Institute for Fiscal Studies

The spending patterns and inflation experience of low-income households over the past decade

IFS Commentary C119

Peter Levell
Zoe Oldfield

Consumer Focus
Campaigning for a fair deal

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

The Spending Patterns and Inflation Experience of Low-Income Households over the Past Decade

Peter Levell

Zoe Oldfield

Institute for Fiscal Studies

Copy-edited by Judith Payne

The Institute for Fiscal Studies
7 Ridgmount Street
London WC1E 7AE

Published by

The Institute for Fiscal Studies
7 Ridgmount Street
London WC1E 7AE
Tel: +44 (0)20 7291 4800
Fax: +44 (0)20 7323 4780
Email: mailbox@ifs.org.uk
Website: http://www.ifs.org.uk

ISBN: 978-1-903274-83-5

Preface

Funding from Consumer Focus and the ESRC Centre for the Microeconomic Analysis of Public Policy at IFS is gratefully acknowledged. The authors would like to thank Cormac O'Dea for his contribution to the programming of the QUAIDS model in Chapter 4 and for the very helpful discussion surrounding this. They would also like to thank Andrew Leicester at IFS and William Baker and Prashant Vaze at Consumer Focus for very helpful comments on earlier drafts of the report. Data from the Family Expenditure Survey, Expenditure and Food Survey and Living Costs and Food Survey is Crown Copyright and reproduced with the permission of the Controller of HMSO and the Queen's Printer for Scotland. This document reflects the views of the authors and not Consumer Focus or the Institute for Fiscal Studies, which has no corporate view. All errors are the responsibility of the authors.

Contents

Executive Summary

This Commentary analyses recent trends in household spending, with a focus on domestic fuel and water, and examines the impact of changes in the price of these goods on household inflation, particularly for those on low incomes and those for whom state benefits make up the largest component of their income ('benefit-dependent' households).

- There are clear differences in spending patterns between high- and low-income households. Low-income households tend to devote a greater share of their spending to fuel and water than higher-income households. In 2009, the poorest 10% of households by income (i.e. the lowest 'income decile') spent 7.7% of their budget on domestic fuel compared with 3.4% for the highest income decile.

- In recent years, inflation rates have been particularly high for goods that make up a larger share of the budget of low-income households. In particular, domestic fuel prices rose very rapidly during 2006 and again in 2008: fuel price inflation reached a peak of almost 40% in September 2008.

- We find that, on average, lower-income households had higher inflation rates over the last decade than higher-income households.

- In particular, the second-to-lowest income decile of the population experienced the highest average inflation rate of the period from 2000 to 2010, with a rate of 3.5%. This contrasts with the highest income decile, who experienced the lowest inflation, with a rate of 2.9%.

- However, no single group consistently experienced a higher average inflation rate than others in every year over the period we consider.

- There have also been differences in inflation rates *within* income groups. Within the lowest income quintile (i.e. the poorest 20% by income), those with the household head aged over state pension age experienced an average inflation rate of 3.8%, compared with a rate of 2.8% for those aged under 35.

- Within the lowest income quintile, there were also differences in the average inflation rate experienced by different family types and by different housing tenure groups over the last decade. Single pensioners experienced the highest inflation rates in both the top and bottom quintiles. Within the lowest income quintile, those with mortgages experienced the lowest average inflation rates, at 3.1%, compared with 3.9% for those who owned their homes outright.

- Fuel and water make larger contributions to the inflation rates of low-income households than to those of higher-income households. For instance, in 2006, fuel price inflation averaged 24.6%, and the effect was to increase average inflation rates of the lowest income quintile by 1.8 percentage points. This compares with a contribution of just 0.8 percentage points for the highest income quintile in that year.

- Looking forwards, the Department of Energy and Climate Change's price projections suggest that there will be price increases in domestic fuel over and above general inflation over the medium term. Other things being equal, these price rises will work to increase inflation rates of poorer households relative to richer households.

- We find evidence that lower-income households reduce their consumption of fuel proportionately more than higher-income households when fuel prices increase. We estimate that the median response among the poorest quintile to a 10% increase in fuel prices is a 6% reduction in fuel consumption. The response among the highest income quintile is much smaller, with the median household essentially holding its consumption constant.

- Although these numbers suggest that if prices do rise in the future, (other things being equal) spending on fuel will increase more for higher-income households than for lower-income households, they also suggest that lower-income households will heat their homes to a lesser extent.

1. Introduction

There is substantial variation in how households allocate their budgets across different types of goods and services, both over time and between different demographic and income groups.[1] At the same time, the rate of price inflation for different goods and services can also vary dramatically. For example, the March 2011 figures for the retail price index (RPI) showed that the annual inflation rate for clothing and footwear was 12.2% whilst the index for leisure goods fell by 0.6%.[2]

This means that different households can face very different inflation rates. Households spending a large portion of their budget on items that are rising rapidly in price will have higher inflation than households spending a smaller share on these items. The 'headline' rates of inflation, such as the RPI and the consumer price index (CPI), measure the *average* rate of inflation in the economy and may or may not reflect any particular household's individual inflation rate. Despite this, headline inflation rates are widely used to uprate pensions, benefits and tax thresholds as well as in wage negotiations. This means that households facing inflation rates above or below the average rate will find themselves being under- or over-compensated for the impact of changes in prices.

Previous work in this area includes Crawford and Smith (2002) and Leicester, O'Dea and Oldfield (2008). Both these reports found that inflation rates across different households can vary substantially. This Commentary follows on from these reports. In particular, it focuses on the contribution of fuel and water to household inflation rates and looks in more detail at differences within low-income groups.

In recent years, inflation rates have been particularly high for goods that make up a larger share of the budget of low-income households In particular, domestic fuel prices rose very rapidly during 2006 and again in 2008: fuel price inflation reached almost 40% in September 2008. Domestic fuel made up 7.7% of the budget of the poorest 10% of households in 2009 on average, compared with 3.4% for those in the richest 10%,[3] so this rise will have had a bigger impact on the inflation rates of poorer households.

[1] See, for example, Blow, Leicester and Oldfield (2004) or Leicester, O'Dea and Oldfield (2008).

[2] Office for National Statistics, 2011b.

[3] Authors' calculations from the 2009 Living Costs and Food Survey.

This Commentary analyses recent trends in household spending, with a focus on domestic fuel and water, and examines the impact of changes in the price of these goods on household inflation, particularly for those on low incomes. We also consider the impact of projected future changes in the price of domestic fuel.

The Commentary is structured as follows. We first discuss the definition and measurement of inflation in the UK (Section 1.1) and describe in more detail what has happened to the prices of domestic fuel and water (Section 1.2). In Chapter 2, we look at spending patterns across different types of household. As well as looking at how spending patterns differ across income groups, we analyse how spending patterns vary *within* the lowest and highest income groups. Chapter 3 examines how inflation rates differ across household types and assesses the contribution of fuel and water prices to these differences. In Chapter 4, we carry out some counterfactual analysis using estimates of how consumers respond to changes in price to predict how spending patterns might change as a result of a range of possible future increases in the price of domestic fuel. Chapter 5 concludes.

1.1 What is inflation?

Inflation is defined as an increase in the general price level. The price level is some index of average prices in the economy, taken as an aggregate of the prices of various goods and services. In official measures of inflation, this is carried out by first choosing a representative 'shopping basket' of the products people typically buy, and then sampling the prices of these goods. The goods chosen in the basket are updated annually to reflect changes in household spending patterns. Roughly speaking, an inflation rate is calculated for each item in the basket and a weighted average of these inflation rates is then taken to give an overall inflation figure. The weight for each category of good reflects how important a part of the 'average' budget it represents.[4]

There is, of course, no such thing as an 'average' household. A household's own inflation rate will depend on its individual expenditure patterns. If spending patterns vary systematically across the income distribution, for example, then in any given year, high- and low-income households will face different rates of inflation. This may be of particular interest to policymakers, if it means, for instance, that the aggregate inflation

[4] For more on this and other aspects of the calculation of price indices, see Office for National Statistics (2010). Details of the 2010 'shopping basket' can be found at http://www.statistics.gov.uk/articles/nojournal/CPI_and_RPI_The_2010_Basket_of_Goods_and_Services.pdf.

measures used to annually 'uprate' state benefits do not accurately reflect the changes in the cost of living that households receiving these benefits experience.

Measures of inflation in the UK

The two most commonly used inflation measures in the UK are the RPI and the CPI. The RPI is the longest-standing measure of UK inflation. The CPI is designed to be comparable to consumer price indices published in other European countries.

In recent years, the CPI has become the most widely used inflation measure for a range of policy purposes. In 2003, the government announced that the CPI rather than the RPI was to be used as the Bank of England's target measure of inflation. Then, in the June 2010 Budget, the Chancellor announced that the government will use the CPI rather than the RPI to uprate state benefits and pensions from April 2011.[5] In Section 3.4, we discuss some of the issues surrounding this decision for households in receipt of state pensions and benefits.

The RPI and CPI differ in a number of ways, including the goods and services covered, the prices and spending categories used in their construction, and the way in which weighted averages are calculated at each stage.

In terms of coverage, the CPI excludes various goods and services which are included in the RPI: mortgage interest payments, council tax, buildings insurance, house purchase costs, housing depreciation, TV licences, vehicle excise duty and trade union subscriptions.[6] However, the CPI includes some things not covered by the RPI: stockbroker fees, university accommodation fees, unit trust fees and overseas student fees.

The CPI draws on different data from the RPI to measure typical expenditure patterns. The RPI relies heavily on data from the Office for National Statistics (ONS)'s Living Costs and Food Survey (LCFS) of households, whereas the CPI uses the UK national accounts.[7] Partly because of this, the RPI and CPI cover different populations when determining average spending.

[5] Many means-tested state benefits were uprated by the Rossi index, a measure of the RPI excluding housing costs. The CPI will now also be used to uprate them instead.

[6] Housing costs may be included in the CPI in future, if agreement is reached on the treatment of owner-occupied housing costs at a European level.

[7] The household final consumption expenditures reported in the national accounts partly draw on the LCFS for their data.

The RPI measure excludes foreign visitors to the UK and those living in institutions (such as nursing homes or student halls of residence), who are not covered by the LCFS. It also excludes very-high-income households and pensioners who derive at least three-quarters of their total income from pensions and benefits, who typically have very different spending patterns from 'average' households. However, all these are included in the CPI measure of average spending. These differences in data and both population and product coverage mean that the weights assigned to any particular item of expenditure differ between the RPI and the CPI.

Finally, the CPI and RPI use different formulas to calculate inflation rates. This methodological difference leads to what is called the 'formula effect', and means that even if the CPI and RPI covered the same goods and the same population, the CPI would tend to give a lower level of inflation than the RPI.

The RPI inflation measure typically overstates the true increase in the cost of living when prices rise, partly because the way it is calculated does not allow for the fact that consumers can react to price increases by substituting away from goods that have become relatively more expensive towards goods that have become relatively cheaper.[8] The different method used to construct the CPI attempts to take this into account, although in a very particular way which makes certain assumptions about consumer behaviour. The ONS believes that this is the most important factor in explaining the difference between the CPI and the RPI.[9]

1.2 Domestic fuel and water price inflation

Domestic fuel and water price inflation has fluctuated dramatically in recent years. This has affected household spending patterns and the distribution of inflation across different groups. Energy prices are largely set by the market and they reflect in part the wholesale cost of gas and electricity and in part the cost of regulated payments for use of transmission and distribution systems.[10] The price of household water is regulated by Ofwat and varies substantially between different regions.[11]

[8] See, for instance, Blow and Crawford (2001).

[9] See http://www.statistics.gov.uk/downloads/theme_economy/cpi-rpi-information-note.pdf.

[10] For a description of the way the ONS collects electricity prices (and, for instance, distinguishes between standing and unit charges), see Office for National Statistics (1998). Also see, for instance, http://www.ofgem.gov.uk/Networks/ElecDist/PriceCntrls/Pages/PriceCntrls.aspx.

[11] Price limits are set for a complex combination of water and sewage charges known as the 'tariff basket', leaving companies some flexibility in the prices they set (http://www.ofwat.gov.uk/pricereview/setting/tariff). The price limits themselves also vary

For instance, average water prices range from £205 per household per year for customers of South West Water to just £88 per household per year for customers of Portsmouth Water.[12]

In this Commentary, domestic fuel refers to electricity, gas and other fuels used in the home for heating and cooking, etc. For shorthand, we will refer to this as 'fuel', but it is important to note that this does not cover vehicle fuels such as petrol and diesel. There are important reasons why the impact of fuel price inflation across households may be of independent interest to policymakers:

- Both the current and previous governments have introduced and considered many policies that are likely to increase the cost of energy in order to meet carbon emissions and renewables targets in the coming years. If lower-income households spend a greater proportion of their income on fuel than other households, then these policies will be, in and of themselves, regressive. Understanding the likely impact of these policies across households may be helpful to policymakers aiming to design appropriate mechanisms to compensate different households.

- In 2001, the previous Labour government set a target to eliminate 'fuel poverty' (defined as a situation where a household needs to spend 10% of its income on fuel in order to adequately heat its home and meet other energy needs) by 2016.[13]

The impact of water price inflation on different groups is also of policy interest. The level and structure of water prices depend extensively on regulatory decisions, and these may change to deal with projected increases in water scarcity. Understanding the distributional impact of policies to reduce water demand, such as increasing water prices, increasing the use of water meters or differential pricing (charging more for marginal units of consumption), is therefore likely to be important in the years ahead.[14] Firms' costs may also increase as a result of investments to treat sewage, for instance, in order to comply with the European Water Framework Directive, and these may feed into consumer prices.[15]

---

from firm to firm and depend partly on firms' individual capital costs as well as according to their performance over the previous five-year period between price reviews (http://www.ofwat.gov.uk/pricereview/setting).

[12] http://www.ofwat.gov.uk/consumerissues/chargesbills/prs_inf_charges2010-11.pdf.

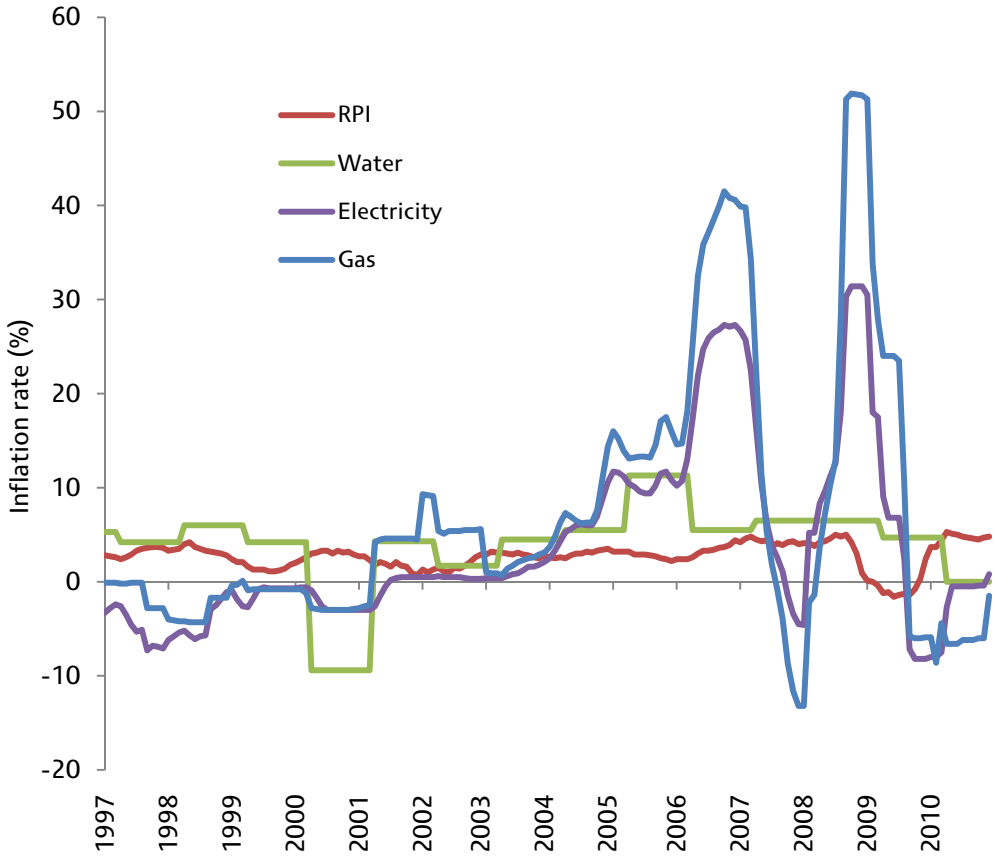
[13] See http://www.decc.gov.uk/en/content/cms/statistics/fuelpov_stats/fuelpov_stats.aspx.

[14] For discussion of the distributional considerations associated with responding to increasing water scarcity, see Benzie et al. (2011).

[15] Possible costs associated with meeting this directive are discussed in Ofwat (2005).

Figure 1.1 compares electricity, gas and water price inflation with overall inflation in recent years, based on the RPI definition.[16] Water prices are updated every April and so do not vary within 12-month periods from April to March each year. On average, electricity, gas and water prices have risen much faster than general prices. Between January 1997 and December 2010, electricity prices rose by 67%, gas prices increased by 139% and water prices increased by 70%, compared with an increase of 48% in the overall RPI over the same period.

Figure 1.1. Electricity, gas, water and general price inflation



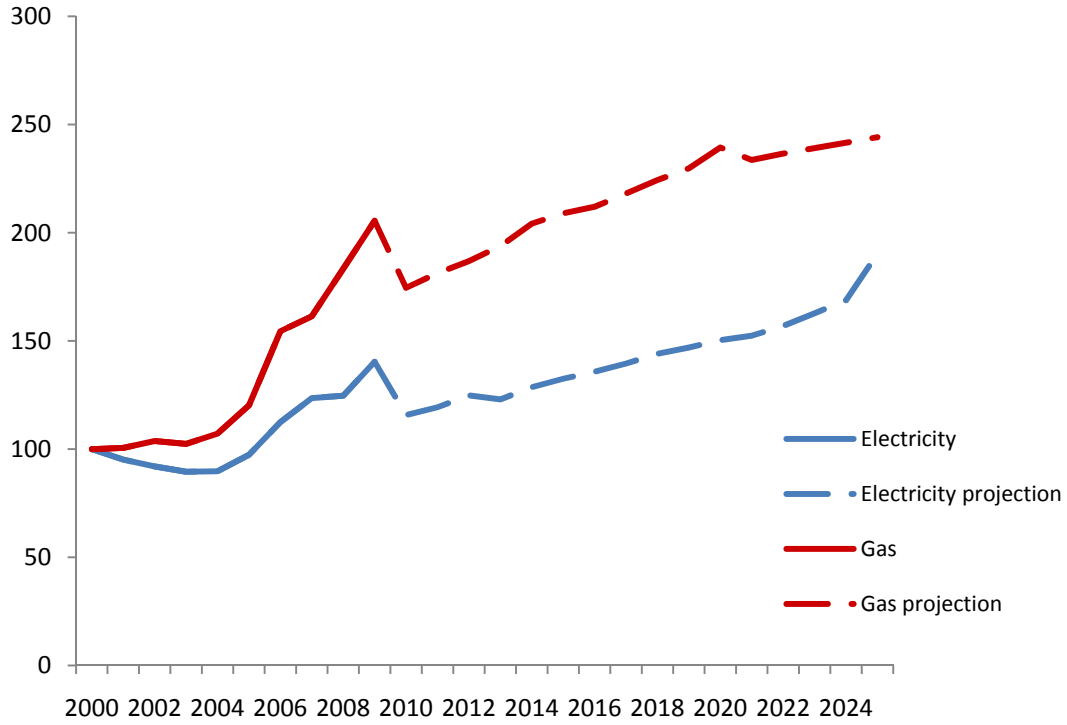
Source: Office for National Statistics.

Occasionally, fuel prices increased much faster than general prices: the fastest increase in gas and electricity prices over the last decade was in October 2008, when electricity prices increased by 31.4% and gas prices increased by 51.9%, compared with a 4.2% increase for the all-items RPI. Water price inflation over the last decade has been much less volatile than electricity and gas price inflation, but has also been noticeably higher than RPI inflation in some years, with water prices increasing at their fastest

[16] The category 'fuel' in the RPI includes electricity, gas, oil and 'other fuels'. Electricity and gas are by far the most important components. 'Water' prices include other related charges (for example, for sewerage).

rate from March 2005 to March 2006 (at 11.3%). However, it is not the case that either fuel or water prices have increased more rapidly than average prices in all years. Throughout much of 2010, for instance, electricity and gas prices fell, although they rose again in the last quarter of 2010, and water prices did not change, while the RPI increased at a rate above its 1997–2010 average.[17]

Figure 1.2. Central price projections for gas and electricity



Source: Authors' calculations from DECC data; see annex F at http://www.decc.gov.uk/en/content/cms/statistics/projections/projections.aspx.

The Department of Energy and Climate Change (DECC) models likely trends in residential energy prices over the medium term given a number of assumptions. These assumptions include the effects of government policy as well as predictions about changes in input prices. DECC publishes possible prices under different scenarios. Figure 1.2 presents DECC's

[17] Several energy companies announced large gas and electricity price increases taking effect in November and December 2010 (see, for instance, http://www.guardian.co.uk/business/2010/oct/29/energy-bills-rise-price-increase, http://www.scottishpower.com/PressReleases_2100.htm and http://www.bbc.co.uk/news/business-11741766). These price increases are only partially reflected in the December RPI figures because the gas and electricity prices consumers are assumed to face for the calculation of the RPI are the prices that were paid at their last meter reading. Price increases are therefore 'phased in' under the assumption that meter readings are distributed uniformly over the course of each quarter. See Office for National Statistics (1998).

central case for retail prices in the years ahead[18] and shows that prices were expected to fall over 2010 followed by a rising trend thereafter. The central scenario is that electricity prices will increase by 14.5%, and that gas prices will increase by 19.7%, in real terms between 2010 and 2015. The higher-end assumptions give an increase of 25.3% in electricity prices and 34.3% for gas prices.

[18] These projections do not include the impact of recently announced policy changes such as Feed-In Tariffs and Carbon Price Support Rates, which may further increase the costs of electricity.

2. Spending patterns

In this chapter, we examine how household spending patterns vary across the income distribution. To do this, we make use of the ONS's Living Costs and Food Survey (and its predecessors the Family Expenditure Survey and the Expenditure and Food Survey). The LCFS is an annual, cross-sectional survey of around 6,000 households per year. Participants are required to record a two-week diary of their expenditures and also answer an interview about their household characteristics, incomes and expenditures on some 'big ticket' items such as furniture, cars and holidays over a longer time period. All expenditures are converted to weekly averages.

Expenditure on domestic fuel is collected by a combination of diary records and interview questions, with the precise method depending on the method of payment. Payments made via a meter are collected in the diary and all other payments (direct debit, standing order, quarterly bill etc.) are collected through interview questions. Spending on fuel is very seasonal so households interviewed in summer will, on average, have smaller recorded payments than those interviewed in winter. However, households are interviewed randomly throughout the year and, because we look at annual data, any seasonal differences will average out.

Water charges are collected through interview questions for all households including those that pay for their water via a meter. For households living in Scotland that pay for their water through a separate council tax, the data are 'anonymised', which means that payments are averaged across local authorities in order to prevent any identification of individual households.[19]

We consider the period 2000 to 2009 (the latest year for which we have data). Throughout this Commentary, we exclude households in Northern Ireland as the energy market there is different from that in England, Scotland and Wales. All data are weighted to take account of the fact that certain types of households are systematically more or less likely to respond to the survey.[20]

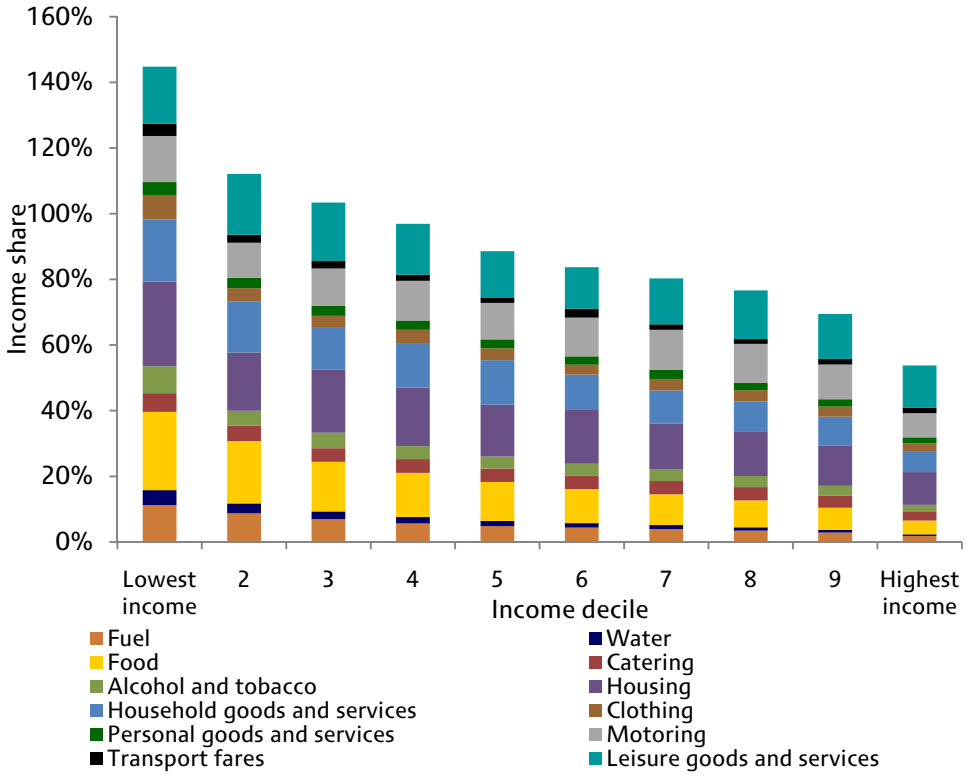
[19] Note that in the 2008 and 2009 LCFS data, there is an error in the calculation of water rates for Scotland. For these years, we match in data from Scottish Water and use information on council tax band to impute the data. Applying this imputation method to years in which there are no errors suggests that our results are robust to using this approach.

[20] See Office for National Statistics (2009) for more details.

2.1 Spending patterns and income

We start by examining how households with different incomes allocated their expenditures in 2009. To do this, we group spending into 12 different categories: food, alcohol and tobacco, water, household goods and services, personal goods and services, public transport fares, catering (i.e. takeaways and meals outside the home), housing, domestic fuel, clothing, motoring, and leisure goods and services. To see how spending on these items varies with income, we split households into 10 equally sized income groups ('deciles'), with the first decile being the poorest 10% of households by income and the tenth the richest.[21] Figure 2.1 shows household spending as a proportion of income separated into its various components in 2009.

Figure 2.1. Share of income spent on 12 categories of goods and services by income decile, 2009

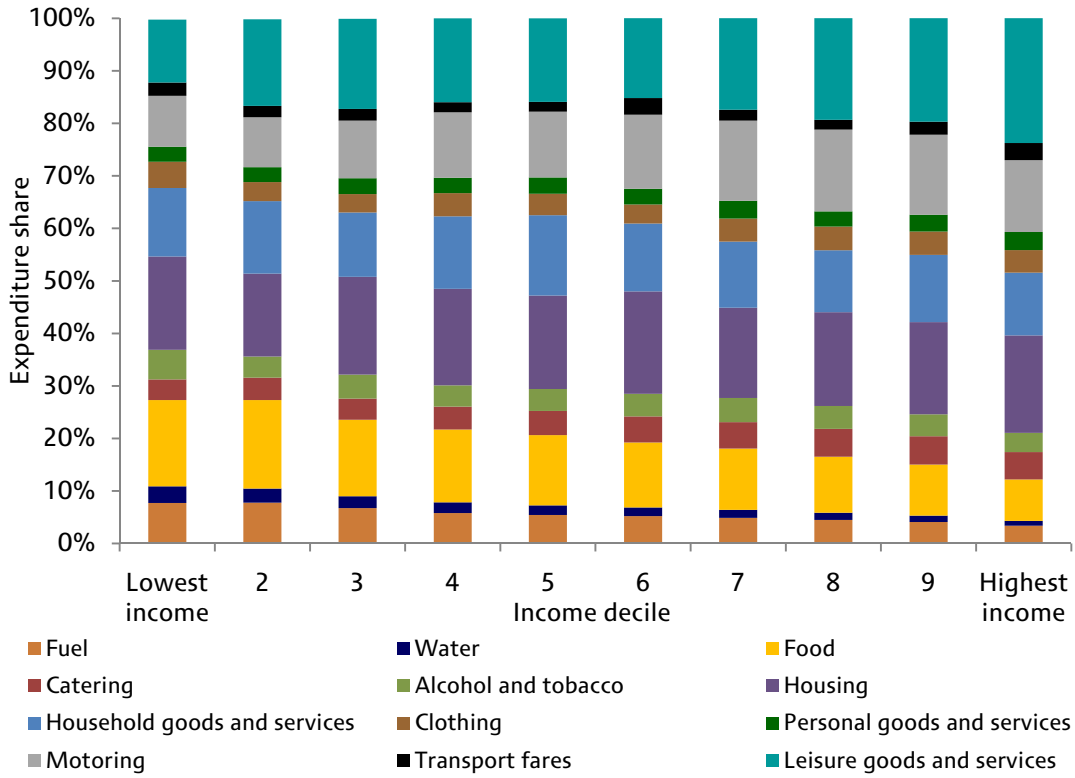


Source: Authors' calculations from Living Costs and Food Survey data.

[21] Incomes are defined after taxes and benefits at the household level. Throughout this Commentary, we equivalise both income and expenditure using the McClements equivalence scale (McClements, 1977) to take account of household composition, since households with fewer people will require a lower income or expenditure to meet a certain living standard than larger households. We drop the bottom two percentiles of the income distribution, as these are mostly households with negative or zero incomes which could be to do with misreporting of income or self-employed households experiencing temporary losses. Previous research at IFS has suggested that households in the very poorest percentiles of the income distribution probably have living standards higher than their incomes alone suggest; see, for instance, Brewer, Goodman and Leicester (2006).

The first thing to note is that total spending tends to be higher as a proportion of income for lower-income households. For instance, households in the lowest income decile spend on average over 140% of their incomes, whereas those in the highest income decile spend about 50% of their total incomes.[22] Partly for this reason, poorer households will tend to spend a higher share of their *income* on most goods than richer households, even if they might be goods we would associate with richer households. For instance, in 2009, households in the highest income decile spent a smaller proportion of their income on leisure goods and services (12.8%) than the lowest income decile (17.4%).

Figure 2.2. Share of expenditure spent on 12 categories of goods and services by income decile, 2009



Source: Authors' calculations from Living Costs and Food Survey data.

For this reason, it is more informative to look at the allocation of spending on different goods as a share of the total expenditure of different income groups, rather than as a share of income. These 'budget shares' also drive differences in inflation across groups. Figure 2.2 shows the budget allocation by income decile, again for 2009. Here, differences between

[22] Some households at the bottom of the income distribution may have temporarily low incomes (a short period of unemployment or sickness, for example), or low incomes but high wealth which allows them to finance high spending (such as some retirees). This partly explains why those in the bottom decile spend more than their income on average.

deciles are more apparent, and in particular it is clear that some goods are a more important part of the budget for lower-income households whilst others make up a bigger share of spending for higher-income households. Economists call goods for which the share of spending declines with income 'necessities' and goods for which the share of spending rises with income 'luxuries'.[23]

The results presented in Figure 2.2 suggest that food, for instance, is a necessity: those in the lowest income decile spent on average 16.4% of their budget on food, compared with 7.9% for those in the highest income decile. Fuel and water also appear to be necessities (we discuss these in more detail in Section 2.2). Leisure goods and services, on the other hand, are apparently luxuries: the budget share was 12.0% in the poorest decile compared with 23.8% in the richest. Housing is an important part of spending for which the budget share does not follow a clear pattern with income. The budget share for housing in the lowest income decile was 17.8%, while the highest income decile spent 18.6%, but the largest share for housing was spent by the sixth decile (19.5%) and the smallest was by the second decile (15.8%).[24]

Rather than looking at total income, we can look at how spending patterns vary according to the composition of income, and in particular the extent to which households are supported by benefits. We define households as 'benefit-dependent' if state benefits (including state pensions) were their most important source of income at the time they were surveyed.[25] This should not be interpreted as meaning that these households rely solely on benefits – for example, around a fifth of households in this group had their household head in work in 2009. Equally, some households who are in receipt of state benefits will not be included in the benefit-dependent group if these are not their most important source of income.

[23] The evidence presented in Figure 2.2 is not sufficient to say definitively whether a good is a luxury or a necessity, since technically we should control for other factors. To answer the question whether a particular good is a necessity, we would ideally like to know whether, if household incomes increased, we would see the average budget share devoted to that item rise or fall. So, for instance, if lower-income households spent a larger budget share on a particular item, but this was entirely the result of demographic differences between the income deciles, then this good would not be a necessity.

[24] Housing costs are measured net of Housing Benefit, Local Housing Allowance and Council Tax Benefit. This will tend to reduce the budget shares of housing for lower-income households.

[25] Benefits included in the measurement of benefit income are: pensions, tax credits, universal benefits (such as Child Benefit), disability benefits (such as Disability Living Allowance) and out-of-work benefits (such as Jobseeker's Allowance). Housing Benefit is treated as a reduction in housing costs, not as income. The other sources of income are wages/salaries, self-employment income, investment income and annuities/pensions.

If benefit-dependent households have systematically different spending patterns from other households, they will also experience different inflation rates. This is relevant when thinking about how benefits should be uprated. Table 2.1 shows the proportion of each income decile that is classed as benefit dependent. A clear correlation can be seen between income and benefit dependency, with over three-quarters of the poorest income decile having benefit income as their most important source of income. However, benefit dependency is even found further up the income distribution, with 21% of households in the fifth decile having benefits as their most important source of income.

Table 2.1. Benefit dependency and income, 2000–09

Income decile	*Proportion benefit-dependent*
1	77.0%
2	78.4%
3	58.2%
4	38.4%
5	21.1%
6	8.9%
7	3.8%
8	1.2%
9	0.4%
10	0.1%

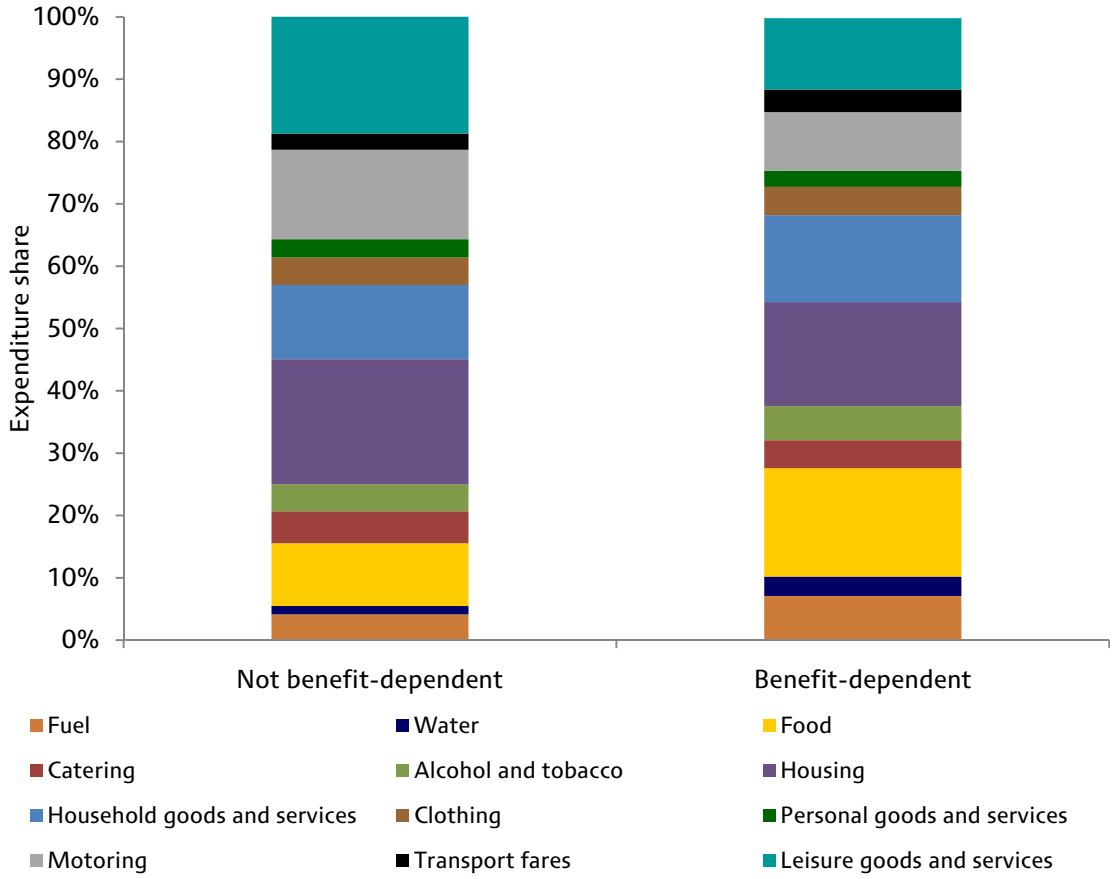
Source: Authors' calculations from Living Costs and Food Survey data.

Figure 2.3 shows expenditure shares for benefit-dependent and non-benefit-dependent households. A large proportion of pensioners[26] are classed as benefit-dependent since many of them rely on the state pension. A benefit-dependent pensioner may therefore be rather different from a benefit-dependent household of working age and so may have quite different spending patterns. For this reason, we exclude pensioner households from Figure 2.3 and look at pensioner households separately below.

In 2009, there were some clear differences between the expenditure patterns of benefit-dependent households and the rest of the population. Since those dependent on benefits have low incomes on average, they spend more of their budget on necessities such as food (17.4% for benefit-dependent households versus 10.1% for other households) and fuel (7.1%

[26] We define a household as a pensioner household if the household head is of pensionable age (which was 65 for men and 60 for women in 2009).

Figure 2.3. Shares of expenditure spent on 12 categories by benefit dependency (working-age households only), 2009



Source: Authors' calculations from Living Costs and Food Survey data.

vs 4.1%), and less on leisure (11.5% vs 18.7%). Benefit-dependent households have lower budget shares for housing (16.7% vs 20.1%).[27]

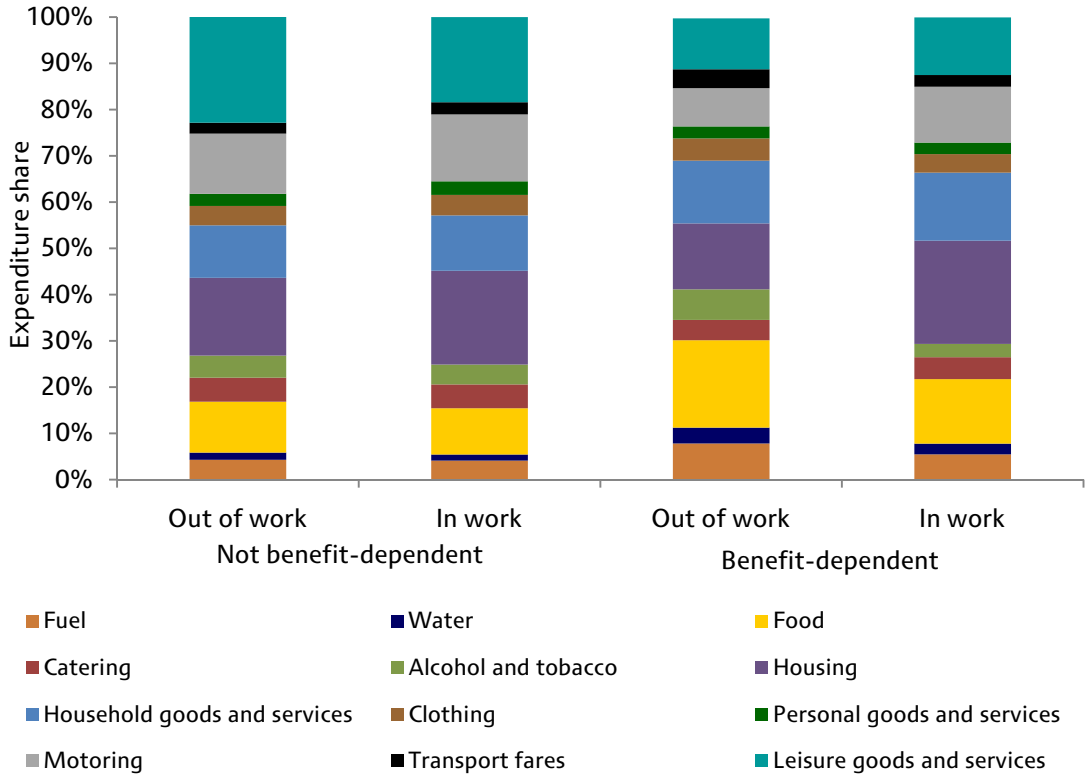
Figure 2.4 repeats this analysis, but separates benefit-dependent households and non-benefit-dependent households by their employment status (a household is defined as 'in work' if the household head[28] is employed or self-employed). Again, clear differences emerge. Among both benefit- and non-benefit-dependent households, those in work spent less on fuel and water on average than their out-of-work counterparts in 2009. Out-of-work benefit-dependent households spent 7.8% of their spending on fuel compared with 5.5% for benefit-dependent households where the head was in work. The difference is much smaller for non-benefit-

[27] This may reflect the fact that benefit-dependent households have some housing costs covered through Housing Benefit, Local Housing Allowance and other benefits (see footnote 24).

[28] We use the standard definition of head of household where the head is the person or the husband of the person who owns or is legally responsible for the household accommodation.

dependent households, with the equivalent figures being 4.3% and 4.1% respectively. There are also important differences in the budget shares for housing, likely reflecting the fact that those who are out of work are more likely to claim Housing Benefit. Among benefit-dependent households, those out of work spent only 14.2% of their spending on housing compared with 22.3% for those in work.

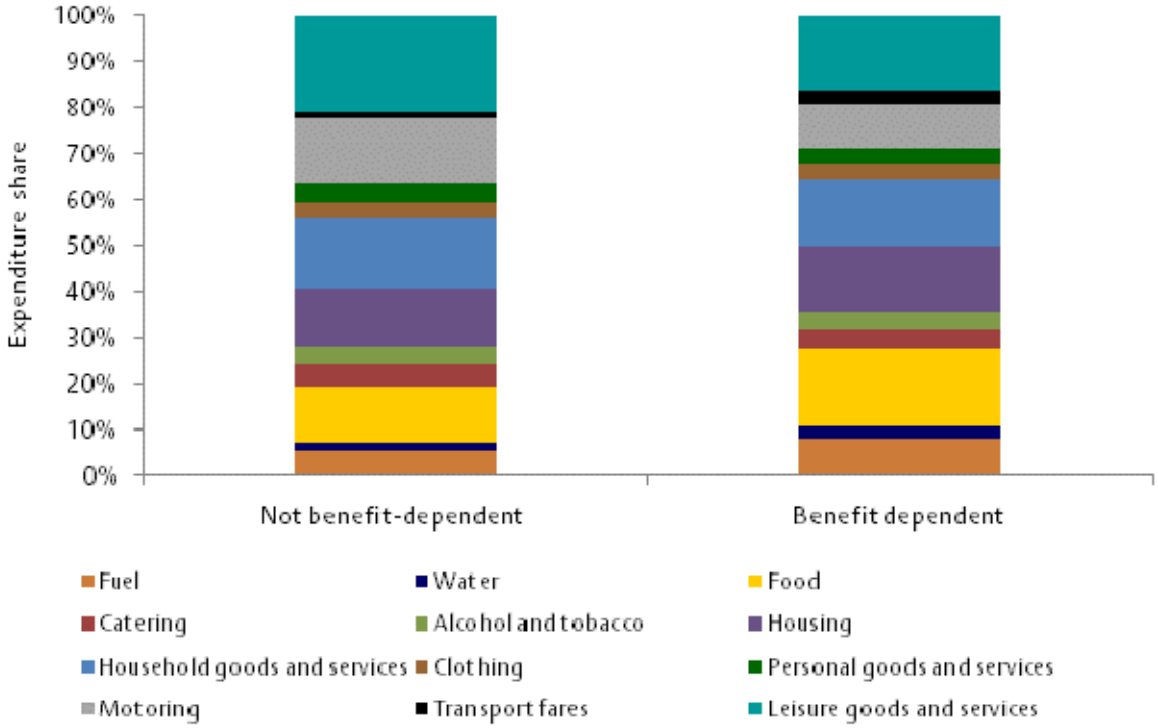
Figure 2.4. Shares of expenditure spent on 12 categories by benefit dependency and employment status (working-age households only), 2009



Source: Authors' calculations from Living Costs and Food Survey data.

Figure 2.5 shows expenditure shares for benefit-dependent and non-benefit-dependent pensioner households. As was the case for working-age households, benefit-dependent pensioners spent more as a share of their spending on food (17.1% vs 12.4%) and fuel (8.2% vs 5.7%) than non-benefit-dependent pensioners, though the relative differences are smaller than for non-pensioners. In contrast to working-age households, benefit-dependent pensioners spent more of their budget on housing than non-benefit-dependent pensioners (14.2% vs 12.8%).

Figure 2.5. Shares of expenditure spent on 12 categories by benefit dependency (pensioner households only), 2009



Source: Authors' calculations from Living Costs and Food Survey data.

2.2 Spending on fuel and water

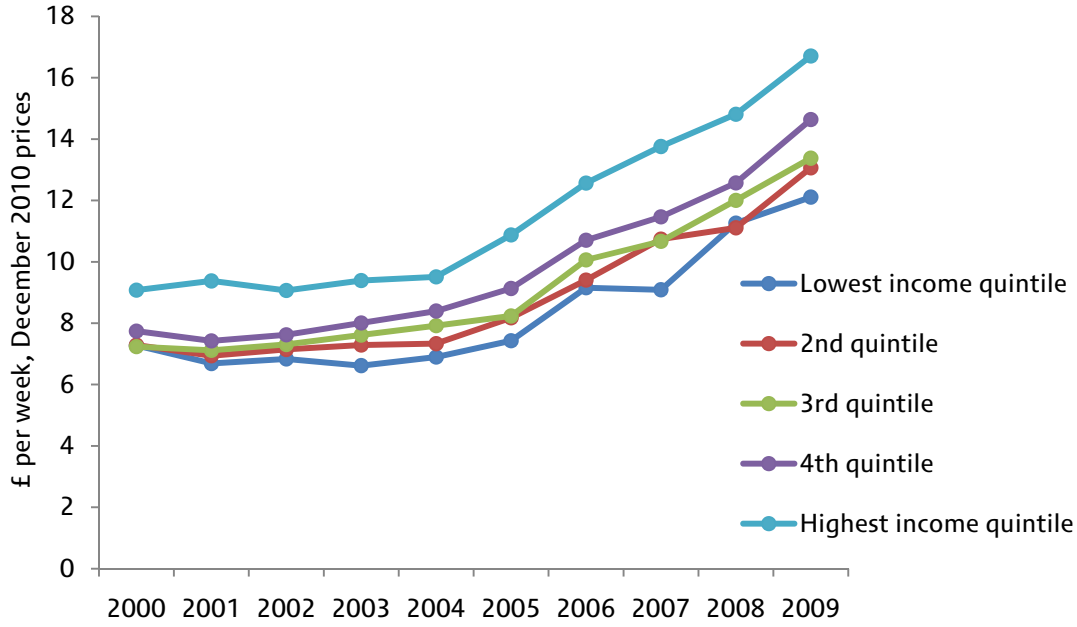
We now turn to look at how spending patterns on fuel and water differ across households and how, in the light of the price increases in domestic fuel and water, spending patterns on these goods have changed over the last decade.

We begin by looking at how the level of average weekly spending on fuel has varied over time between different income groups. To make the exposition clearer, we divide households into five income groups ('quintiles'), rather than 10 as above. Figure 2.6 shows spending on fuel over time, adjusting values to December 2010 prices using the all-items RPI.

The richest fifth of households consistently spend more on fuel than other households (even adjusting for household composition). While differences in the level of fuel expenditure across other income groups are quite small, there is still some evidence of a positive relationship between income and the level of spending. Note that differences in the level of spending are not the same as differences in energy consumption, as different consumers may pay different prices per unit of energy. Other research has shown that the relationship still holds when consumption rather than spending is

considered.[29] Of course, as we saw above, even though higher-income households spend more on fuel each week, it makes up a smaller part of the total budget for them than for lower-income households. Figure 2.6 also makes it clear that real spending on fuel has increased over time for all income groups.

Figure 2.6. Weekly level of spending on fuel by income quintile



Source: Authors' calculations from Living Costs and Food Survey data.

Figure 2.7 looks at the levels of spending on water. Strikingly, while the richest households have tended to spend slightly more than other households on water, there is very little variation in the level of spending across different income quintiles. As with fuel, real expenditure has risen over the period.[30]

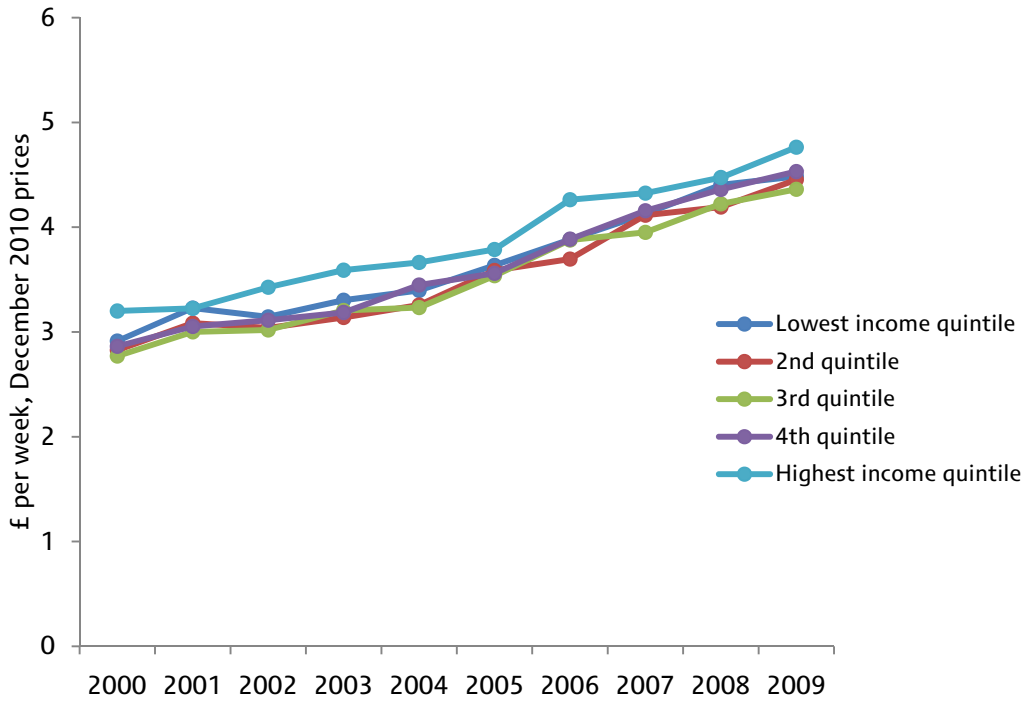
The rises in real spending on fuel and water over time could be explained by a number of factors, including rising incomes (which may have led to increases in expenditure on all goods) and rising prices. It is therefore interesting to look at spending on fuel relative to spending on other goods. Figure 2.8 shows the share of spending devoted to fuel by income quintile over the same period. As in Figure 2.2, lower-income households tend to devote a greater share of their spending to fuel than higher-income

[29] See White, Roberts and Preston (2010).

[30] Water charges for unmetered households are linked to their homes' 'rateable values'. These were last updated in 1990 and are imperfectly correlated with household income, which may explain the lack of variation in the level of water spending between different income groups. (See http://www.ofwat.gov.uk/consumerissues/chargesbills/householdcharges/unmetered/rv for an explanation of rateable values.)

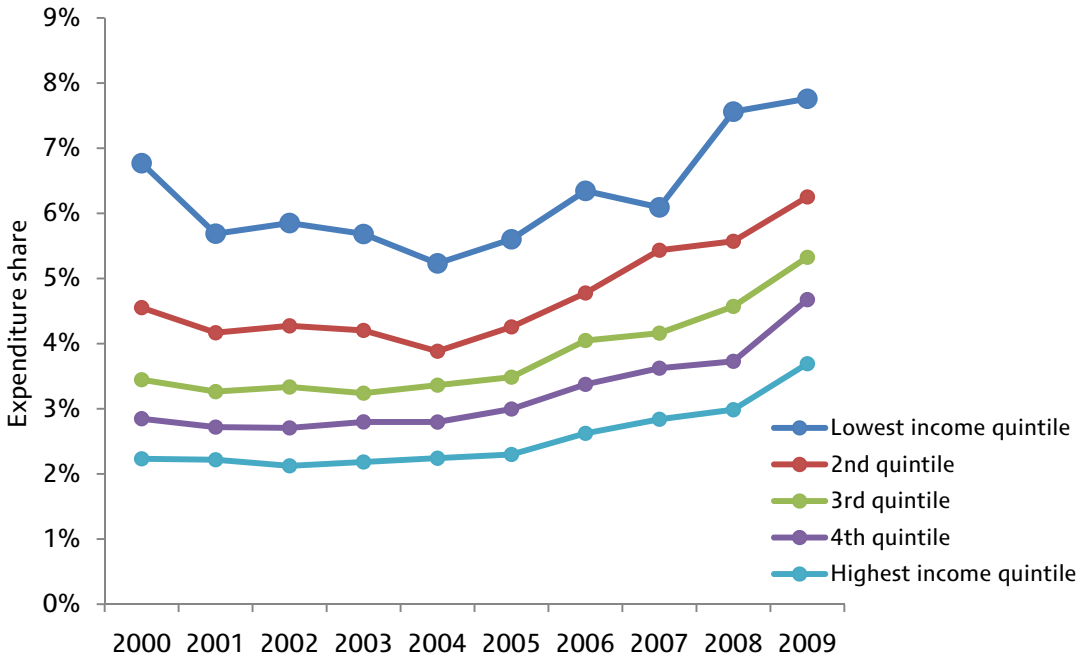
households. In 2009, the poorest 20% of the population spent 7.8% of their budget on domestic fuel compared with 3.7% for the richest 20%. This pattern is consistent across time.

Figure 2.7. Weekly level of spending on water by income quintile



Source: Authors' calculations from Living Costs and Food Survey data.

Figure 2.8. Share of spending on fuel by income quintile

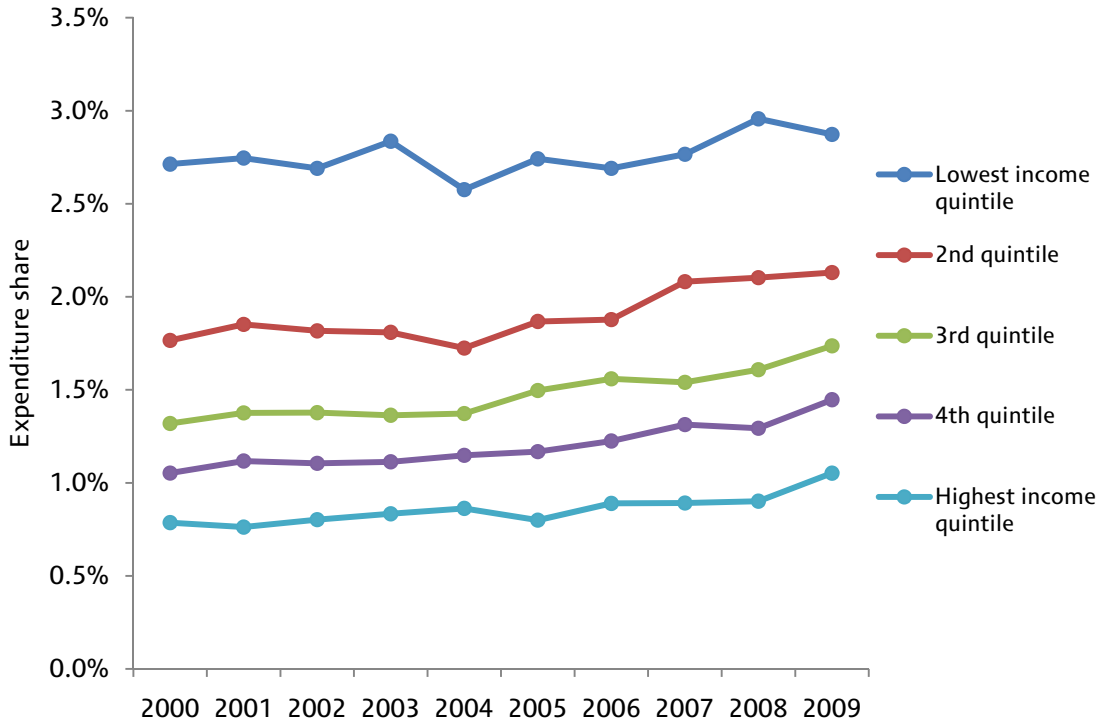


Source: Authors' calculations from Living Costs and Food Survey data.

The share of spending on fuel has increased for all households, implying that spending on fuel has risen faster than spending on other goods. The trends in the fuel budget share are similar for most groups over most of the period, though in 2008 there is a noticeable increase in the fuel share of spending for the bottom quintile relative to other households. This may be related to the large fuel price rises in 2008 (see Figure 1.1). However, it is interesting that a similar phenomenon was not observed in 2006, when there were also rapid increases in fuel prices, but which appeared to increase the fuel budget share for all income groups in a similar way. It is also noticeable that the fall in fuel price levels in 2007 was not associated with any obvious reduction in the average fuel budget share.

Figure 2.9 repeats this analysis for the water budget share. We see a similar pattern. Lower-income households spend a greater proportion of their expenditure on water in all years.

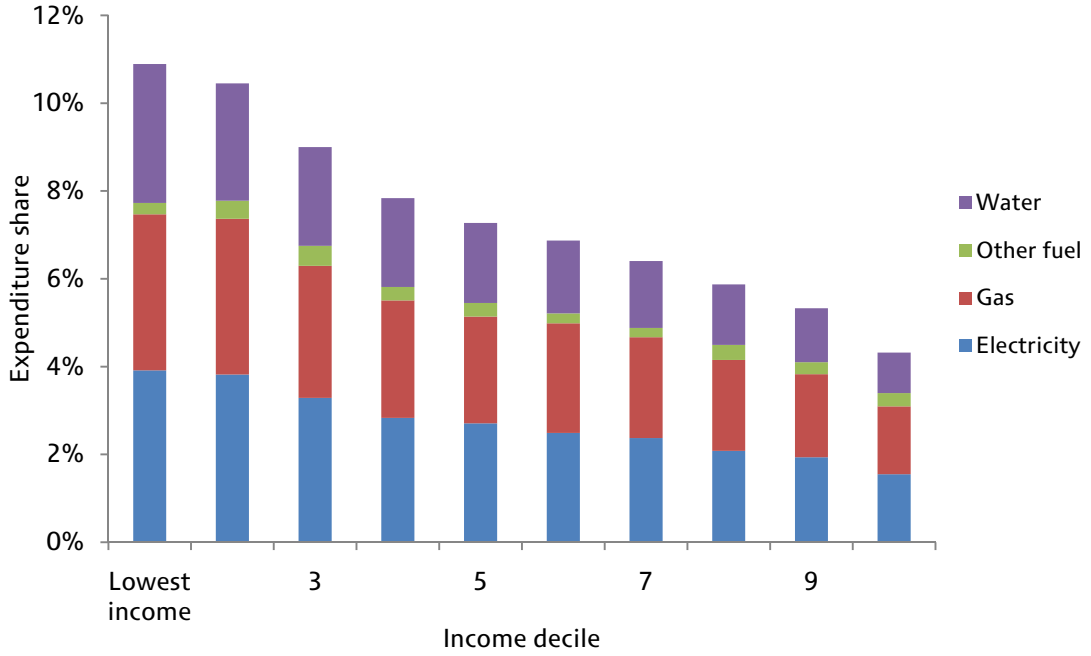
Figure 2.9. Share of spending on water by income quintile



Source: Authors' calculations from Living Costs and Food Survey data.

Lower-income households spend more on fuel and water than other households as a share of their total expenditure. To examine the cross-sectional differences between income groups in greater detail, Figure 2.10 breaks down these figures for 2009, looking separately at the expenditure shares of electricity, gas, other fuels (such as heating oil) and water by income decile.

Figure 2.10. Detailed fuel and water spending shares, 2009



Source: Authors' calculations from Living Costs and Food Survey data.

On average, lower-income households devote larger proportions of their total expenditure to electricity, gas and water than higher-income households. Overall, the bottom decile spent 7.7% of their budget on fuel, while the top decile spent 3.4%. Decomposing spending on fuel into its various components, we see that electricity accounts for 3.9% of the expenditure of the poorest income decile, falling steadily to 1.5% for the richest decile. The proportions for gas are similar (3.6% for the poorest, 1.5% for the richest). The differences for water are even more pronounced. The poorest decile spent about 3.2% of their budget on water, while the richest decile spent around 0.9%. This is, of course, consistent with the fact that the level of absolute spending on water does not vary much with income.

2.3 Factors associated with differences in spending of benefit-dependent and non-benefit-dependent households

We have seen that lower-income households and benefit-dependent households tend to spend a greater share of their spending on fuel and water than other households. Here we look at the differences between benefit-dependent and other households in detail to try to understand why these different spending patterns emerge.

There are a variety of reasons why benefit-dependent households might spend more of their budget on fuel and water:

- Benefit-dependent households have lower incomes than other households, so we would expect them to spend a greater proportion of their incomes on 'necessities', including fuel and water, than other households.

- Benefit-dependent households have different demographic characteristics from other households. In 2009, for instance, 61% were pensioners compared with 14% of non-benefit dependent households. Amongst working-age households, those dependent on benefits had more children on average (1.01 compared with 0.66 for non-benefit-dependent households in 2009). Benefit-dependent households are also more likely to be out of work: in 2009, only 22% of working-age household heads were in work compared with 91% of non-benefit-dependent working-age households. These demographic differences may account for some of the variation in spending patterns: for example, people out of work (pensioners and the unemployed) might spend longer in their homes and so (other things being equal) this would work to increase the amount of energy they use.

- Benefit-dependent households are much more likely to rent than other households. In 2009, 51% of benefit-dependent households rented their homes compared with just 21% of other households.[31] Depending on how water bills are paid, there may be less incentive for renters to conserve water. Housing tenure status is also known to be correlated with the energy efficiency of properties (Brechling and Smith, 1994). However, this effect could go in either direction. According to the most recent English Housing Survey (Department for Communities and Local Government, 2011), those in the social rented sector were the most likely of all tenure groups to have energy-efficiency improvements installed (such as double glazing and cavity wall insulation), while those in the private rented sector were the least likely.

Clearly, these different factors may be correlated with each other: people who are out of work also have lower incomes, for example. One way of disentangling the impact of the various effects is to use a multivariate regression, which allows us to control for a number of different factors at once. We regress the share of household spending on fuel and water over the period 2000–09 on (log) household income, the month of interview (to control for seasonal effects), the year of interview, region, age group (based on four broad bands, including 'of pensionable age'), employment status, education, sex, tenure, the number of rooms in the home, family type, the number of adults and the number of children.

[31] Of these, 73% of benefit-dependent renters were in local authority accommodation compared with 36% of non-benefit-dependent renters.

To see whether these variables have any differential effect on the share of fuel spending for benefit-dependent households, we 'interact' these variables (except income, month, year, region and sex) with a dummy variable that takes the value 1 if the household is benefit-dependent and 0 otherwise. A statistically significant interaction term means that the relationship between that particular characteristic and the share of spending on fuel and water is different for benefit-dependent and non-benefit-dependent households. A statistically significant main effect for a particular characteristic means that there are differences in the budget shares of fuel and water between non-benefit-dependent households with and without that characteristic. In order to see whether there are differences between benefit-dependent households with and without a particular characteristic, it is necessary to consider both the main and interaction effects and conduct a joint significance test on the sum of the coefficients. The results of the regression are reported in Appendix A.

Even after controlling for all these factors, dependence on benefits seems to directly increase the share of spending on fuel and water. Benefit-dependent households are estimated to have spent 3.1 percentage points more of their budget on fuel and water than other households, which is statistically significantly different from zero. This implies that the other factors we control for in the regression are not able to fully account for the differences between these two groups of households.

The regression results also shed light on the role of the other possible contributory factors we presented above. The results suggest that, all else equal, an increase in household incomes of 10% is associated with a 0.23 percentage point reduction in the share of spending spent on fuel and water. This confirms that fuel and water are indeed necessities and that this relationship is not just driven by other differences between poorer and richer households.

Age is also correlated with spending on fuel and water. The regression results suggest that the effect of age on spending is (significantly) different for benefit- and non-benefit-dependent households except for those aged 35–45. The share of spending on fuel and water by non-benefit-dependent households strictly increases with age, with pensioners spending on average 2.3 percentage points more on fuel and water than those aged under 35. The same is true for benefit-dependent households, though joint significance tests cannot reject the hypothesis that those aged 35–45 spend no more on fuel and water than those aged under 35. There are statistically significant differences between benefit-dependent pensioners and benefit-dependent households in all other age groups. Benefit-dependent pensioners spend on average 1.4% more than benefit-dependent households aged under 35.

Employment status also seems to be correlated with the share spent on fuel and water. Joint significance tests indicate that, all else equal, benefit-dependent households with a working head spend less on fuel and water as a share of their spending than benefit-dependent households where the head is unemployed. The regression coefficients suggest that this effect is quite large, at around 2.2 percentage points. This 'employment effect' is much smaller for non-benefit-dependent households, for whom the difference is not statistically significant.

There is evidence that spending on fuel and water varies between couples and single households for non-benefit-dependent households, with couples spending 0.2 percentage points less than single households. The equivalent difference for benefit-dependent households is around 1 percentage point. We control for both the number of adults and the number of children separately. The number of children seems to have only a small impact. Joint significance tests suggest that benefit-dependent households spend on average slightly less of their total spending on fuel and water for each additional child, all else equal. The results also show that non-benefit-dependent households spend an extra 0.1 percentage points of their budget on fuel and water per child. Each additional adult is associated with a reduction of 0.2 percentage points in the budget share of fuel for non-benefit-dependent households and 0.3 percentage points for benefit-dependent households. This reflects the fact that (other things being equal) heating a house for one person costs the same as heating a house for two or more people. The effect of the number of adults on the share of spending is (significantly) different for benefit-dependent and non-benefit-dependent households.

There is mixed evidence that those in rented accommodation spend more on fuel and water as a share of their budget than those who own their homes. The results suggest that benefit-dependent households in rented accommodation spend 1.0 percentage points more than those who own their homes (with joint significance tests showing that this is significant). However, non-benefit-dependent households who rent spend 0.4 percentage points less on fuel – a result that is statistically significant. Unsurprisingly, an increase in the number of rooms in a household increases spending on fuel and water. The regression coefficients suggest that for benefit-dependent households, each additional room raises the budget share of fuel and water by 0.6 percentage points. The equivalent figure for non-benefit-dependent households is 0.3 percentage points.

2.4 Summary

There are clear differences in spending patterns between higher- and lower-income households. Lower-income households tend to devote a

greater share of their spending to fuel and water than higher-income households. We find that differences in income, employment status, age and tenure could help to explain variation between benefit-dependent and non-benefit-dependent households in the share of spending they devote to fuel and water. They are not, however, able to account for all of the differences between these two groups.

3. Inflation rates

The previous chapter showed substantial differences in spending patterns across households based on their income or reliance on benefits. These differences in spending patterns, combined with the fact that prices of different goods and services increase at different rates, mean that individual households experience inflation rates that may or may not be close to the headline rate. In this chapter, we calculate household-specific inflation rates (based on the RPI inflation measure) and analyse how they vary by household type.

3.1 Methodology

As in Chapter 2, we use expenditure data from the UK Living Costs and Food Survey. Expenditures in the LCFS are calculated as weekly averages and reported for each household in several hundred expenditure codes. These expenditure codes are aggregated into 71 groups, or 'sections', that match those used in calculating the RPI. For each household, we work out the share of its total budget spent on each section and use these expenditure weights to generate a household-specific inflation rate using published RPI inflation data for each section.[32]

Defining w_{hm}^s as the budget share of household h observed in month m on RPI section s, and p_m^s as the year-on-year RPI inflation rate for section s in month m, our household inflation measure is then

$$\pi_{hm} = \sum_s w_{hm}^s \, p_m^s$$

where $w_{hm}^s = x_h^s / \sum_s x_h^s$ and x_h^s is weekly household spending on section s for household h.

[32] Our list of sections differs slightly from those used currently to calculate the RPI, as we have in some cases aggregated sections that have changed over time in order to generate a consistent series of inflation measures over a long time period. For most sections, measuring total expenditures is relatively straightforward: all codes relating to bread purchases are added to give the 'bread' section, spending on all shoes and related items adds up to the 'footwear' section and so on. One less straightforward case is housing-related expenditures. We define housing expenditures to match the way they are calculated in the RPI as closely as possible. Rent and local taxes are recorded net of any rebates or status discounts (thus households receiving full Housing Benefit and Council Tax Benefit, for example, will be recorded as having zero expenditure on these items). From the perspective of measuring inflation, this is important – households on full Council Tax Benefit will be shielded from any rise in the tax rate and so their personal inflation rate will be unaffected. For those with mortgages, only mortgage interest costs are included as spending, with mortgage principal repayments considered as a form of saving or investment rather than expenditure – this again matches the approach in the RPI.

Note that our approach assumes that households' inflation rates vary only because of differences in their expenditure patterns. We are limited by the nature of the data to assuming that all households face the same inflation rate, p, for each section (e.g. bread) but devote a different share of their spending, w_h, to it. In practice, households will also face different inflation rates not only because they have different basket weights but also because the particular inflation rate they face for each expenditure category is different. For example, within bread, some households will buy wholemeal bread and others will buy white bread, and the inflation rate may be different across different bread types. However, the data are limited to variations in spending patterns across sections and do not cover variations in prices faced.[33]

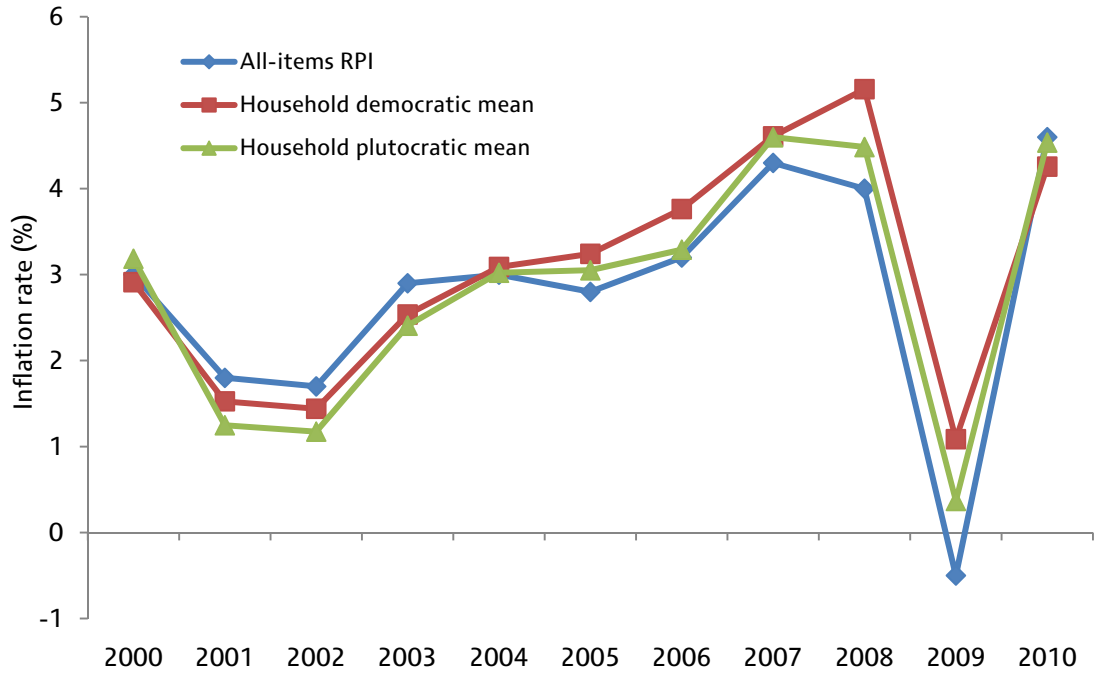
RPI inflation rates for each expenditure section are recorded each month, and we apply the relevant month's inflation rates to each household in our LCFS data depending on the month in which they are observed. So, for example, a household observed in the LCFS data in March 2009 will have an inflation rate based on RPI inflation between March 2008 and March 2009. However, our expenditure data only cover the period up to the end of 2009. We therefore use all of the households observed in 2009 and assume their expenditure patterns remain unchanged into 2010 in order to look at inflation rates for the very recent past – that is, we ignore possible substitution between spending groups based on relative price changes since 2009. This is the best we can do without making arbitrary assumptions about how individual households' expenditure patterns will have changed in the interim. Note, however, that our focus is on differences in inflation rates across demographic groups, which means that the problem of substitution really matters only to the extent that different groups will have responded to relative price changes in different ways.

Once we have calculated household-level inflation rates, we can take an average to obtain an overall inflation rate for a particular demographic group. There are two possible ways of calculating these averages. We could take an unweighted average of household inflation rates (a 'democratic' average) or, alternatively, we could weight households by their share of total group expenditure (a 'plutocratic' average). The RPI is, effectively, a plutocratic average of household-level inflation rates: households that spend more have a greater influence on the economy-

[33] This may be a particularly important issue when considering fuel prices as pricing structures may mean that poorer households spend more per unit of energy than other households (see National Consumer Council (2004)). Here we are considering changes in prices, and so this is only relevant to the extent that prices faced by poorer households have risen faster than prices faced by other households in recent years.

wide average weights used to calculate the headline RPI figure. Figure 3.1 shows how our overall inflation measures, using either a democratic or a plutocratic average, compare to the 'average' inflation rate given by the RPI from 2000 to 2010.

Figure 3.1. Comparison of average household inflation and RPI inflation



Source: Authors' calculations from Living Costs and Food Survey data.

Note that there is no reason to expect our average inflation rate to match the 'average' RPI inflation rate as calculated by the ONS in any given month or year. There are, in particular, three primary reasons for this:

- First, our household sample includes households excluded from the ONS definition of inflation, such as those in the top 4% of incomes and pensioner households that derive at least three-quarters of their income from state benefits.

- Second, the ONS inflation basket has included as part of the housing category a section called 'depreciation' since 1995. This is supposed to reflect the expenditure costs needed to maintain the housing stock at a constant quality, which, coupled with mortgage costs, may give a better measure of the consumption of housing for owner-occupiers than mortgage payments alone. However, we have no way of replicating this section in our data. In 2010, this accounted for 5.5% of the RPI basket.

- Finally, it is known that expenditure surveys such as the LCFS tend to underestimate expenditures on items such as alcohol and tobacco: the RPI figures use other data to supplement the LCFS figures (such as

retailer sales data and HM Revenue and Customs data) when working out the appropriate basket weights for these items.[34] We rely on the survey data for these items.

Unsurprisingly, therefore, there are differences between both of our averages and the RPI. Since 2005, household-level average inflation rates have tended to be higher than the headline RPI rate (though from 2001 to 2003, household average rates were lower). In 2000, 2004 and 2010, the household averages were very similar to the headline RPI.

The plutocratic average household-level inflation rate tends to track the RPI more closely than the democratic average (as we would expect given that the RPI is itself a plutocratic average). For our purposes, however, it is not clear that we would want to weight the inflation of the rich more heavily when looking at averages. We therefore employ democratic averages for groups and subgroups for the remainder of this Commentary.

3.2 Household-level inflation rates

In this section, we analyse how inflation rates have varied according to different household characteristics. As in Chapter 2, we focus on differences by income group and according to whether or not households are dependent on benefits. In Section 3.2.3, we look at more detailed breakdowns of average inflation within income groups. To do this, we take the richest and poorest 20% of households by income and examine average inflation rates *within* those groups by age, family type and housing tenure.

3.2.1 Household inflation by income

Figure 3.2 shows average annual inflation rates for households by income decile over the whole period 2000–10.[35] Excluding the bottom decile, the average inflation rate experienced by households typically declined with income (though the differences were quite small in the upper half of the income distribution). Average inflation over the period was 3.5% for households in the second income decile compared with 2.9% for households in the richest income decile. Households in the lowest income decile experienced an average inflation rate over the period of 3.3%.[36]

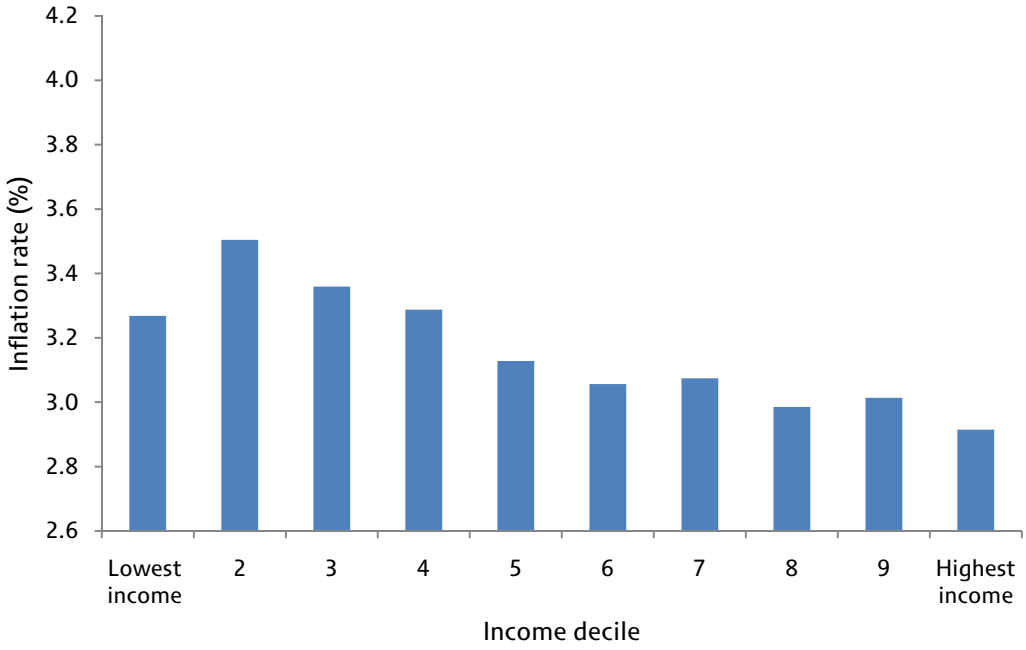
[34] See section 6.6.1 of Office for National Statistics (2010).

[35] In this figure and all similar figures, the vertical axis starts at 2.6% and ends at 4.2%. This is to make patterns across groups clearer and to make comparisons across figures easier.

[36] The lower inflation rate for the bottom decile is at least partly explained by the fact that these households are much more likely to rent their homes and much less likely to own their homes outright than those in the second decile (18% of households in the lowest income decile

Whilst these differences may seem small, over time the differences become rather larger. For example, a household with an average inflation rate of 2.9% per year for 10 years would face prices that were 33% higher by the end of the period, whereas a household with an inflation rate of 3.5% per year would face prices that were 41% higher.

Figure 3.2. Average annual inflation rates by income decile, 2000–10



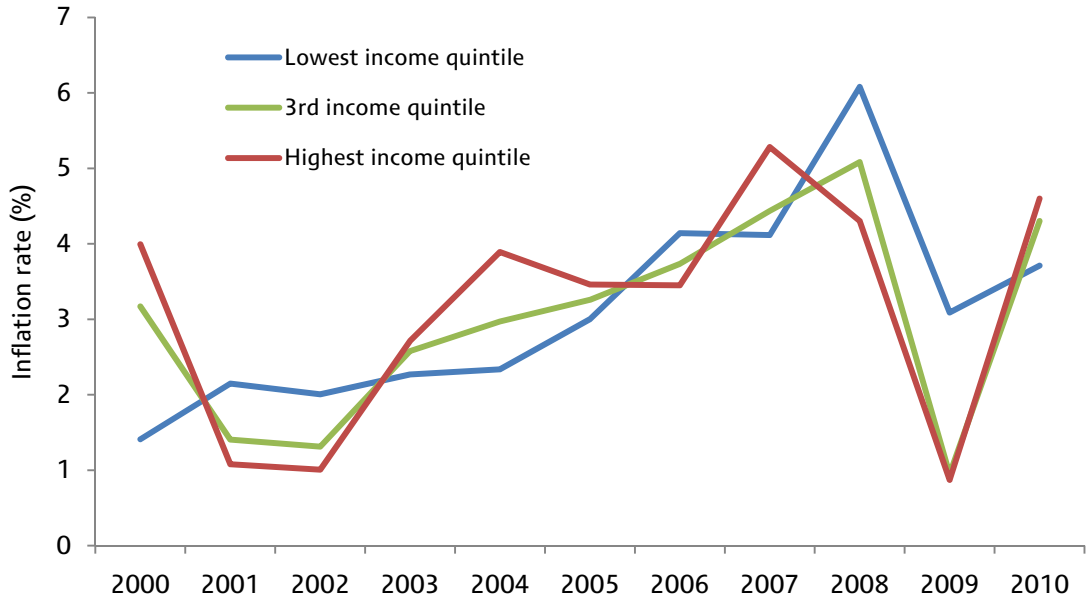
Source: Authors' calculations from Living Costs and Food Survey data.

These figures are averages over an 11-year period, but from year to year there has been some variation as to which income groups faced higher average inflation rates. Figure 3.3 plots annual inflation rates for the first, third and fifth income quintiles over time. No single income group persistently experienced higher inflation than the others. There was a particularly large difference between the highest and lowest income quintiles in a number of years. Most noticeably was in 2009, when on average inflation rates were less than 1% for those in the third and fifth quintiles, compared to 3.1% for those in the lowest income quintile. Differences across income groups were also relatively large in 2000, 2004 and 2008, though in both 2000 and 2004 it was the richer households who

owned their homes without a mortgage compared with 34% in the second income decile). As we explain below, those who owned their homes experienced higher inflation rates than other groups, because this group did not benefit from the steep declines in interest rates seen in some years (see Section 3.3). The lower inflation rate in the bottom income decile is also likely to be partly explained by the finding that those in the poorest percentiles of the income distribution probably have higher living standards than their incomes alone suggest, as found in Brewer, Goodman and Leicester (2006).

faced the higher average inflation rates. We consider the factors driving these differences in Section 3.3 below.

Figure 3.3. Inflation rates for three income quintiles



Source: Authors' calculations from Living Costs and Food Survey data.

3.2.2 Inflation rates by benefit dependency

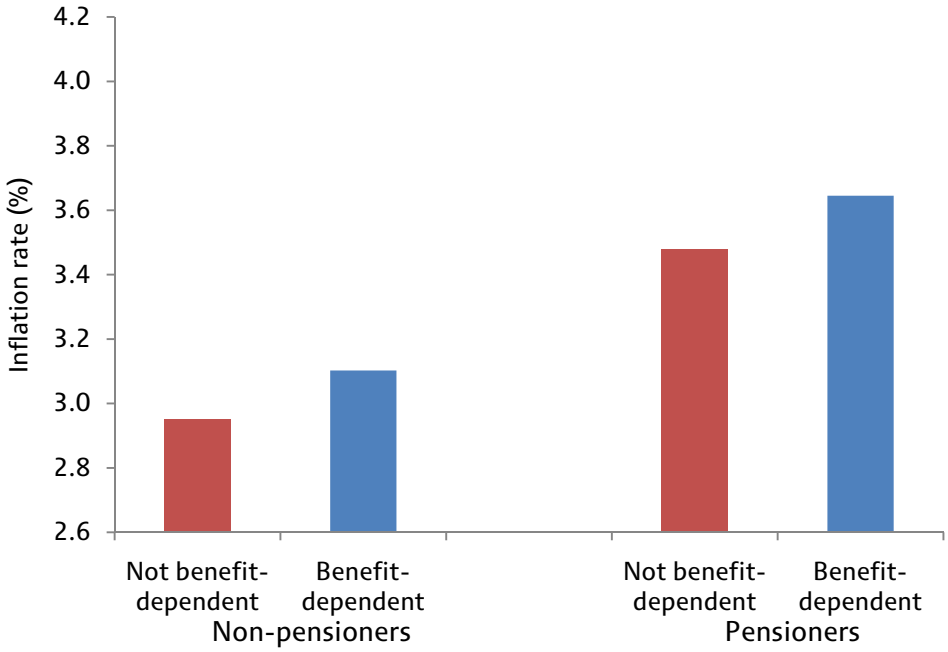
In Section 2.1, we examined how spending patterns differed between benefit-dependent and non-benefit-dependent households. Here we look at how these have fed through into the average inflation rates faced by these groups over the last decade. Whether or not the headline rate of inflation is representative for households who are benefit-dependent is particularly relevant, since the largest component of income for these households (benefit income) is uprated in line with the headline measure.

Figure 3.4 shows average annual inflation rates for benefit- and non-benefit-dependent households over the whole period. We split the sample into pensioner and non-pensioner households. In each case, those who were benefit-dependent experienced slightly higher inflation rates on average than those who were not benefit-dependent. Pensioner households, whether benefit-dependent or not, also experienced higher average inflation rates than non-pensioner households over this period.

Figure 3.5 explores these results over time, focusing on non-pensioner households. Once again, whilst benefit-dependent households experienced a higher inflation rate over the period as a whole, this was not true for all individual years. The differences between the two groups were

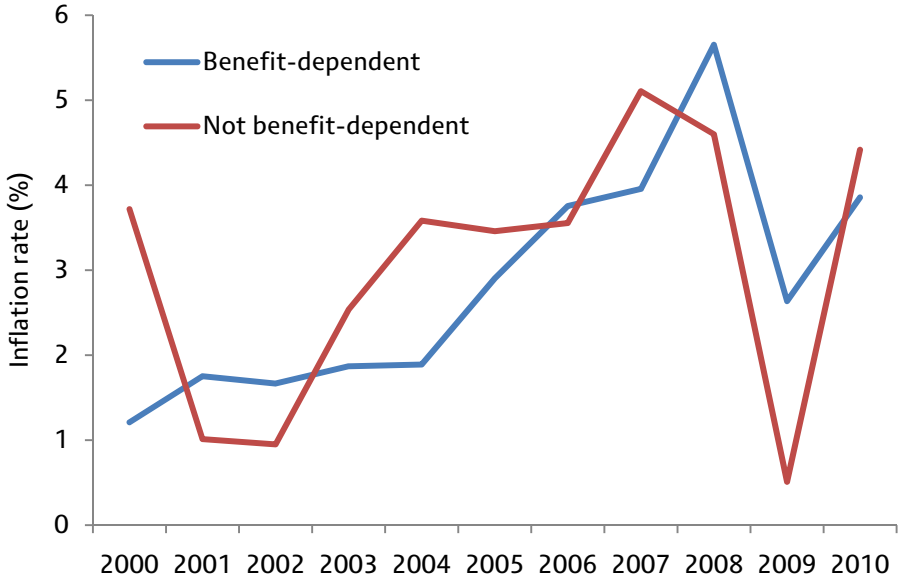
particularly large in 2009 (when benefit-dependent households had an average inflation rate of 2.6% compared with 0.5% for non-benefit-dependent households). In both 2000 and 2004, average inflation rates were much higher for non-benefit-dependent households: in 2004, benefit-

Figure 3.4. Average annual inflation rates by benefit dependency, 2000–10



Source: Authors' calculations from Living Costs and Food Survey data.

Figure 3.5. Inflation rates for working-age benefit-dependent and non-benefit-dependent households



Source: Authors' calculations from Living Costs and Food Survey data.

dependent households had an average inflation rate 1.7 percentage points lower than non-benefit-dependent households.

3.2.3 Inflation rates within income groups

While there is considerable variation in inflation rates across income groups, there may well be substantial differences in the inflation rates facing households *within* a given income group, related to factors such as age, family type and housing tenure. In this section, we examine each of these in turn. These various factors will be correlated with each other and with other factors which we do not consider here, so any differences should not be interpreted as causal.

Inflation rates by age and income

Having observed that pensioner households tend to experience higher inflation rates than non-pensioner households, we now consider in more detail the relationship between inflation rates and age within income groups. Figure 3.6 shows average household-level inflation rates over the period 2000–10 for different age groups in the top and bottom quintiles of the income distribution. Households are categorised by age on the basis of the age of the household head, with the oldest age group being of state pension age (SPA) or above.[37]

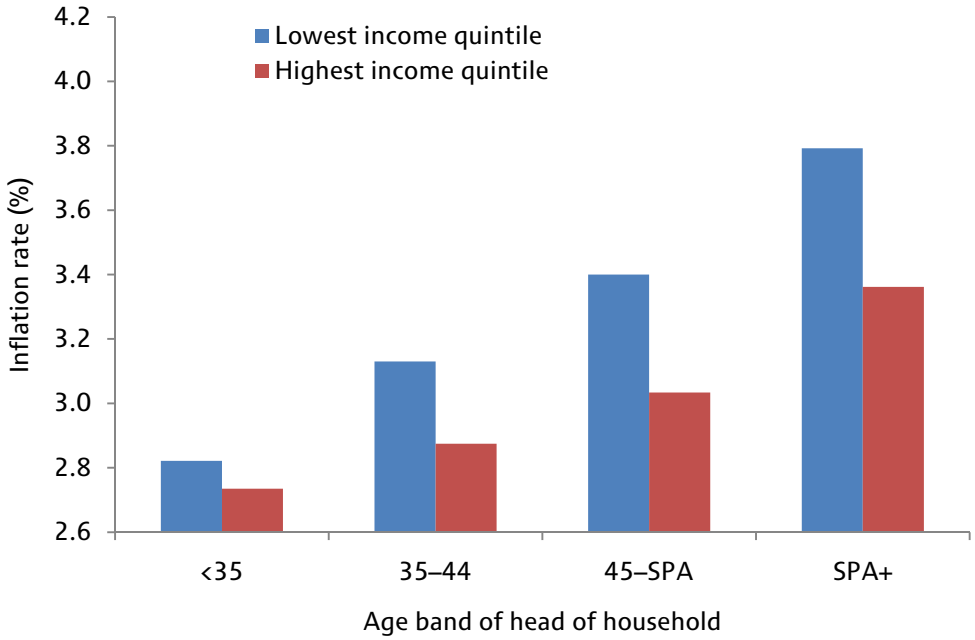
Within both income groups, older households have experienced higher inflation rates on average than younger households – and the inflation rates experienced strictly increase with age.

The lowest income quintile experienced a greater average inflation rate than the highest income quintile within every age group. The gap between average inflation for rich and poor appears to widen with age, reaching just over 0.4 percentage points for those over SPA.

We see a similar picture when we consider benefit-dependent households and non-benefit-dependent households in Figure 3.7. For both groups, average inflation rates over the period appear to increase with age. Benefit-dependent households with household heads in the youngest age group experienced an inflation rate of 2.8% compared with an inflation rate of 3.7% for those in the oldest age group. For non-benefit-dependent households, the respective figures are 2.8% and 3.5%.

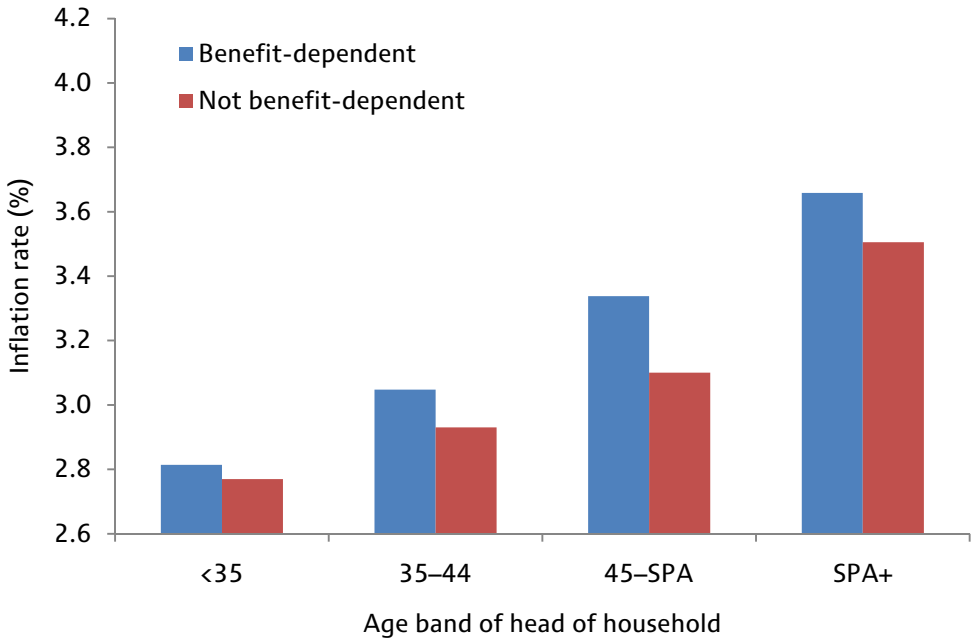
[37] Note that Figures 3.6 and 3.7 refer to those in these age bands in each year of sampling. They do not show whether or not a particular cohort – for instance, those aged 35 and over in 2010 – has experienced higher inflation rates than others over the last 10 years.

Figure 3.6. Average annual inflation rates by age and income quintile, 2000–10



Source: Authors' calculations from Living Costs and Food Survey data.

Figure 3.7. Average annual inflation rates by age and benefit dependency, 2000–10



Source: Authors' calculations from Living Costs and Food Survey data.

There are, however, some noticeable differences when comparing Figure 3.7 with Figure 3.6. For all age groups, benefit-dependent households had higher average inflation rates, though the differences are not as large as when we considered income quintiles. A further contrast with Figure 3.6 is that the differences between benefit-dependent and non-benefit-dependent households do not increase in the same way with age. The largest difference was for households where the head was aged 45 to SPA, where benefit-dependent households had an average inflation rate of 3.3%, 0.24 percentage points higher than that of non-benefit-dependent households. The difference for households where the head was over 65 was just 0.15 percentage points.

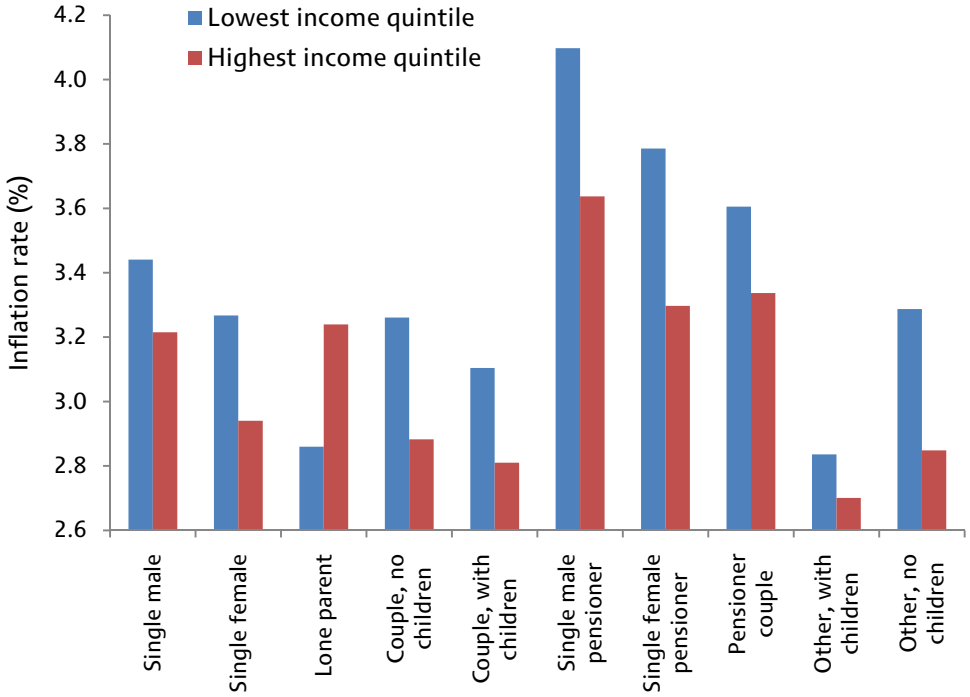
Inflation rates by family type and income

Figure 3.8 shows average inflation rates within the top and bottom income quintiles for different family types. The lowest quintile experienced higher inflation rates than the highest income quintile across all family types except lone parents.[38] Within both income groups, pensioners experienced higher inflation rates than non-pensioners (as we saw in Figure 3.6), with single male pensioners experiencing the highest inflation rates of all family types for both income quintiles (4.1% for the lowest quintile and 3.6% for the highest). Among working-age households, single males experienced the highest average inflation rate within the lowest income quintile (3.4%), while lone parents experienced the highest inflation rate within the highest income quintile (3.2%). Lone parents in the lowest income quintile experienced quite a low average rate of inflation over the period, at 2.9%. This is likely driven by the fact that lone parents in the bottom quintile are very unlikely to be owner-occupiers (only 3% owned their homes outright) and, as we see below (Figure 3.10), outright owners tended to experience the highest rates of inflation.

Figure 3.9 repeats this analysis for benefit-dependent and non-benefit-dependent households. We see the same patterns that are exhibited in Figure 3.8: single male pensioners experience the highest average inflation rate amongst both groups (3.9% in each case); and for a given family type, benefit-dependent households have higher inflation rates than non-benefit-dependent households, other than for lone parents. However, the differences for a given family type are often smaller when we compare benefit-dependent and non-dependent households than when we compare high and low incomes.

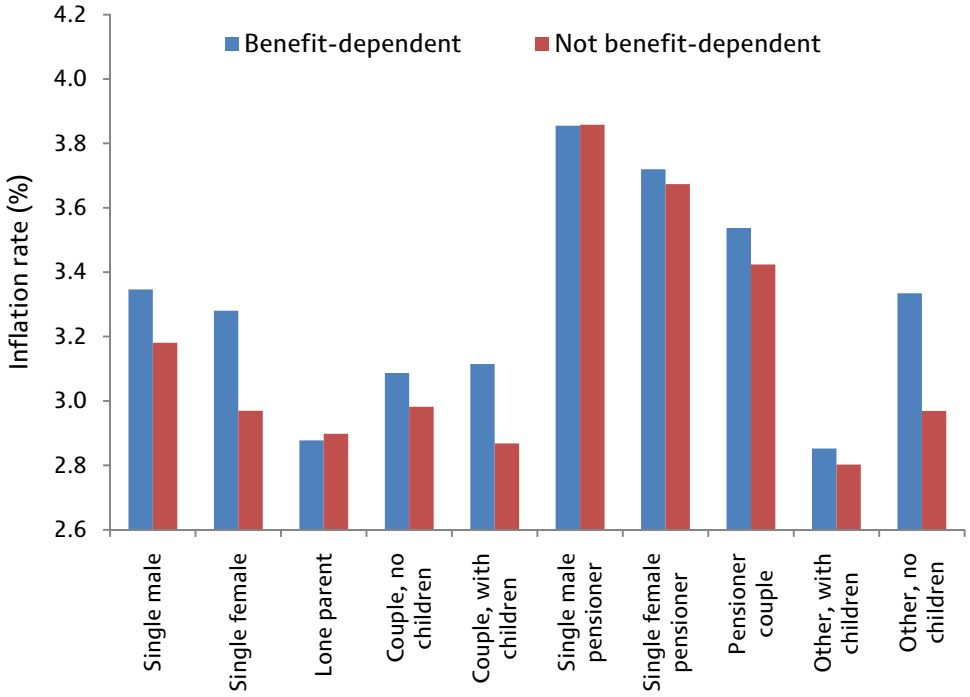
[38] Note that because we are looking at data over a 10-year period, the sample size for lone parents in the richest income group is sufficiently large to carry out this analysis.

Figure 3.8. Average annual inflation rates by family type and income quintile, 2000–10



Source: Authors' calculations from Living Costs and Food Survey data.

Figure 3.9. Average annual inflation rates by family type and benefit dependency, 2000–10



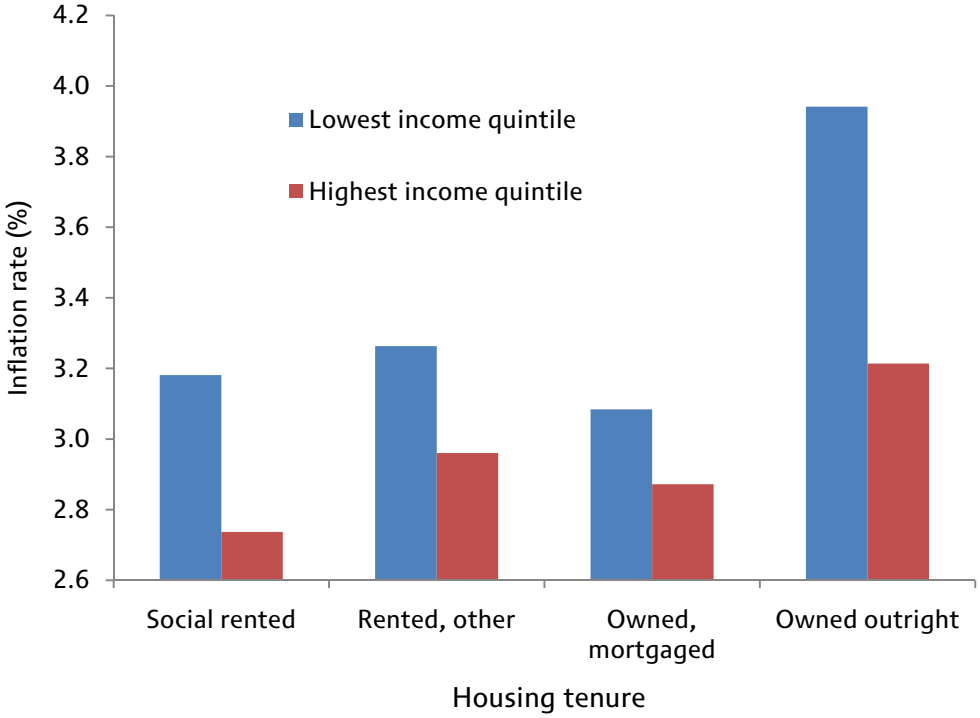
Source: Authors' calculations from ONS Living Costs and Food Survey

Inflation rates by housing tenure and income

Leicester, O'Dea and Oldfield (2008) found that housing tenure can be an important driver of variation in inflation rates. In 2009, rapid cuts in interest rates led to substantial falls in the inflation rate facing households with mortgages relative to other tenure groups. This is because mortgage interest payments typically make up a relatively large share of household budgets. In this subsection, we consider differences in average inflation experienced within income groups by tenure. We consider households in social rented accommodation, rented private sector accommodation, those who own homes with mortgages and those who own homes without mortgages.

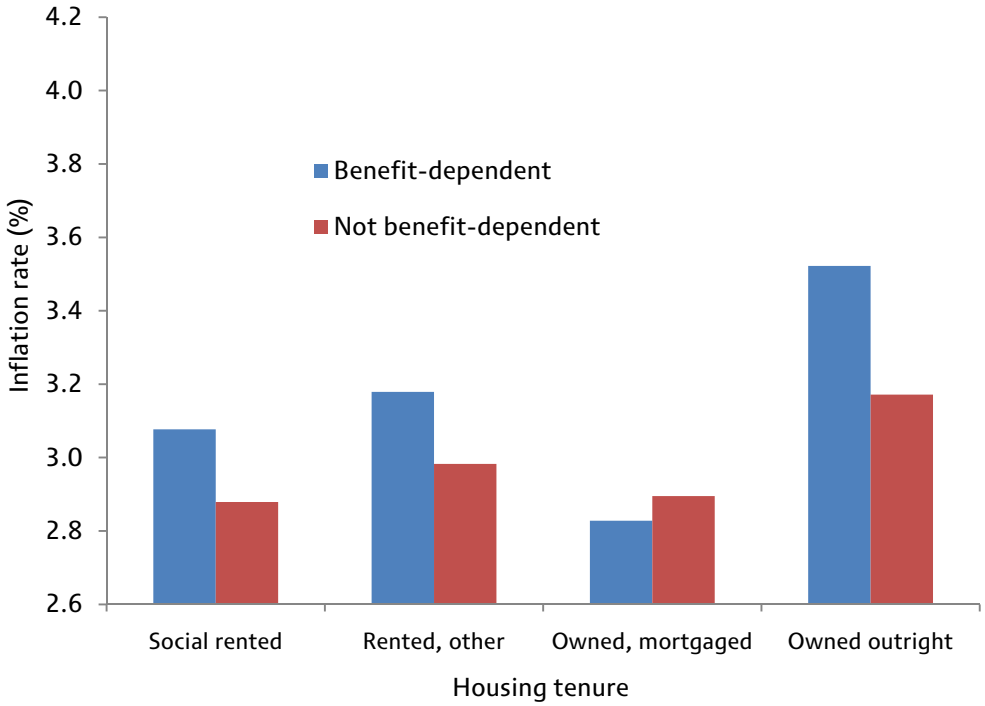
Figure 3.10 shows average inflation rates within the poorest and richest income quintiles by housing tenure for the period 2000–10. For a given tenure group, households in the lowest income quintile experienced higher average inflation rates than those in the highest income quintile. Across tenure types, those who own their homes outright experienced the highest average annual inflation rates amongst both the lowest and highest income quintiles (3.9% and 3.2% respectively). The higher average inflation rates experienced by those who own their homes without a mortgage reflect the fact that these households are unaffected by changes in mortgage interest payments, where inflation rates were substantially negative over some of

Figure 3.10. Average annual inflation rates by housing tenure and income quintile, 2000–10



Source: Authors' calculations from Living Costs and Food Survey data.

Figure 3.11. Average annual inflation rates by housing tenure and benefit dependency (working-age households only), 2000–10



Source: Authors' calculations from Living Costs and Food Survey data.

the period. Within the bottom quintile, those who owned their homes with mortgages experienced the lowest average inflation rate at 3.1%. The possible importance of mortgage interest payments in driving differences in different groups' inflation rates is discussed in Section 3.3.

Figure 3.11 shows these differences for benefit-dependent and non-benefit-dependent households of working age. The pattern is similar although the differences between the two groups are smaller than the differences by income group and, for the households with a mortgage, the benefit-dependent group have a slightly lower inflation rate than the non-dependent group. Benefit-dependent households who own outright faced the highest annual average inflation rates (3.5%).

3.3 Contribution of different expenditure groups to the inflation rate

The headline rate of inflation can be broken down to show how different goods and services contributed to the overall rate. This contribution depends both on the inflation rate for a particular good (or group of

goods) and its weight in the overall index. Each month, the ONS breaks down the headline rates of inflation in this way.[39]

As with the headline rate, these breakdowns are averages. The contribution of each good or service to each household's *own* inflation rate will depend on the price change and each household's own set of weights as determined by its spending patterns. Appendix B describes the average contribution of each of the spending categories examined in Chapter 2 to the overall average inflation rate each year between 2000 and 2010. Negative values within the table imply that the prices of these items fell in that year.

This breakdown gives us some idea as to the main drivers of our results in this chapter. For instance, in 2008, we saw that the inflation rates experienced by lower-income and benefit-dependent households were higher than those for higher-income and non-benefit-dependent households. In this year, the largest contributions to the overall inflation rate were made by food and fuel, which, as we saw in Chapter 2, make up a larger share of the budgets of poorer and benefit-dependent households.

Low-income groups also experienced higher inflation in 2009, but the decomposition in Appendix B suggests the explanation is different from that in 2008. In 2009, housing made a strong negative contribution to inflation on average. Drilling down into official inflation figures, this is driven by reductions in mortgage interest rates, where inflation rates fell to –42% as interest rates fell. By contrast, rents rose by around 2%.

According to our expenditure survey data, around 60% of households in the top quintile owned their homes with a mortgage compared with only 11% in the bottom quintile. Among the poorest quintile, 63% rented their homes, compared with 11% in the top quintile. As a result, steep declines in interest rates would have significantly contributed to the differences we observe in household-level inflation between different income groups in that year.

Similarly, mortgage interest rates help explain why higher-income households experienced higher inflation in 2000, 2004 and 2007 (see Figure 3.3): in each of these years, mortgage interest inflation rates exceeded 20% whilst rent inflation was only 2–3% in each year. Differences in tenure between income groups have therefore been

[39] See, for example, page 28 of the most recent publication based on the January 2011 inflation figures, http://www.statistics.gov.uk/pdfdir/cpibrief0211.pdf.

important determinants of the variation in inflation rates that households in different income groups experienced over the last decade.[40]

Contribution of fuel and water to overall inflation rates

Our earlier analysis focused on the impact of price increases in domestic fuel and water. We saw that the poor spend significantly more as a proportion of their total budget on these items and so any change in price has a larger impact on these households. In this section, we look at the contributions of changes in fuel and water prices to overall inflation rates and see how these contributions vary across income groups to quantify how different groups are affected differently by changes in the price of fuel and water.

Contribution of fuel prices to inflation rates

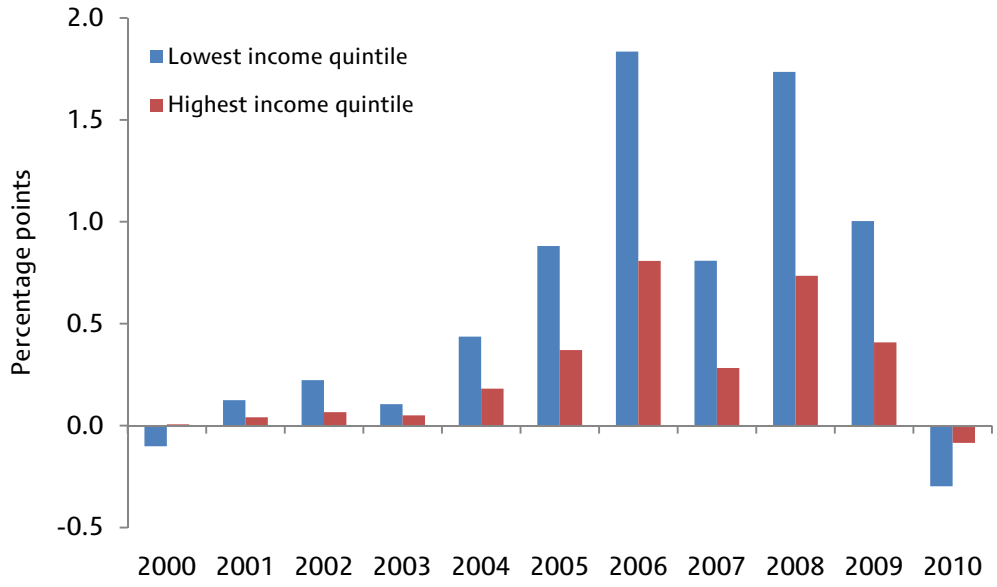
Figure 3.12 shows the percentage point contribution of fuel price inflation to household-level inflation rates in the lowest and highest income quintiles over the period 2000–10. The magnitude of the contribution is always greater for lower-income households, which in any given year is entirely driven by the fact that lower-income households spend more of their budget on fuel than richer households. Over time, this contribution could change both because the budget share of fuel changes for a given group and because of changes in fuel price inflation. Note, though, that differences between 2009 and 2010 are entirely due to differences in prices, since we do not have expenditure data for 2010 and so have assumed that 2009 spending patterns remain unchanged.

In some years, fuel made a much greater contribution to the inflation of poorer households than richer ones. The most striking differences are in 2006 and 2008. These two years were associated with the highest average annual inflation rates for fuel (at 24.6% and 18.9% as measured by the RPI). In 2006, fuel prices contributed 1.8 percentage points, on average, to the inflation rate of the bottom quintile; the figure for 2008 was 1.7 percentage points. The contributions of fuel for the highest income quintile were 0.8 and 0.7 percentage points in 2006 and 2008 respectively. In 2010, the contribution of fuel was negative for both income groups. This

[40] From February 2010, an 'average effective rate' (AER), as opposed to the standard variable rate, has been used to calculate mortgage interest prices in the RPI, which may affect the impact of this in the future; see http://www.ons.gov.uk/about/consultations/closed-consultations/measurement-of-mortgage-interest-payments-within-the-retail-prices-index--2009-/index.html. The AER takes account of changes in the costs of a wider range of mortgages (including fixed-rate and tracker mortgages) and is likely to be less volatile than the standard variable rate. The declines in mortgage interest prices in 2009 are likely to have been steeper than they would have been had the AER been used in that year.

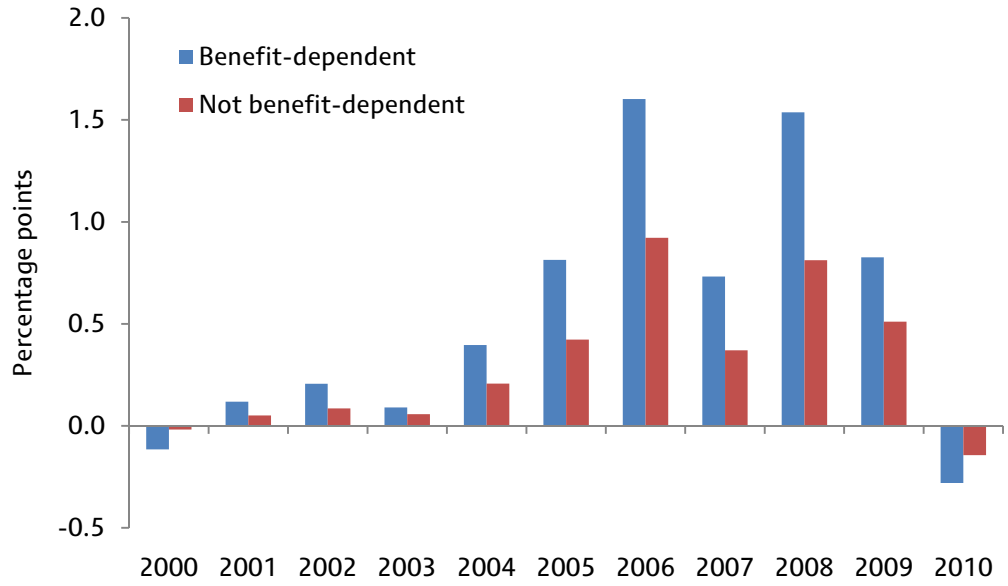
reflected the fact that fuel prices (as measured by the RPI) fell during that year (see Figure 1.1).

Figure 3.12. Contribution of fuel prices to inflation rates for the richest and poorest income quintiles



Source: Authors' calculations from Living Costs and Food Survey data.

Figure 3.13. Contribution of fuel prices to inflation rates for working-age households by benefit dependency



Source: Authors' calculations from Living Costs and Food Survey data.

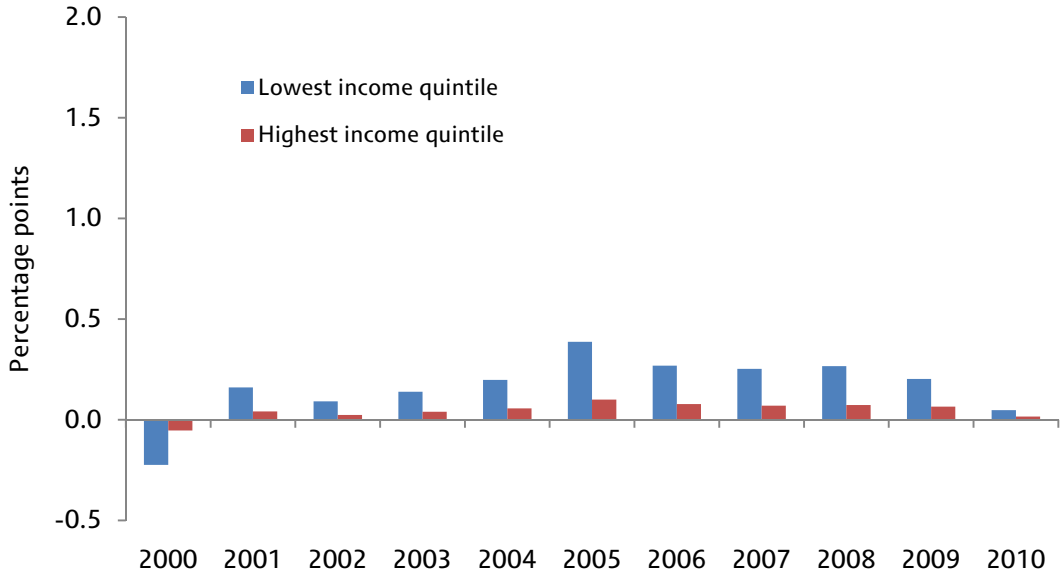
Figure 3.13 shows the same thing as Figure 3.12 but for working-age benefit-dependent households compared with non-benefit-dependent households. The pattern across time is similar, though the differences between the two groups are not as large (reflecting the facts that the top income quintile is a much narrower group than non-benefit-dependent households and that we are looking at a narrower age band).

Contribution of water prices to inflation rates

Figure 3.14 shows the average contribution of water price inflation to household-level inflation for the poorest and richest income quintiles. Figure 3.15 shows the same thing for benefit-dependent and non-benefit-dependent households. The contributions of water to overall inflation rates are, on the whole, much smaller than the contributions made by fuel to households' inflation. This is due to the fact that water accounts for a much smaller share of household spending on average than fuel.

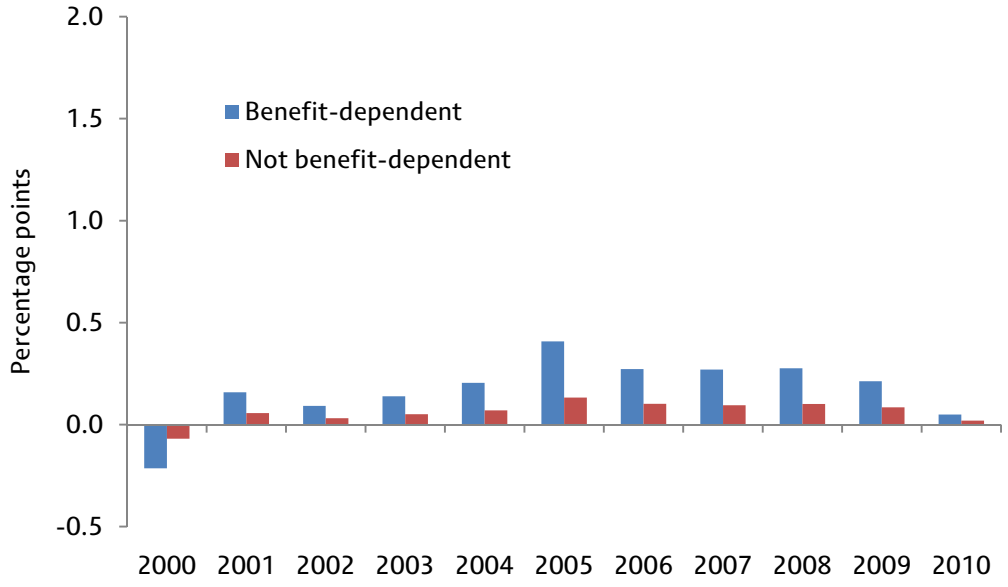
Once again, the magnitude of the contribution of water price inflation is always greater for lower-income or benefit-dependent households than for higher-income or non-benefit-dependent households. This is due to the fact that the former devote a greater proportion of their spending to water. Indeed, the budget share for water among households in the poorest quintile was on average 3.2 times the budget share among the richest quintile over the period considered. These differences are larger in relative terms than they are for fuel. When we compare benefit-dependent and

Figure 3.14. Contribution of water prices to inflation rates for the richest and poorest income quintiles



Source: Authors' calculations from Living Costs and Food Survey data.

Figure 3.15. Contribution of water prices to inflation rates for working-age households by benefit dependency



Source: Authors' calculations from Living Costs and Food Survey data.

non-benefit-dependent households (as in Figure 3.15) rather than the top and bottom quintiles, the relative differences are similar but smaller.

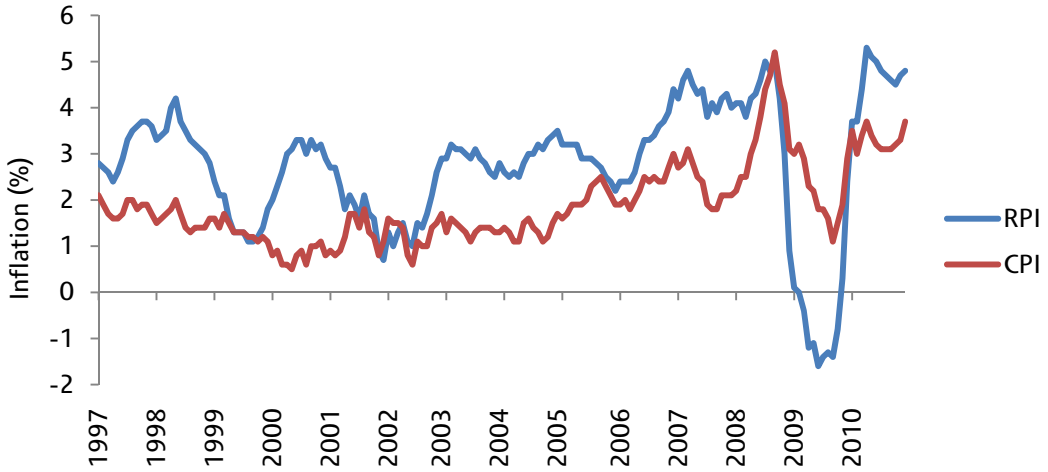
3.4 The move from RPI to CPI for the indexation of benefits

In the June 2010 Budget, the government announced that from April 2011, it would uprate benefits and tax credits by the CPI, rather than the RPI or Rossi index it had used in the past. The CPI will also replace the RPI as the measure of inflation in the government's 'triple lock' for the Basic State Pension (which means the pension rises by the highest of average earnings, inflation and 2.5%) from April 2012.

Figure 3.16 shows the differences between CPI and RPI inflation since 1997. CPI inflation tends to be lower than RPI inflation but this has not been the case in every year. For instance, in 2009, the CPI averaged 2.2% compared with –0.5% for the RPI. This was largely due to the steep reductions in mortgage interest rates in that year, which are included in the RPI but excluded from the CPI.

The fact that CPI inflation is generally lower than RPI inflation means that the change in uprating is forecast to save the government £5.8 billion by 2014–15 (HM Treasury, 2010). This was possibly an important motive for the change. However, the government also argued that the CPI better reflected the inflation experience of benefit recipients.

Figure 3.16. RPI and CPI inflation



Source: Office for National Statistics.

In October 2010, IFS published a Briefing Note discussing this claim (Browne and Levell, 2010), focusing on the two particular assertions the government had made.[41] The government's arguments were (1) that the way the CPI was calculated better accounted for the fact that households can partially avoid price increases by substituting away from goods that have become relatively more expensive and (2) that the CPI's exclusion of housing costs was more appropriate for benefit recipients as they were more likely to be insulated from changes in these costs.

Whilst the first of these arguments may be reasonable (if one accepts the assumptions about consumer behaviour that the CPI implicitly makes), the second is more questionable. Those households most likely to be insulated from changes in housing costs (those on means-tested benefits) saw their benefits uprated by the Rossi index, which already excludes housing costs.[42] By contrast, a large proportion of households receiving universal benefits (such as Child Benefit) are not insulated from changes in housing costs, which means that excluding housing costs from the index used to uprate benefits may not be appropriate. The IFS study did not, however, come to an overall judgement on whether indexing benefits to the CPI represented an improvement over the status quo. It noted that future

[41] Of course, other differences between the RPI and CPI are also relevant in assessing their appropriateness for uprating state benefits (including differences in the population used to derive the weights, and non-housing costs that are included in one index and not the other, etc.). These, however, tend to be less important in explaining differences between the RPI and CPI (see http://www.statistics.gov.uk/downloads/theme_economy/cpi-rpi-information-note.pdf).

[42] The ONS intends to introduce housing costs to the CPI in the future.

changes to means-tested benefits (particularly with regard to limits on Housing Benefit) may enhance the case for using the CPI.[43]

Our analysis in Section 3.3 provides a third but related consideration. Whether or not an inflation index better captures the inflation experience of benefit-dependent households depends partly on the extent to which the weights assigned to different categories of expenditure reflect the true spending patterns of the households in receipt of those benefits. The fact that the CPI excludes some housing costs from its coverage can be thought of as meaning it attaches zero weight to these expenditures. In this particular respect, it is more representative of spending by working-age households on means-tested benefits than the RPI (though not the Rossi), for reasons outlined in Browne and Levell (2010). However, the spending patterns of these households may also differ from the average in other respects: for instance, they tend to devote a greater share of their spending to food and fuel than other households.

A final remark is that given the differences in household spending patterns and changes in relative prices from one year to the next, it is not at all clear that one particular index that may have more closely captured the inflation experience of one particular group in the past will continue to do so in the future, unless it is explicitly designed to do so.[44]

3.5 Summary

In this chapter, we looked at household-level inflation rates and how these have varied for different groups over time. In particular, we found that on average, poorer and benefit-dependent households had higher inflation rates over the last decade than richer and non-benefit-dependent households. Pensioners also had a higher average inflation rate than non-pensioners. We also saw that within income groups, there is a great deal of variation in the inflation rates that households experience. There were differences in average inflation rates between old and young, between different family types and between housing tenure groups over the period considered. However, we rarely found subgroups in which poorer households experienced lower average inflation rates than the equivalent richer households.

[43] This is because the CPI includes rents while the Rossi does not. Future changes to Housing Benefit (such as caps on total payments and indexing allowances to the CPI rather than using local rents) will mean more benefit recipients will be affected by changes in rents, so the inclusion of rents in the index used to uprate their benefits would become more appropriate.

[44] For an example of such an index, see the RPI pensioner indices in Office for National Statistics (2011a, table 7.4).

While the average inflation rate over the 11-year period was higher for the groups identified above, they did not experience higher inflation every single year. In years where mortgage interest payments increased sharply, richer households had higher inflation rates. Fuel and water make larger contributions to the inflation rates experienced by poorer and benefit-dependent households. Fuel was a particularly significant driver of recent inflation patterns across different groups.

Looking forwards, DECC figures suggest that there will be significant price rises in domestic fuel over the medium term. Other things being equal, these price rises will work to increase the inflation rates of poorer households relative to richer households. We discuss the possible impact of future fuel prices in the next chapter.

4. Counterfactual analysis of future changes in domestic fuel prices

Over the past year, the price of domestic fuel fell, although since November 2010 prices have started to rise again. Current DECC price projections suggest that there will be further real price rises over the medium term – both as a result of predicted changes in commodity prices and as a result of policy changes aimed at achieving government targets on carbon emissions and renewable energy.

In this chapter, we make use of a general demand model to estimate the impact of future price increases on household spending patterns. Some households may respond more to price rises than other households. In periods of fuel price inflation, households that are more price-responsive will reduce their consumption of fuel relatively more than other households. The resulting change in spending patterns will affect the weight assigned to fuel (and other goods) in the calculation of their inflation rates in subsequent years. The price responsiveness of different households is therefore of interest to those aiming to forecast the impact of future fuel price increases on different groups.

How responsive households are to changes in fuel prices is also important when thinking about a household's ability to keep its home warm and its potential susceptibility to cold-related ill health. Any change in fuel consumption has implications for households who are already rationing their fuel consumption,[45] and these implications will be more serious the more responsive these households are to changes in the price of fuel. It is also important to recognise that in the medium to long term, households may also respond to fuel price rises by making improvements in fuel efficiency. This longer-run effect is not considered here.

The responsiveness of a household's demand for some goods to price changes can be measured by an 'elasticity of demand'. Simply put, this is the percentage change in the quantity of the good that the household purchases divided by the percentage change in price. Own-price elasticities give the response of the demand for a good with respect to a change in its own price, while cross-price elasticities give the response of demand for a good with respect to the change in the price of some other good. An own-price elasticity of –0.5 would imply that a 10% increase in

[45] Defined for the purposes of the UK Fuel Poverty Strategy as having temperatures below 21ºC in the living room and 18ºC in other occupied rooms (see http://webarchive.nationalarchives.gov.uk/+/http://www.berr.gov.uk/files/file16495.pdf). Other research suggests that many households already under-consume fuel relative to their energy 'needs'; see, for instance, Lainé (2011, p. 65).

the price of a good would lead to a 5% reduction in the demand for that good.

We have calculated the change in the fuel budget share that would result from a given percentage fuel price increase, and used this to calculate the implied elasticities of demand for fuel for different income groups. To do this, we used a Quadratic Almost Ideal Demand System (QUAIDS) model of consumer demand following Banks, Blundell and Lewbel (1997).[46] This model estimates parameters to predict budget shares for 12 broad spending categories of goods. The parameters are allowed to vary according to various household characteristics[47] as well as total household spending. These parameters are then used to estimate how these budget shares will change in response to simulated price increases.

We simulate household responses for various simple scenarios where the price of fuel increases but where everything else (the prices of other goods, household demographics, income and total expenditures) remains constant. Therefore we are not predicting what might actually happen in the future (since other factors are almost certain to change). Rather, we are asking what spending patterns would look like in the absence of other changes. This isolates the impact of the change in the price of fuel. We compare households' spending patterns in 2009 with the spending patterns predicted by the model with the fuel price increases.[48] The model covers non-housing[49] spending only and so we implicitly assume that spending on housing does not change with the prices of other goods (and that spending on other goods does not change with the price of housing).

Table 4.1 shows the changes in the average fuel budget share under different price increases by income quintile.[50,51] Because the model

[46] We made use of a program that was already written for other research at IFS. The model was not specifically prepared for this Commentary.

[47] Including the number of adults, the number of children, age, age squared, a dummy for the month of December and a dummy for the third quarter of the year, a time trend, the number of cars a household has, the number of rooms and whether or not a household has central heating.

[48] To obtain a prediction of how budget shares would change, we used the model first to predict the budget share of fuel given current prices, and then to predict the budget share under the different price scenarios. The proportional change in the share implied by the model was then used to scale up actual budget shares in 2009.

[49] 'Housing' refers to rent, mortgage interest, council tax, water, repairs, DIY, dwelling insurance and ground rent.

[50] Note that these budget shares are shares of total expenditure including housing.

[51] Within each quintile, there will be a distribution of changes in budget shares, with considerable overlap between quintiles. Because the model is fitted according to where most

Table 4.1. Median budget shares for different fuel price increases by income quintile

Income quintile	*Median budget share*				
	Before	*5% increase*	*10% increase*	*15% increase*	*20% increase*
1	7.8%	8.0%	8.2%	8.4%	8.5%
2	6.3%	6.4%	6.6%	6.7%	6.9%
3	5.2%	5.4%	5.6%	5.8%	5.9%
4	4.5%	4.6%	4.9%	5.0%	5.2%
5	3.6%	3.9%	4.1%	4.3%	4.5%

Source: Authors' calculations from Living Costs and Food Survey data.

occasionally leads to large outlier responses, we report the median result for households within each income quintile rather than the mean.[52] We consider fuel price increases of 5%, 10%, 15% and 20%.

For most households, the model predicts that when the price of domestic fuel rises, the quantity consumed falls. However, if the fall in the quantity consumed is not sufficient to offset the rise in the price, overall expenditure on fuel (and therefore the budget share) rises. Table 4.1 shows that under the scenario of a 5% increase in the price of domestic fuel, the model predicts that the budget share of the median member of the poorest income group would increase from 7.8% to 8.0%. Under a 20% increase in the price of fuel, the budget share for the poorest group is predicted to rise to 8.5%. All income groups are predicted to see an increase in their fuel budget shares under each of the four price changes.

We can use the predictions of the model to work out the implied responsiveness of each income group to the change in fuel prices. Table 4.2

Table 4.2. Implied median elasticities of demand for fuel by income quintile

Income quintile	*Implied median elasticity*			
	5% increase	*10% increase*	*15% increase*	*20% increase*
1	–0.6	–0.6	–0.6	–0.5
2	–0.5	–0.5	–0.5	–0.5
3	–0.4	–0.4	–0.4	–0.4
4	–0.2	–0.3	–0.3	–0.3
5	0.0	0.0	0.0	–0.1

Source: Authors' calculations from Living Costs and Food Survey data.

households lie in the expenditure distribution, it will not necessarily be a good fit for households with very high or very low expenditures (those at the tails of the distribution). For this reason, results for very-high-income households in particular should be interpreted with care.

[52] For this reason, the average budget shares will differ from those reported in Section 2.1.

shows the own-price elasticity of demand for fuel for the median household within each income quintile.

Our results suggest that lower-income households are more responsive to changes in the price of fuel than higher-income households, with higher-income households showing very little response (at the median) to the change in the price of fuel.[53] The elasticities imply, for instance, that the median response to a 10% increase in fuel prices in the bottom quintile is a 6% reduction in demand for fuel. For the top quintile, the median response is to keep fuel consumption constant.[54] A possible reason for this is that lower-income households may devote more of their budget to goods for which it is harder to reduce their expenditure (such as food) when fuel prices rise. Although these numbers suggest that if prices do rise in the future, then (other things being equal) spending on fuel will increase more for higher-income households than for lower-income households, they also suggest that lower-income households will heat their homes to a lesser extent.

[53] As for the budget shares, within each quintile there is a distribution of elasticities, with considerable overlap between quintiles. Because the model is fitted according to where most households lie in the expenditure distribution, it will not necessarily be a good fit for households with very high or very low expenditures (those at the tails of the distribution). For this reason, results for very-high-income households in particular should be interpreted with care.

[54] The same relationships between price responsiveness and income are also apparent if we consider mean rather than median responses.

5. Conclusion

This Commentary has looked at differences in spending patterns and household-level inflation rates between different income groups. We find important differences in spending between higher- and lower-income households, with lower-income households spending more on food, water and fuel and less on leisure goods and services than higher-income households.

These differences in spending patterns mean that high- and low-income households will experience different inflation rates in any given year. Over the last 10 years, we find that, partly owing to above-average increases in fuel prices, lower-income households have on average experienced higher inflation rates than higher-income households. This is likely to be of interest to policymakers since it has implications for the rules used to uprate state benefits. As well as differences between income groups, there is also a great deal of heterogeneity within income groups. We considered differences by age, family type and housing tenure. The contribution of inflation in fuel and water prices to overall inflation was greater for lower-income households, reflecting their tendency to devote a greater share of their spending to these items.

DECC projections suggest that fuel prices will increase significantly in the coming years, due to increases in commodity prices and policies designed to meet carbon reduction and renewable generation targets. Without compensating changes, these price rises will have a greater impact on poorer households. We find that lower-income households tend to be more price-responsive than higher-income households, suggesting that as fuel prices rise, the weight assigned to fuel in the calculation of household-level inflation rates will decline faster for lower-income households.

It is important to note that this Commentary has looked only at short-term responses to changes in the price of domestic fuel. Longer-term responses to higher fuel prices also need to be taken into account when looking at the distributional effect of price rises. If households respond by investing in energy-efficiency measures, this will, naturally, also have an impact on spending on fuel and will also improve outcomes for the environment.

Appendix A: Sources of differences in budget share of fuel and water

In this appendix, we present results for a regression of the budget share of fuel and water on various household characteristics. We include interaction terms to allow effects to differ between benefit-dependent and non-benefit-dependent households.

	Coefficient	*Standard error*	*t-statistic*
Benefit-dependent	0.0311**	0.0032	9.74
Log income	–0.0227**	0.0005	–48.17
Head in work	–0.0011	0.0008	–1.36
Education of head	–0.0021**	0.0005	–4.23
Renter	–0.0043**	0.0006	–6.59
Number of rooms	0.0025**	0.0002	13.73
Number of adults	–0.0022**	0.0007	–3.12
Number of children	0.0010**	0.0003	3.36
Region (base = North)			
Yorkshire and Humberside	–0.0007	0.0008	–0.86
East Midlands	–0.0051**	0.0009	–5.91
West Midlands	–0.0024**	0.0008	–2.90
South East	–0.0069**	0.0006	–10.81
London	–0.0066**	0.0008	–8.01
South West	–0.0038**	0.0008	–4.70
Wales	0.0062**	0.0010	6.29
Scotland	–0.0006	0.0008	–0.74
Age (base = under 35)			
Aged 35–45	0.0033**	0.0007	4.50
Aged 45–pensionable age	0.0100**	0.0007	14.59
Pensionable age	0.0227**	0.0011	21.41
Family type (base = single)			
Couple	–0.0024**	0.0009	–2.59
Other family type	–0.0006	0.0015	–0.36
Interaction effects			
Head in work x Benefit-dependent	–0.0206**	0.0017	–12.42
Education of head x Benefit-dependent	–0.0052**	0.0010	–5.38
Renter x Benefit-dependent	0.0147**	0.0011	13.23
Number of rooms x Benefit-dependent	0.0033**	0.0004	8.67
Number of adults x Benefit-dependent	–0.0072**	0.0018	–3.94
Number of children x Benefit-dependent	–0.0033**	0.0006	–5.31
Age interaction (base = under 35)			
Aged 35–45 x Benefit-dependent	–0.0006	0.0018	–0.31
Aged 45–pensionable age x Benefit-dependent	–0.0045*	0.0018	–2.51
Pensionable age x Benefit-dependent	–0.0090**	0.0019	–4.66
Family type interaction (base = single)			
Couple x Benefit-dependent	–0.0182**	0.0021	–8.75
Other family type x Benefit-dependent	–0.0122**	0.0034	–3.61
Intercept	0.1785**	0.0028	64.20

Notes: Outcome variable is budget share for fuel and water (between 0 and 1). Controls for month and year of interview, and sex of the head of household are also included but not reported here. Sample size is 59,341. *Significant at 5% level. **Significant at 1% level.

Appendix B: Contribution of different spending groups to average inflation rates, 2000–10

Here we present the contributions of individual spending categories to overall inflation. Rows sum to give the average annual inflation rate in each year (subject to rounding). Note that in 2010 we have assumed that spending patterns are unchanged from 2009 – the latest year for which we have data. Differences in the contribution of spending categories to inflation are therefore entirely due to changes in prices in that year.

	Food	*Catering*	*Alcohol and tobacco*	*Housing*	*Water*	*Fuel*	*Household goods and services*	*Clothing*	*Personal goods and services*	*Motoring*	*Transport fares*	*Leisure goods and services*	*Total*
2000	–0.06	0.17	0.25	1.78	–0.11	–0.03	0.01	–0.20	0.03	0.62	0.07	0.36	2.89
2001	0.57	0.20	0.19	0.29	0.02	0.03	–0.02	–0.22	0.08	–0.02	0.07	0.52	1.72
2002	0.15	0.17	0.15	–0.04	0.05	0.13	0.28	–0.25	0.05	–0.05	0.06	0.73	1.42
2003	0.19	0.15	0.15	0.98	0.08	0.08	0.25	–0.07	0.04	0.24	0.15	0.30	2.53
2004	0.10	0.13	0.13	1.88	0.11	0.29	0.21	–0.13	0.02	0.21	0.06	0.05	3.05
2005	0.18	0.14	0.14	1.40	0.21	0.59	0.12	–0.11	0.06	0.23	0.09	0.16	3.22
2006	0.27	0.13	0.14	0.96	0.15	1.27	0.27	–0.05	0.08	0.30	0.04	0.19	3.76
2007	0.68	0.15	0.17	1.97	0.14	0.54	0.27	–0.04	0.07	0.25	0.12	0.25	4.58
2008	1.43	0.19	0.18	0.64	0.16	1.12	0.35	–0.15	0.09	0.69	0.14	0.36	5.20
2009	0.81	0.13	0.17	–1.69	0.12	0.68	0.44	–0.18	0.08	0.00	0.10	0.51	1.17
2010	0.39	0.15	0.22	0.31	0.03	–0.18	0.53	0.25	0.11	1.75	0.13	0.58	4.27

References

Banks, J., Blundell, R. and Lewbel, A. (1997), 'Quadratic Engel curves and consumer demand', *Review of Economics and Statistics*, vol. 79, pp. 527–39.

Benzie, M., Harvey, A., Burningham, K., Hodgson, N. and Siddiqi, A. (2011), *Vulnerability to Heatwaves and Drought*, York: Joseph Rowntree Foundation (http://www.jrf.org.uk/sites/files/jrf/climate-change-adaptation-full.pdf).

Blow, L. and Crawford, I. (2001), 'The cost of living with the RPI: substitution bias in the UK retail prices index', *Economic Journal*, vol. 111, pp. 357–82.

Blow, L., Leicester, A. and Oldfield, Z. (2004), *Consumption Trends in the UK, 1975–99*, Report no. 65, London: Institute for Fiscal Studies (http://www.ifs.org.uk/comms/r65.pdf).

Brechling, V. and Smith, S. (1994), 'Household energy efficiency in the UK', *Fiscal Studies*, vol. 15, no. 2, pp. 44–56.

Brewer, M., Goodman, A. and Leicester, A. (2006), *Household Spending in Great Britain: What Can It Teach Us about Poverty?*, Bristol: Policy Press (http://www.jrf.org.uk/sites/files/jrf/9781861348555.pdf).

Browne, J. and Levell, P. (2010), 'The distributional effect of tax and benefit reforms to be introduced between June 2010 and April 2014: a revised assessment', Briefing Note no. 108, London: Institute for Fiscal Studies (http://www.ifs.org.uk/publications/5246).

Crawford, I. and Smith, Z. (2002), *Distributional Aspects of Inflation*, Commentary no. 90, London: Institute for Fiscal Studies (http://www.ifs.org.uk/comms/comm90.pdf).

Department for Communities and Local Government (2011), *English Housing Survey: Headline Report 2009/10* (http://www.communities.gov.uk/documents/statistics/pdf/1851086.pdf).

HM Treasury (2010), *Budget 2010* (http://www.hm-treasury.gov.uk/d/junebudget_complete.pdf).

Lainé, L. (2011), *Access for All: Making the Green Deal a Fair Deal*, London: Consumer Focus (http://www.consumerfocus.org.uk/files/2011/03/Access-for-all.pdf).

Leicester, A., O'Dea, C. and Oldfield, Z. (2008), *The Inflation Experience of Older Households*, Commentary no. 106, London: Institute for Fiscal Studies (http://www.ifs.org.uk/comms/comm106.pdf).

McClements, L. D. (1977), 'Equivalence scales for children', *Journal of Public Economics*, vol. 8, pp. 191–210.

National Consumer Council (2004), 'Lifelines – affordable utilities', in *Why Do the Poor Pay More … or Get Less?*, London: National Consumer Council.

Office for National Statistics (1998), *The Retail Prices Index: Technical Manual*, London: TSO (http://www.statistics.gov.uk/downloads/theme_economy/rpi_technical_manual.pdf).

Office for National Statistics (2009), *Living Costs and Food Survey: User Guide Volume A*.

Office for National Statistics (2010), *Consumer Price Indices: Technical Manual*, Newport: ONS (http://www.statistics.gov.uk/downloads/theme_economy/CPI_Technical_manual-2010.pdf).

Office for National Statistics (2011a), *Focus on Consumer Price Indices: Data for January 2011* (http://www.statistics.gov.uk/downloads/theme_economy/focus-on-cpi-jan-2011.pdf).

Office for National Statistics (2011b), *Focus on Consumer Price Indices: Data for March 2011* (http://www.statistics.gov.uk/downloads/theme_economy/focus-on-cpi-mar-2011.pdf).

Ofwat (2005), *Water Framework Directive: Economic Analysis of Water Industry Costs* (http://www.ofwat.gov.uk/publications/commissioned/rpt_com_wfdoxera211105.pdf).

White, V., Roberts, S. and Preston, I. (2010), *Understanding 'High Use Low Income' Energy Consumers*, Bristol: Centre for Sustainable Energy (http://www.cse.org.uk/downloads/file/understanding_high_use_low_income_energy_consumers.pdf).