

# The relative inflation experience of poor urban South African households<sup>1</sup>

Haroon Bhorat and Morné Oosthuizen, University of Cape Town

While access to income, or a lack thereof, lies at the heart of characterising inequality and poverty in society, poor households' welfare levels are greatly influenced by fluctuations in the real values of whatever incomes they do have access to. This line of enquiry, namely the impact that relative final price movements have on households across the income distribution, is a new one for post-apartheid South Africa, with its local intellectual origins lying in Kahn<sup>2</sup>. This article's two main objectives are, firstly, to derive inflation rates for urban households grouped according to expenditure deciles and, secondly, to identify some of the key product categories responsible for the largest shares of inflation of the poorest 40 per cent of urban households. At a more generic level, the article is implicitly a representation of how the macroeconomic environment is able to, and indeed does, impact on household welfare.

The period under investigation, from the end of 1997 to mid-2002<sup>3</sup>, is an interesting one. The rapid depreciation of the rand at the end of 2001 and the beginning of 2002 had a knock-on effect throughout the economy as crucial inputs, for example, oil and many capital goods, are sourced from the international market where prices are dollar-denominated. Thus, 2002 saw an acceleration in the rate of inflation outside the South African Reserve Bank's three-to-six-per-cent target range. Furthermore, some of the most rapid price increases have been found to have occurred in food products. For example, according to a report presented to Cabinet, "staple grain prices had risen by up to 44 per cent, meat by up to 25 per cent and vegetables by 17 per cent"<sup>4</sup>. This occurred in response to the regional drought and higher rand food prices in the food export market, which lured produce away from the domestic food market, thereby placing

upward pressure on local food prices. In the analysis of poverty, this is of particular concern due to the fact that poorer households spend a relatively large proportion of their incomes on food, rendering them more vulnerable to price inflation from this source. The dynamic nature of the inflation process may provide interesting and useful insights into the varying experiences of households across the income distribution.

## Consumer price index weights for urban households

The construction of consumer price indices relies on two sets of data. Firstly, detailed price data are required for a given period and, secondly, expenditure weights are calculated from detailed household expenditure data, allowing price movements to be weighted according to their importance in the representative basket of goods and services consumed by households. This study utilises the 1999 simulated update of the 1995 Income and Expenditure Survey<sup>5</sup>, originally conducted by Statistics SA, as well as detailed price data for a wide variety of goods and services consumed by households in historical urban and metropolitan areas, obtained from Statistics SA. As no rural price data are available, this study is confined to urban households.

Changes in consumer price indices (CPIs) are therefore driven by both the mix of price changes and the weights of goods and services within the consumption basket. As a result, the way in which expenditure weights are calculated will impact on CPI inflation. There are two methods for calculating the weights used in the CPI, both with strengths and weaknesses. The first and most widely used method reflects the composition of total consumption expenditure and results in so-called *plutocratic* weights.

1 This article is based on Bhorat, H. and M. Oosthuizen. 2003. *The Relative Inflation Experience of Poor Urban South African Households*. A research report commissioned by the South African Reserve Bank.

2 Kahn, B. 1985. *The effects of inflation on the poor in South Africa*. Economic Learning Resources Series No 5. September. Cape Town: University of Cape Town. Internationally, various studies have investigated group price indices, where groups are defined either demographically or economically. See Idson, T. and C. Miller. 1999. Calculating a price index for families with children: implications for measuring trends in child poverty rates. *Review of Income and Wealth* 45(2): 217-233. Also, Garner, T.I., Johnson, D.S., and M.F. Kokoski. 1996. *An experimental consumer price index for the poor*. *Monthly Labour Review* 119(9). September: 32-42.

3 The period of analysis was determined by the availability of the price data collected by Statistics SA.

4 Boyle, B. 2002. Government steps in to feed poor. *News24*. 10 October. Available [online]: [http://www.news24.com/contentDisplay/level4Article/0,1113,2-8\\_1269972,00.html](http://www.news24.com/contentDisplay/level4Article/0,1113,2-8_1269972,00.html)

5 At the time of the study, IES2000 was not yet publicly available. The IES99 is a simulated update of the Income and Expenditure Survey of 1999, which surveyed over 29 500 randomly selected households. The IES99 is therefore based on the most comprehensive coverage of income and expenditure information that existed in South Africa at the time of the study. The data set is simulated in the sense that WEFA Southern Africa, a data company, unofficially updated the 1995 IES on the basis of a number of different criteria, including the following:

- Re-weighting the population to reflect mid-1999 population totals, with the anchor being Statistics SA's 1996 population census
- Benchmarking total income earned by households on the 1999 estimate of total income in the national accounts
- Benchmarking expenditure on Bureau of Market Research estimates of expenditure by product type (from report no 261, "Household Expenditure in South Africa by Province, Population Group and Product", 1999).

We are therefore fairly confident that the IES99 is a robust representation of household data, albeit an update on the raw data of the 1995 IES.

The second method reflects the average household's expenditure composition and these weights are conventionally known as *democratic* weights.

### Box 1 Deriving plutocratic and democratic weights

The standard method of deriving expenditure weights, as employed by Statistics SA and internationally, entails aggregating expenditure on a specific product or service across all households and then calculating the share of this aggregate within total expenditure. These weights are termed plutocratic weights. Mathematically, this is stated as

$$w_i^p = \frac{\sum_{h=1}^H e_i^h}{\sum_{i=1}^n \sum_{h=1}^H e_i^h}$$

where  $w_i^p$  is the plutocratic (hence the  $p$  superscript) weight of product  $i$  for  $i = 1, \dots, n$  items,  $e_i$  represents the expenditure on product  $i$ , and the superscript  $h$  denotes the household for  $h = 1, \dots, H$ . This implies that "the CPI ... can be interpreted as a weighted average of household price indexes ... [the] weight of each household [being] its total expenditure" (Ley, 2002: p.2).

The alternative method of calculating the weights entails a change in the unit of analysis, from the product to the household. Democratic weights are calculated, in essence, by averaging the structure of each household's expenditure. Mathematically, this is represented as

$$w_i^d = \frac{1}{H} \cdot \sum_{h=1}^H \left( \frac{e_i^h}{\sum_{i=1}^n e_i^h} \right)$$

using the same notation as above. The difference between plutocratic and democratic weights lies in how one averages the consumption bundles of a society's households. Plutocratic weights average across expenditures, while democratic weights average across households. "[In] the democratic price index, every household counts equally, while in the 'plutocratic' ... index, every dollar of expenditure counts equally" (Pollak, 1980: 276).

Generally, the official weights for CPIs around the world are plutocratic weights. This is because these weights reflect the composition or structure of consumer expenditure in a given economy. Thus, if 10 per cent of all consumer expenditure in an economy is on clothing, then clothing will constitute 10 per cent

of the weight in the CPI. Plutocratic weights render inflation rates that, therefore, best reflect consumer inflation and are most appropriate for macroeconomic policy-making, deflation of macroeconomic aggregates (such as national accounts data) and monetary policy where the control of economy-wide inflation is an objective. In short, the total amount of rands spent on an item will determine that item's importance in a plutocratically-weighted CPI.

Democratic weights have a different objective: Instead of trying to reflect the structure of total consumer spending, democratic weights aim to reflect the structure of the average household's spending. The difference between democratic weights and plutocratic weights arises as a product of inequality in expenditure levels in society. If the total rands spent on an item determine its plutocratic weight, it is clear that households with higher levels of expenditure will have a greater impact in determining plutocratic weights than poorer households with lower levels of expenditure. As a result, for example, the top 20 per cent of South African households represent more than 70 per cent of the weight in the CPI, compared to the 1,4 per cent of the poorest 20 per cent of households, because those are the proportions of total consumer spending that these groups account for. Basically, democratic weights reflect the average structure of each individual household's consumer spending. So, if the average household spends 10 per cent of its total spending on food, then the democratic weight for food will be 10 per cent.

Sources:

Ley, E. 2002. *Whose Inflation? A Characterization of the CPI Plutocratic Gap*. Available [online]: <http://netec.mcc.ac.uk/WoPEc/data/Papers/wpawuwppe0110001.html>

Pollak, R.A. 1980. Group Cost-of-Living Indexes. *American Economic Review* 70(2).

Since the focus here is on poor households, a democratically-weighted CPI is preferable as it better reflects the average household. The extent to which democratic indices better reflect the average household is demonstrated by calculating correlation coefficients between the various sets of weights. In Table 1.1 the bias of the plutocratic weights towards better-off groups is evident, with the correlation peaking in deciles 8 and 9, and dropping to below 0,6 as expenditure falls. By contrast, correlations with the democratic weights are highest in deciles 4, 5 and 6, but all are above 0,85, except for the most extreme deciles. Only the top three deciles have higher correlations for plutocratic as opposed to democratic weights. South Africa, though, is not unique in this. Ley<sup>6</sup> refers to two studies on United Kingdom (UK) and United States of America (US) data, which locate the household whose expenditure most closely resembles the plutocratic weights. In the UK, this household is in the 71st percentile, while in the US it is found in the 75th percentile.

6 Ley, E. 2002. *Whose Inflation? A Characterization of the CPI Plutocratic Gap*. Available [online]: <http://netec.mcc.ac.uk/WoPEc/data/Papers/wpawuwppe0110001.html>

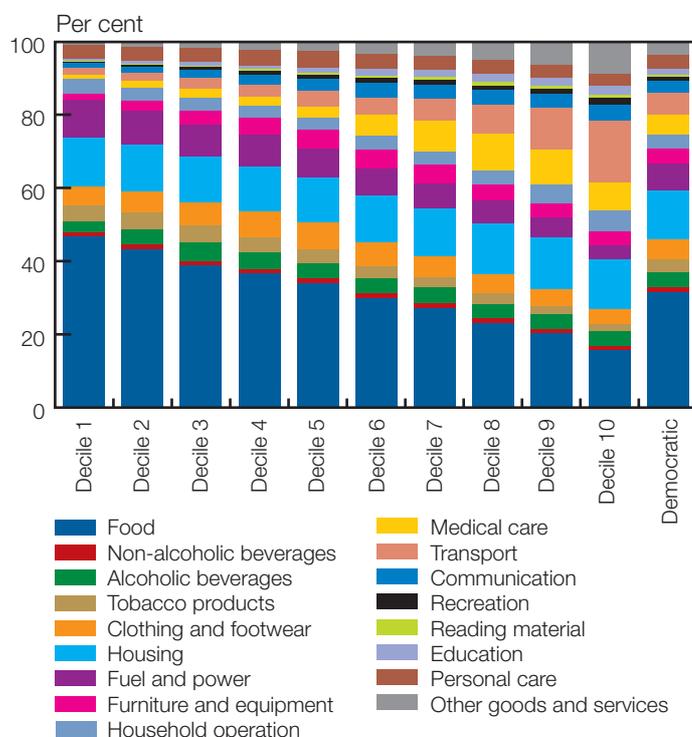
**Table 1.1 Correlations between sub-population weights, and democratic and plutocratic weights**

Sub-population <sup>7</sup>	Correlation with plutocratic weights	Correlation with democratic weights	Difference
Decile 1 .....	0,591	0,823	-0,232
Decile 2 .....	0,697	0,907	-0,211
Decile 3 .....	0,741	0,934	-0,193
Decile 4 .....	0,782	0,953	-0,170
Decile 5 .....	0,829	0,969	-0,140
Decile 6 .....	0,913	0,985	-0,072
Decile 7 .....	0,950	0,952	-0,002
Decile 8 .....	0,971	0,908	0,063
Decile 9 .....	0,974	0,864	0,110
Decile 10 .....	0,938	0,749	0,189

Source: Own calculations, Simulated IES99

Based on the 1999 simulated update of the Income and Expenditure Survey data, the average structure of households' expenditures (the democratic weighting) is illustrated for the ten expenditure deciles<sup>7</sup> and overall in Figure 1.1.

**Figure 1.1 Average composition of urban household expenditure by decile, 1999**

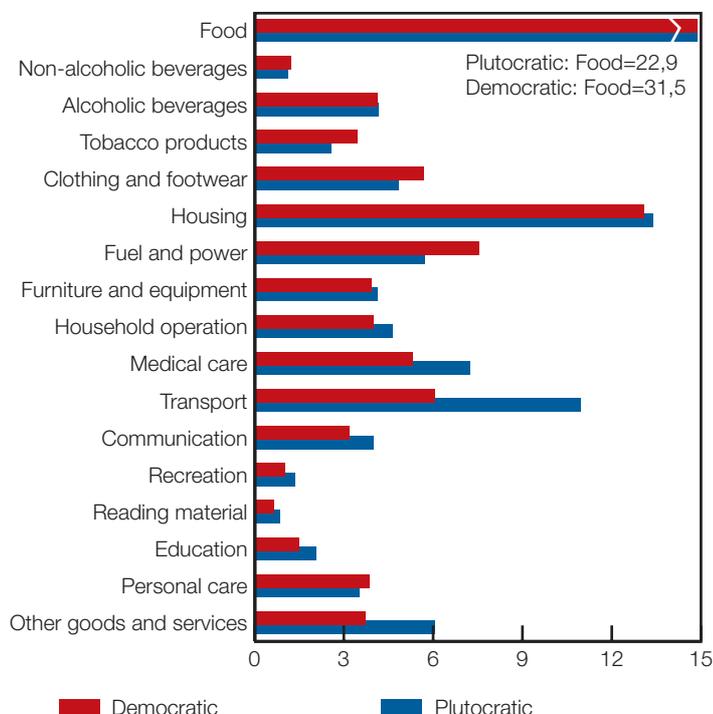


Source: Own calculations, Simulated IES99

The differing expenditure patterns according to income, as proxied by expenditure decile, are clear. Poor households spend significantly greater proportions of their budgets on food and fuel and power than better-off households. By contrast, better-off households spend greater proportions of their budgets on transport and medical care. Food, housing, and household fuel and power are the three largest expenditure categories for decile 1 households, representing over 70 per cent of total expenditure, while transport, food and housing are the most important categories for decile 10 households, accounting for less than 46 per cent of total expenditure. Consequently, poor households appear to be significantly more vulnerable to price shocks in their major expenditure categories than non-poor households, since the former group's expenditure is more concentrated in fewer categories.

In practice, the difference between plutocratic and democratic weights can be significant, although this is not always the case (see Figure 1.2). For example, the democratic weight of food is 31,5 per cent, which is almost nine percentage points higher than the plutocratic weight. By contrast, the democratic weight for transport is around five percentage points lower than the plutocratic weight.

**Figure 1.2 Comparison of plutocratic and democratic weights, urban households, 1999**



Source: Own calculations, Simulated IES99

<sup>7</sup> Decile 1 represents the ten per cent of households with the lowest expenditure, and decile 10 represents the ten per cent of households with the highest expenditure.

In the case of alcoholic beverages, and furniture and equipment, the plutocratic and democratic weights are almost identical. Clearly, the rankings of the various categories may differ depending on the type of weights used, and this is linked to the level of inequality in spending on each category. Where the democratic weight exceeds the plutocratic weight, poorer households spend proportionately more on that item than better-off households, and vice versa.

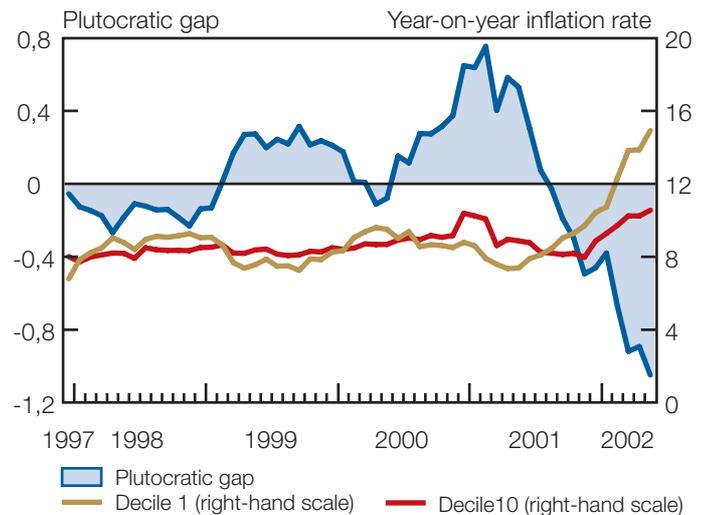
### Consumer price inflation<sup>8</sup> for urban households

Employing the democratically-weighted inflation rate in tandem with the plutocratic inflation rate provides another method of discerning which income group is experiencing higher rates of inflation at any given moment. This is done by means of the plutocratic gap or plutocratic bias<sup>9</sup>, which is the plutocratically-weighted inflation rate *minus* the democratically-weighted inflation rate. As has been discussed, democratic weights are more closely matched to households at the middle and lower end of the distribution, while plutocratic weights match most closely to households in the upper end of the distribution. Therefore, where better-off households experience higher rates of inflation than poorer households, the plutocratically-weighted inflation rate will be greater than the democratically-weighted inflation rate and the plutocratic gap will be positive, and vice versa.

Figure 1.3 presents the plutocratic gap for South Africa between December 1997 and May 2002 and reveals some important points. The first part of the period saw a negative plutocratic gap, indicating that poorer households were experiencing higher rates of inflation than better-off households. However, for almost half the period (between March 1999 and July 2001), inflation was higher for better-off households. The figure also presents CPIX inflation for deciles 1 and 10, respectively the poorest and wealthiest deciles. The match between the movements of these two groups' rates of inflation and the sign of the plutocratic gap is striking: Periods during which the plutocratic gap is positive are also periods where decile 10 inflation is higher than decile 1 inflation, and vice versa.

During the first part of the period up to November 2000, the various deciles' inflation rates ranged between seven and nine per cent year on year, with the dispersion in rates gradually widening from 1,4 percentage points on

Figure 1.3 CPIX plutocratic gap (per cent), December 1997 to May 2002



Source: Own calculations, Simulated IES99

average in 1998 up to 2,7 percentage points in 2000. However, in early 2001, the poorest households saw a rapid acceleration in their rate of inflation relative to that of other households, resulting in even greater dispersion<sup>10</sup>. The steep decline in the plutocratic gap is indicative of the extent to which the fortunes of poor households deteriorated from an inflation perspective.

The data confirm Kahn's assertion that there is "no reason to expect that lower income groups will necessarily be faced with a higher inflation rate than any other group"<sup>11</sup>. Over the 66-month period, non-poor households experienced higher inflation rates than poor households for 27 months, concentrated in the middle of this period. The adverse impact of the rapid depreciation of the rand in the latter part of the period, combined with the effects of the regional drought, while negatively impacting on inflation across the income distribution, was particularly harshly felt among the poorest deciles.

These results point to two important implications for policy. Firstly, that the data very powerfully illustrate the nexus between the macroeconomic environment and its welfare outcomes. Clearly, price movements in the economy impact differentially at different points in the income distribution. Secondly, policy formulation designed to ameliorate the consequences of price shocks for the poor needs to be mindful of the fact that

<sup>8</sup> This is the consumer price index minus mortgage costs (CPIX).

<sup>9</sup> *Op cit.*, p.7. Also Crawford, I. and Z. Smith. 2002. *Distributional Aspects of Inflation*. The Institute of Fiscal Studies, Commentary 90. London.

<sup>10</sup> Greater dispersion in the rates of inflation across households when inflation rates are higher has also been found to exist in the UK by Crawford and Smith 2002. *Op cit.*, p.31.

<sup>11</sup> Kahn, B. 1985. *Op cit.*, p.22.

poor households do not always experience above-average rates of inflation, relative to other income groups. This is, however, not a negation of the fact that non-poor households are far more capable of adjusting their expenditure patterns to cushion themselves from price movements, compared to poor households.

### Inflation drivers for poor urban households

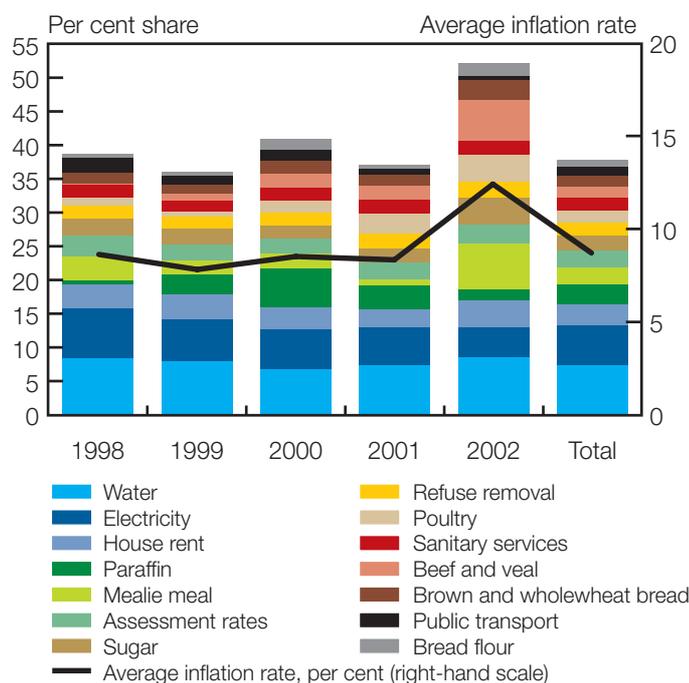
A further objective of this article is to shed some light on which goods and services are primarily responsible for inflation among the poorest 40 per cent of households (i.e. deciles 1 to 4). This was achieved by selecting all categories of expenditure that accounted for two per cent or more of total expenditure in at least one of the four poorest deciles. One of the prerequisites for a category to be described as a driver of inflation is that it should represent a relatively greater proportion of expenditure.

The study explores the inflation history of various expenditure categories over the period and how these impacted on the overall inflation experience of households at various points across the income distribution, providing two important insights. Firstly, there are clear differences in the impact of price increases in these categories on households across the income distribution due to the variation in weights across deciles. Secondly, various products had made large contributions to total inflation at different times during the period, with very few goods or services consistently accounting for large proportions of total inflation.

This section briefly identifies some of the key inflation drivers for the poorest households. From the four expenditure categories analysed, fourteen goods and services have been selected in order to explain as large a proportion of inflation as possible among the poorest 40 per cent of households. These products and their percentage share contributions to overall inflation over the period are presented in Figure 1.4.

Somewhat surprisingly, two basic services, water and electricity, top the list in contributing the most to inflation over the period as a whole. Water contributed an average of 7,0 per cent of total inflation for households in the first four deciles of the period, while electricity contributed a further 5,9 per cent of total inflation. Within each period, the proportion of total inflation for the poorest 40 per cent of households attributable to these two expenditures fluctuated between 12,5 per cent and 16 per cent. House rent was the third largest contributor to inflation over the period, representing 3,2 per cent of

Figure 1.4 Contribution of products to total inflation experienced by poorest 40 per cent of urban households



Source: Own calculations, Simulated IES99

Note: The averages for 1998 include the figures for December 1997, while the averages for 2002 are for the first five months of that year.

These are not necessarily the top 14 inflation drivers for these households. However, since only three products with weights of more than two per cent in any of these four deciles are not considered here, it can be said with a high degree of certainty that the goods and services listed above are a reasonably accurate reflection of the most important inflation drivers for these deciles.

overall inflation among the poor. Other municipal expenditures that feature in this list include assessment rates, refuse removal and sanitary services, while public transport is also an important contributor to inflation.

The vulnerability of poor households to changes in the price of paraffin is clearly illustrated by the fact that paraffin alone contributed almost three per cent of total inflation over the period, while in 2000 it contributed 5,8 per cent to total inflation. This product moved from twelfth position in 1998 to fourth in 1999 and was third in 2000 and 2001, making it the fourth most important inflation driver for the period as a whole.

The vulnerability of low-income households to food inflation and the marked shift towards food-driven inflation during the latter part of the period are evident from the rise in the relative importance of the various food products. In 1998 and 1999, individual food products

were generally of lesser importance in driving inflation than the individual non-food items, with food items occupying four of the bottom five places. However, from 2000 onwards, food items began to emerge as major inflation drivers. This was the case particularly for poultry during 2001, and mealie meal and beef and veal in 2000 and 2002. Mealie meal was the second most important inflation driver in 2002, and the only product to displace electricity from that position. Sugar remained relatively important during the entire period, and is ranked seventh for the period.

The most important observation is that the prices of water, electricity, rates, public transport, sanitary services, refuse removal and paraffin are all, to varying extents, determined by state-owned enterprises, or local, provincial or national government. With the exception of 2002, at least three of these goods and services were listed as one of the top five most important inflation drivers, while the top spot was consistently held by water<sup>12</sup>.

## Conclusion

Consumer price indices, as with any aggregate, hide a wealth of information, irrespective of which method is used to calculate the weights. Plutocratic indices, as they reflect the structure of consumer spending, are best suited to macroeconomic analysis and as indicators of economy-wide inflation. In any analysis of economic welfare, particularly where the poor are the focus – for example, changes in real incomes and adjustments of state transfers – democratically-weighted indices are very useful<sup>13</sup>. Statistics SA's monthly publication of separate price indices for a number of expenditure groups is similarly helpful.

Through direct measurement of decile inflation rates and the estimation of the plutocratic gap, it is confirmed that poor households do not consistently experience higher rates of inflation than higher income groups. The answer to the question of who is experiencing the highest rate of inflation at a given time will depend on the structure of inflation at that time. For example, in 2002 when food inflation was high and paraffin prices rose rapidly, poorer deciles experienced higher rates of inflation. Nevertheless, poor households remain more vulnerable to inflation in their main expenditure categories due to the relatively high concentration of their spending in these categories.

Finally, in terms of inflation drivers, the analysis has revealed that government, in some form or another, is able to affect the prices of seven of the top 14 items driving inflation for poor households over the period. Water and electricity were consistently ranked first and second over the period (with electricity falling to third in 2002) as the largest contributors to poor households' inflation. Similarly, government is able to influence the prices of paraffin, assessment rates, refuse removal, sanitary services and public transport to varying degrees. This finding suggests significant scope for the state to shield poor households from excessive inflation, both directly through its pricing decisions and indirectly through the demonstration effect. Granted, government is not omnipotent in this regard, particularly where the vagaries of international commodity and currency markets have knock-on price effects in the domestic economy, although as the case of the mealie meal subsidy in 2002 demonstrates, there is scope for government to act in aid of the poor in certain instances. However, in more recent years, government has made significant progress in containing administered price movements, bringing them in line with the inflation target range.

<sup>12</sup> The provision of free water since late 2000 will have reduced the weight of this component within the overall expenditure bundle of households, lowering water's contribution to inflation, thereby affecting its 2001 and 2002 rankings.

<sup>13</sup> Schultze, C. and C. Mackie (eds). 2002. *At What Price? Conceptualising and Measuring Cost-of-Living and Price Indexes*. Panel on Conceptual, Measurement, and Other Statistical Issues in Developing Cost-of-Living Indexes. Committee on National Statistics. Washington, D.C.: National Research Council. Available [online]: <http://search.nap.edu/books/0309074428/html/>