown in Figure 7.1, which plots both series between January 2003 and October 2014. Only in 2010 and 2014 to date – when the range of inflation outcomes between deciles narrows markedly (see Figure 5.5) – is the gap between the two negligible.

Figure 7.1: CPI-consistent democratic and plutocratic inflation rates for all households, %
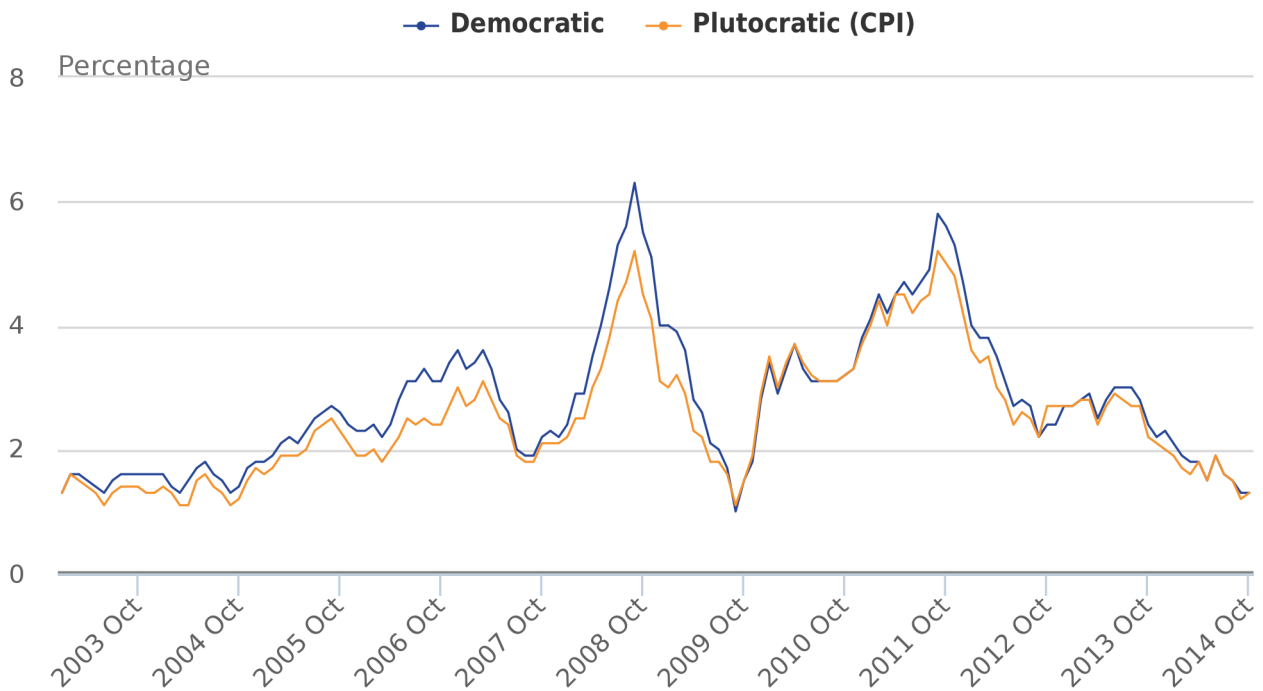
Source: ONS Calculations

While Figure 7.1 above shows the democratically- and plutocratically-weighted price indices for the period January 2003 and October 2014, Figure 7.2 shows the difference between the two series. It indicates that the CPI is on average around 0.3 percentage points lower than an equivalent index in which every household is given an equal weight over this period. In 2008, this difference was particularly marked, while in late 2009 to early 2010 and in recent months in 2014, the difference was close to zero. While assessing the statistical significance of these differences is difficult, the underlying trend is clear: during periods when the degree of variation in household inflation experiences is much broader (see Figure 5.5), the extent of the difference between these indices is greater. In line with the analysis presented in Section 5, this effect is particularly noticeable in 2006, 2008 and 2011: periods in which the average rate of inflation rises quite sharply.

Figure 7.2: Difference between plutocratically- and democratically-weighted price indices, percentage points
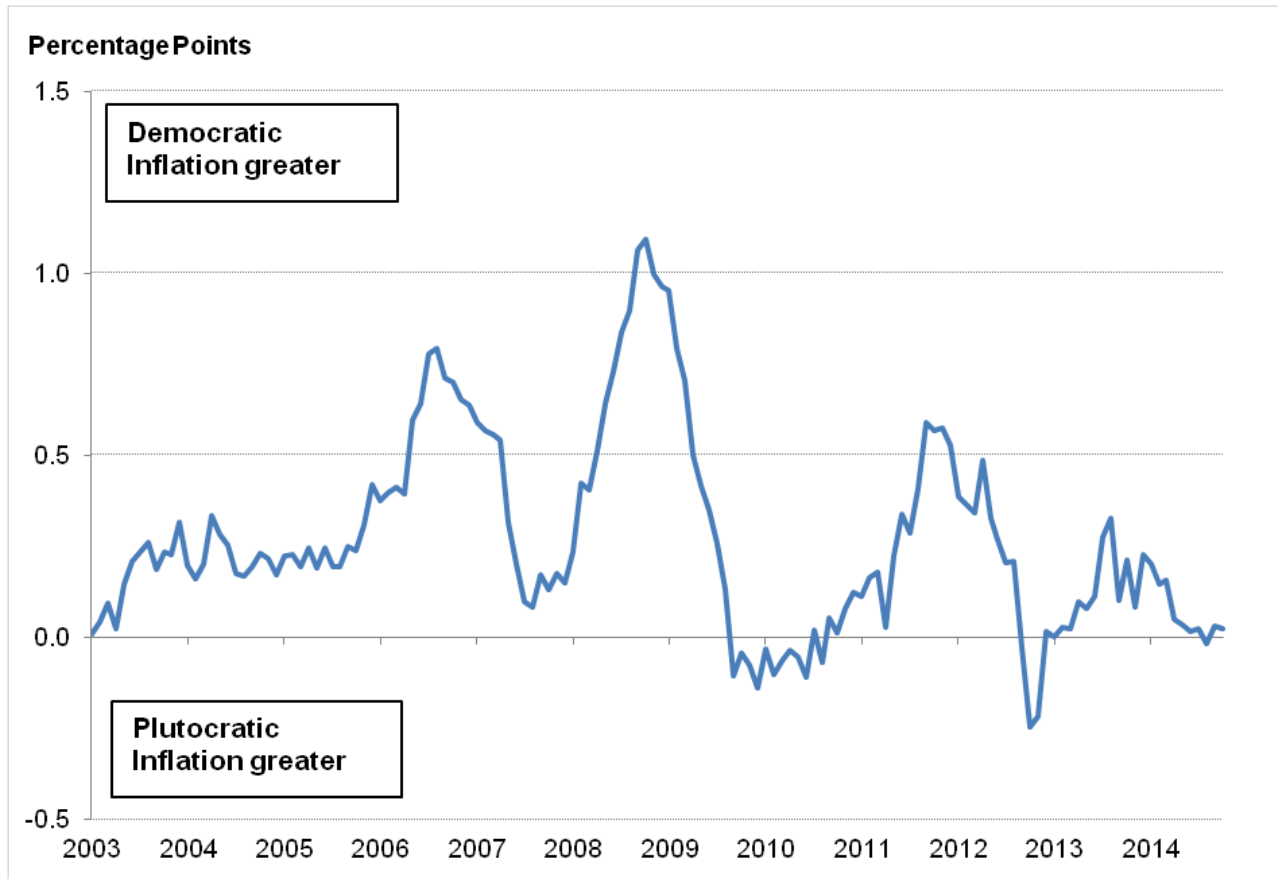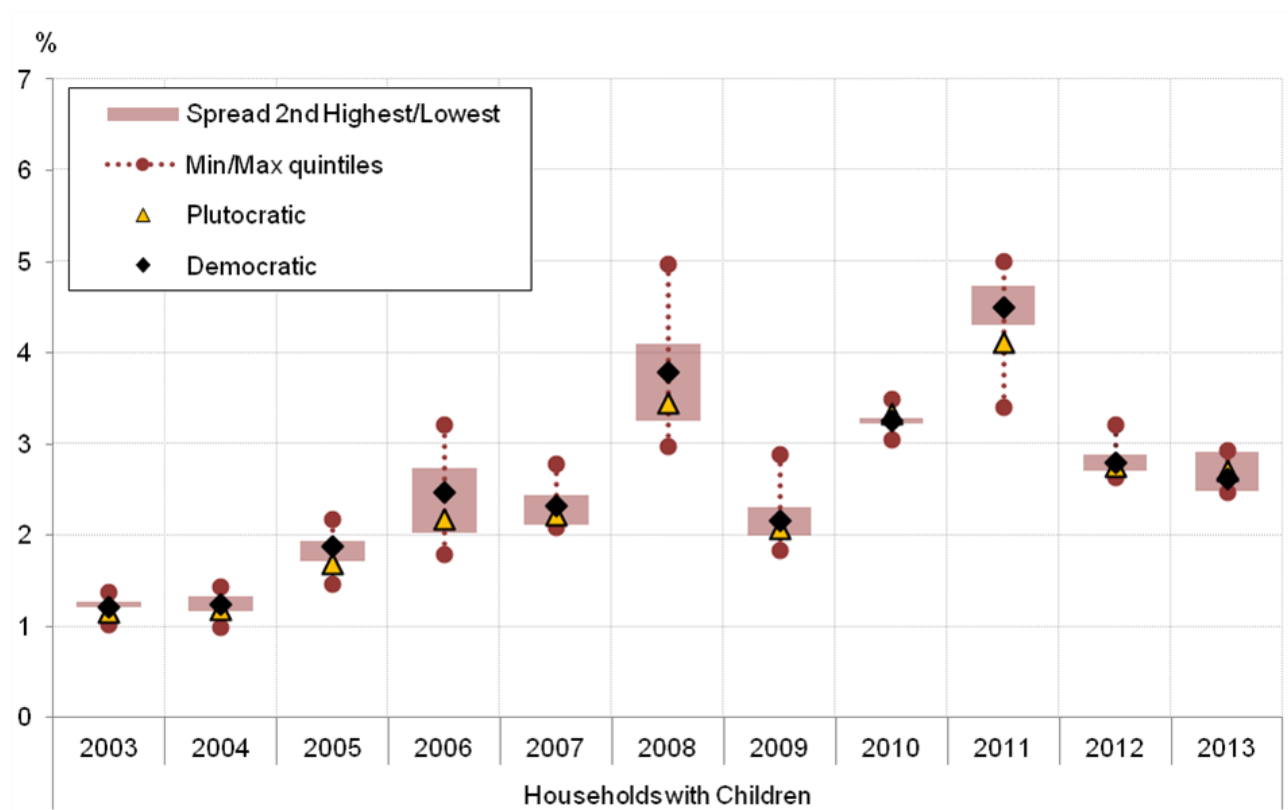

Source: ONS Calculations

7.2.2 Households with and without children

While the calculation of a democratic price index for the household sector as a whole is of interest, the concept can usefully be applied to sub-groups of the population. In this analysis, the plutocratically-weighted index represents the average price movement in the sub-group's basket of goods and services weighted by their share in total expenditure, while the democratically-weighted index represents the average price change experienced by households in the sub-group. This distinction (Leicester et al., 2008) can help to unpick the degree of variation in price experiences within groups.

Figure 7.3 below presents the democratically- and plutocratically-weighted indices for households with and without children in Panels A and B respectively, as well as the range of inflation outcomes for expenditure quintiles within each sub-group. The dots represent the highest and lowest inflation rates observed, with the shaded bars showing the range between the 2nd-highest and 2nd-lowest expenditure quintile. First, it supports the finding in Section 5 that households with children have experienced a lower rate of price increase on average than households without children, as indicated in the yellow triangles of Panels A and B. Secondly, the degree of variation in inflation outcomes is larger for households without children, as indicated by the range of inflation rates shown in Panel A and Panel B. Through most of this time period, the highest (lowest) inflation rates observed – indicated by the top (bottom) dots – are the inflation rates for the lowest (highest) expenditure quintiles. The degree of variation in 2008 is particularly marked for households without children, when the plutocratic (3.7%) and democratic (4.6%) averages lie within a range of 2.9% for the highest-expenditure quintile and 6.2% for the lowest-expenditure quintile. Thirdly, this greater variety in inflation outcomes across the expenditure quintiles for households without children manifests itself in a greater difference between the plutocratic and democratic price indices. This is shown by the greater difference between the two markers in Panel B than in Panel A.

Figure 7.3A: Range of plutocratically-calculated inflation rates for expenditure quintiles of households with children; CPI-consistent democratic and plutocratic inflation rates; %
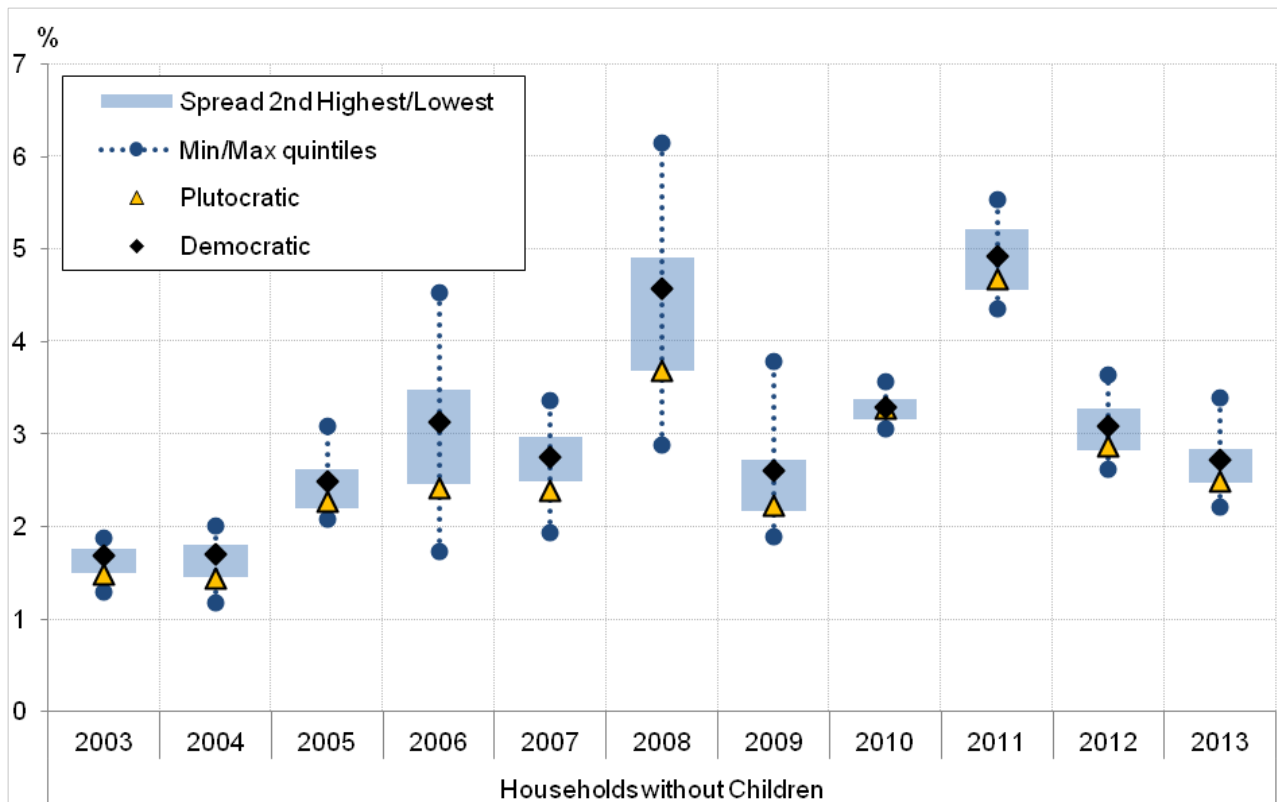

Source: ONS Calculations

Notes:

1. Figures shows the plutocratically weighted (yellow) and the democratically weighted (black) inflation rates for each group in each period. Figures also show the range of inflation outcomes for the quintiles (red/blue dots) and the inter-quintile range between the 2nd-highest and 2nd-lowest measures of equivalised quintile inflation rates (shaded red/blue bar).

Figure 7.3B: Range of plutocratically-calculated inflation rates for expenditure quintiles of households without children; CPI-consistent democratic and plutocratic inflation rates; %

Source: ONS Calculations

Notes:

1. Figures shows the plutocratically weighted (yellow) and the democratically weighted (black) inflation rates for each group in each period. Figures also show the range of inflation outcomes for the quintiles (red/blue dots) and the inter-quintile range between the 2nd-highest and 2nd-lowest measures of equivalised quintile inflation rates (shaded red/blue bar).

What explains these differences? As in Section 5 above, the inflation rate differentials shown here are driven by differences in expenditure patterns. Households without children consequently appear to be a more heterogeneous group than households with children, spending more on average on products whose price has increased relatively sharply over this period. Much of this difference is likely due to the demographic composition of these groups, as retired and elderly households are concentrated in the households without children group.

7.2.3 Retired households

Section 5 indicated that retired households have experienced higher rates of inflation than non-retired households on average since 2003, largely as a consequence of retired households spending more of their income on products that have risen strongly in price over this period.

Figure 7.4 presents the plutocratically- (yellow) and democratically-weighted (black) inflation rates for retired (Panel A) and non-retired households (Panel B). The two panels also summarise the distribution of inflation rates for these groups, showing the range of inflation outcomes for expenditure quintiles in each group. The dots represent the highest and lowest quintile-level inflation rates observed, with the shaded bars showing the range between the 2nd-highest and 2nd-lowest quintile results. As reported above, the average rate of price increase for retired households is higher than for non-retired households, but it is the difference in the range of inflation outcomes that is particularly striking. On average, the range of inflation outcomes across the expenditure quintiles of the retired population is around twice as broad as the equivalent range for non-retired households. In 2008, while inflation outcomes for the non-retired population ranged from 2.9% to 5.0%, the equivalent range for the retired population was 3.0% to 7.1%. While some retired households experienced broadly the same inflation rate as the non-retired population, a subset of this group faced much faster rates of price increase.

Figure 7.4A: Range of plutocratically-calculated inflation rates for expenditure quintiles of retired households; CPI-consistent democratic and plutocratic inflation rates; %
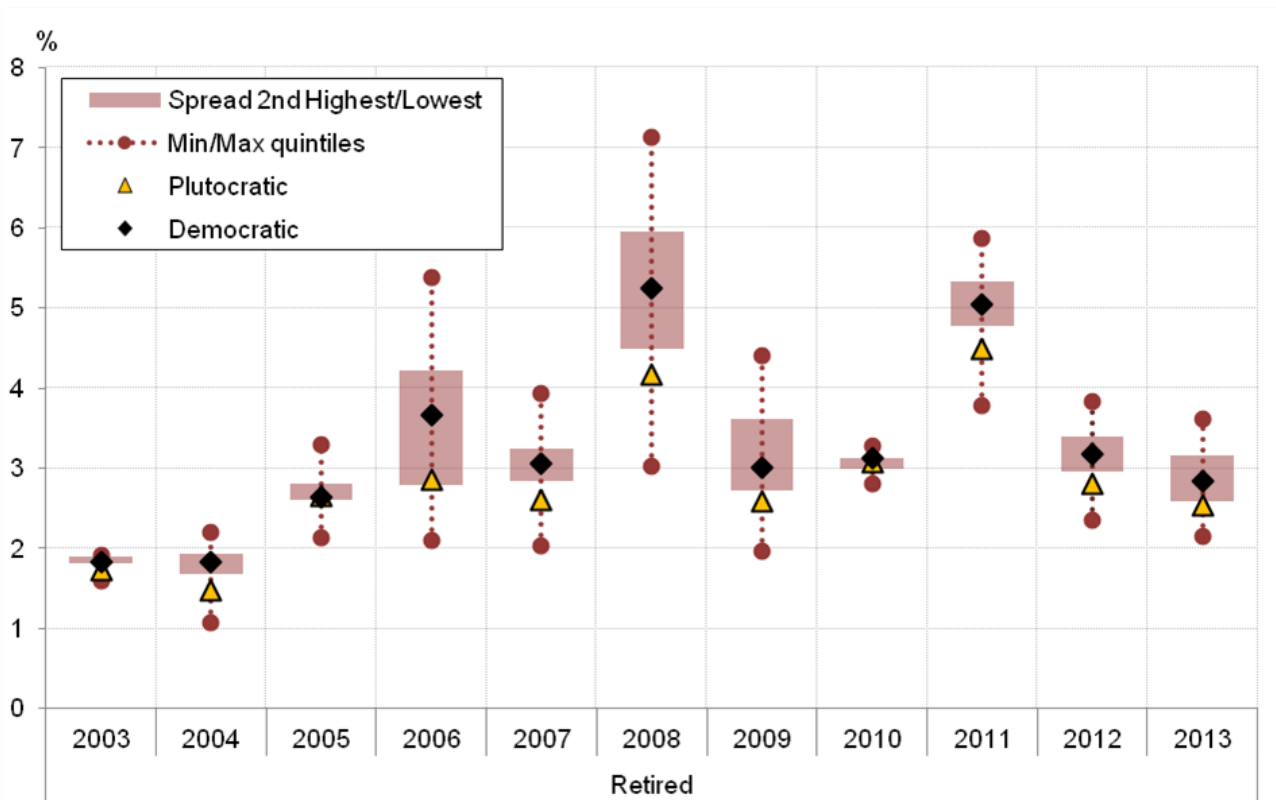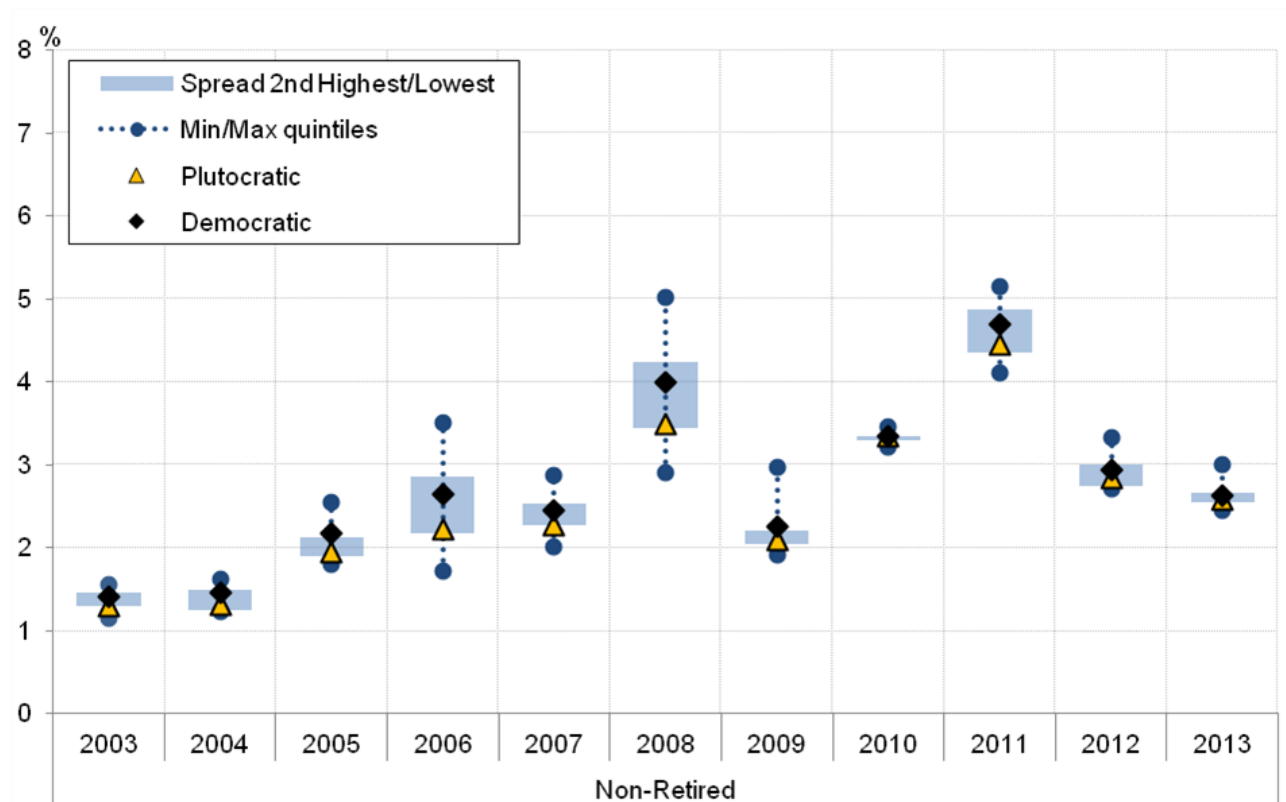

Source: ONS Calculations

Notes:

1. Figures shows the plutocratically weighted (yellow) and the democratically weighted (black) inflation rates for each group in each period. Figures also show the range of inflation outcomes for the quintiles (red/blue dots) and the inter-quintile range between the 2nd-highest and 2nd-lowest measures of equivalised quintile inflation rates (shaded red/blue bar).

Figure 7.4B: Range of plutocratically-calculated inflation rates for expenditure quintiles of non-retired households; CPI-consistent democratic and plutocratic inflation rates; %

Source: ONS Calculations

Notes:

1. Figures shows the plutocratically weighted (yellow) and the democratically weighted (black) inflation rates for each group in each period. Figures also show the range of inflation outcomes for the quintiles (red/blue dots) and the inter-quintile range between the 2nd-highest and 2nd-lowest measures of equivalised quintile inflation rates (shaded red/blue bar).

This broader distribution of observed inflation rates within the retired household population is also shown in the difference between the plutocratic and democratic inflation rates. In Panel A, the difference between these two measures is notably larger than the difference between the two in the lower panel. Taken together, these results indicate that the degree of variation in expenditure patterns within the retired population is markedly wider than among non-retired households. The reasons for this difference are likely to stem from the very different financial circumstances that prevail within the retired population, to say nothing of differences in tastes and preferences. However, what is clear from this analysis is that any single measure of inflation for a sub-group – whether calculated on a plutocratic or a democratic basis – will not capture the full degree of variation in price experience within groups. This finding in particular has important policy implications.

3. Background notes

1. Details of the policy governing the release of new data are available by visiting www.statisticsauthority.gov. uk/assessment/code-of-practice/index.html or from the Media Relations Office email: media.relations@ons. gsi.gov.uk