UK Household Cost-of-Living Indices, 1979–92

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I. INTRODUCTION

The only circumstance under which one can speak accurately about *the* cost-of-living index is one in which household expenditure patterns do not vary. If relative prices move and households consume goods and services in different proportions, then each household will have its own unique cost-of-living index. This paper is concerned with the pattern and extent of these variations in the cost of living between different types of household.

To illustrate this, consider the data on a typical necessity: domestic fuels. Figure 1 shows the Engel curve[2] for domestic fuel drawn non-parametrically using UK data from the 1992 Family Expenditure Survey (FES). The fuel share of total spending declines as the logarithm of total expenditure increases. This downward- sloping Engel curve is typical of goods that are usually thought of as necessities: poorer households with lower total expenditure spend a greater proportion of that total on necessities like fuel and food than do richer households.[3]

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[2] The proportion of the total household budget allocated to fuel against log total expenditure.

[3] Luxuries are usually characterised by upward-sloping Engel curves.

FIGURE 1

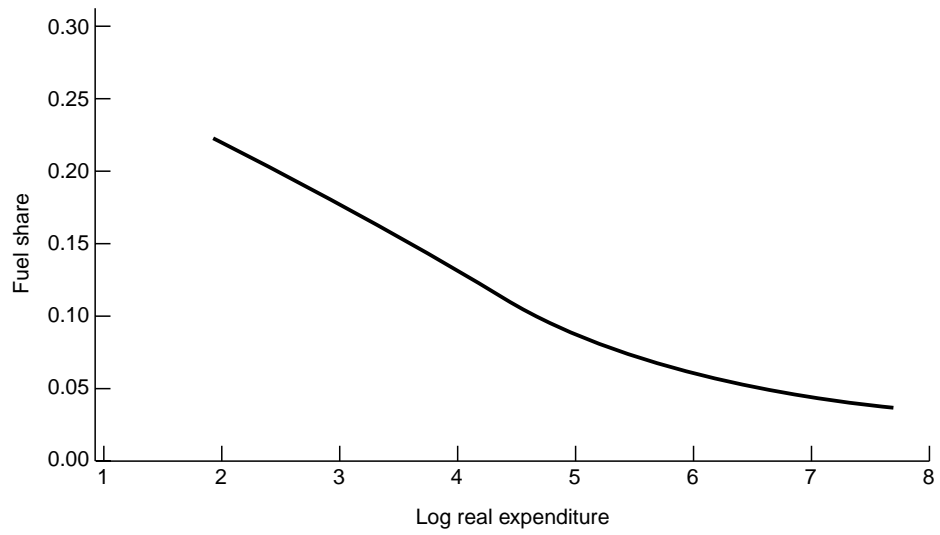**The Engel Curve for Domestic Energy, FES, 1992**

FIGURE 2

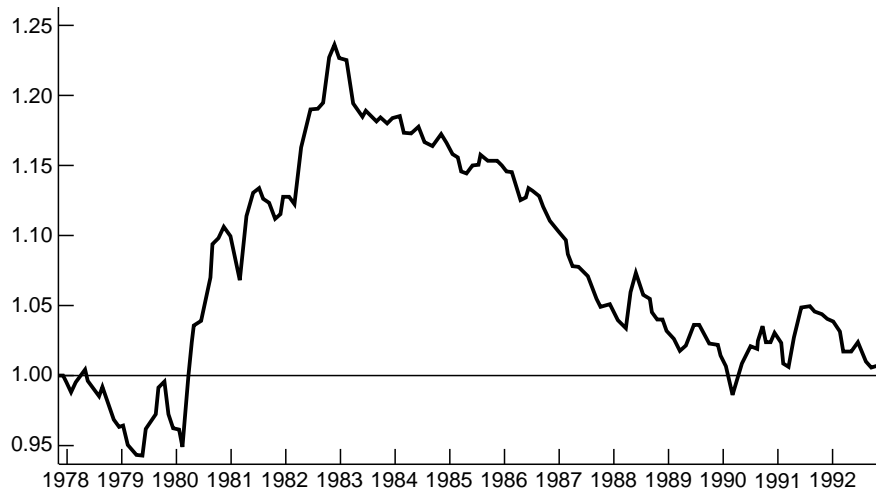**The Relative Price of Domestic Fuel, 1978-92**

Figure 2 shows the price of domestic fuels relative to the all-item retail price index from 1978 to 1992. Figures 1 and 2 are sufficient to show the existence of systematic differences between the cost of living of different households. The relative price movements illustrated will have a greater effect on the cost of living of households that consume more fuel than others. Banks, Blundell and Lewbel (1994) show that Engel curves are neither flat nor always linear for a range of commodities using UK FES data.

The plan of the paper is as follows. Section II presents a discussion of the properties of some alternative cost-of-living indices, the method and the data to be used in the study. Section III focuses on patterns of non-housing inflation for different income groups and demographic groups. Section IV looks at the influence of indirect tax reform over the period on non-housing inflation. Section V examines the results of the inclusion of housing costs in the analysis. Two possible methods of calculating housing costs are discussed and alternative all-item cost-of-living indices are calculated using both measures. Section VI concludes.

II. CALCULATING HOUSEHOLD COST-OF-LIVING INDICES

Cost-of-living indices measure the cost of reaching a given standard of living under different economic circumstances. Under changing prices, the true cost-of-living index is the relative (minimum) cost of attaining a reference-level living standard at each set of prices. Traditionally in economics, the standard of living is measured by the goodness (utility) consisting in consumption.[4] This is typically proxied by income or total expenditure.

Calculation of true cost-of-living indices requires that the cost function (describing the minimum cost of attaining a given standard of living/utility level) is known. The usual way of obtaining the cost function is by estimating a system of demand equations and applying the normal theorems of duality. Banks, Blundell and Lewbel (1994) utilise this method in a five-good demand system based on UK FES data. However, this approach is arduous and is only practicable for a low number of very broadly defined goods. Furthermore, using broad definitions of expenditure groups incurs the cost of discarding information on variations in spending patterns within these groups. As a result, economists have attempted to devise measures that avoid the need for explicit estimation of welfare and behavioural responses to price changes.

Two of the most commonly used indices are the Laspeyres and the Paasche. These indices take base- and end-period expenditure weights respectively.

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[4] Sen (1985) argues persuasively against the usual approach of thinking about the standard of living as utility, income and wealth, suggesting a wider interpretation in which living standards are conceived of in terms of human functionings and capabilities. Sen may be right, but it is difficult to see how to implement his ideas with existing data.

However, the only circumstance under which the Laspeyres and Paasche indices will be equal to the appropriate true indices is one in which household preferences exhibit no substitution effects, i.e. household consumption patterns do not respond to relative price changes. Empirical studies usually find ample evidence of substitution effects.[5]

A useful alternative to the Laspeyres and Paasche indices is one proposed by Tornqvist (1936) which Diewert (1976) shows to be equivalent to the true index under a relatively more plausible model of household consumption behaviour which allows for substitution effects. This uses expenditure weights which are the average of the beginning (Laspeyres) and end-period (Paasche) weights. The Tornqvist index is based upon a preferred model of household behaviour, and although it still avoids the need to estimate substitution effects, it does not suffer the substitution bias inherent in the Paasche and Laspeyres indices.[6] It also has the advantage that the model of preferences underlying it is fairly general[7] and performs relatively well in applied work on demand analysis.[8]

The method adopted here is to calculate chained series of pairwise Tornqvist indices for each commodity. This will mean that each link in the chain refers to a different reference welfare level. Nevertheless, Diewert (1978) shows that these indices differentially approximate each other as well as the true index provided that variations in prices and expenditures between each period are small. He argues that this provides a strong justification for minimising period-to-period variations in prices and quantities by means of frequent rebasing and by chaining annual indices.

The indices calculated in this paper use information on price movements from the 74 sub-indices of the retail price index for the period 1978 to 1992, and corresponding household expenditure data from the Family Expenditure Survey for the same period. Because the price data are collected from national sources, there is no regional variation and as a result this paper ignores regional issues. Differences in cost-of-living indices between population groups are thus generated entirely by differences in their spending patterns, scaled by relative price movements. In the following sections, cost-of-living indices for specific population groups are calculated and compared with the all-household 'headline' measure.

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[5] Blundell, Pashardes and Weber (1994), for example, find evidence of large cross-price substitution effects in UK FES data.

[6] For a proof of this, see Diewert (1978).

[7] Christensen, Jorgenson and Lau, 1975.

[8] Deaton and Muellbauer, 1980; Blundell, Pashardes and Weber, 1994.

III. NON-HOUSING MEASURES

There are several ways of illustrating group cost-of-living indices. Most previous studies (Fry and Pashardes (1986) and Bradshaw and Godfrey (1983), for example) present cost-of-living levels. However, most of the policy-relevant issues are to do with annual changes in the level, i.e. inflation. Benefit uprating, for example, is designed to compensate households for year-to-year changes in their cost of living rather than the levels. Figure 3 illustrates the annual change (inflation) in the Tornqvist[9] cost-of-living indices (exclusive of housing) for all households and for those in the top and bottom income deciles, from 1979 to 1992.

Non-housing inflation rates for households at the top and bottom of the income distribution follow the average closely. In general, the all-households average rate lies between the other two but the ranking changes: there are periods when poorer households are facing a higher rate of inflation and richer households a lower rate than the average, and there are also periods when this is reversed. Figure 4 emphasises the between-group differences by plotting the difference in inflation rates from the average at each point. The all-households average index is therefore normalised to zero and the differences for each income group are traced around it. For example, in early 1982 when the average
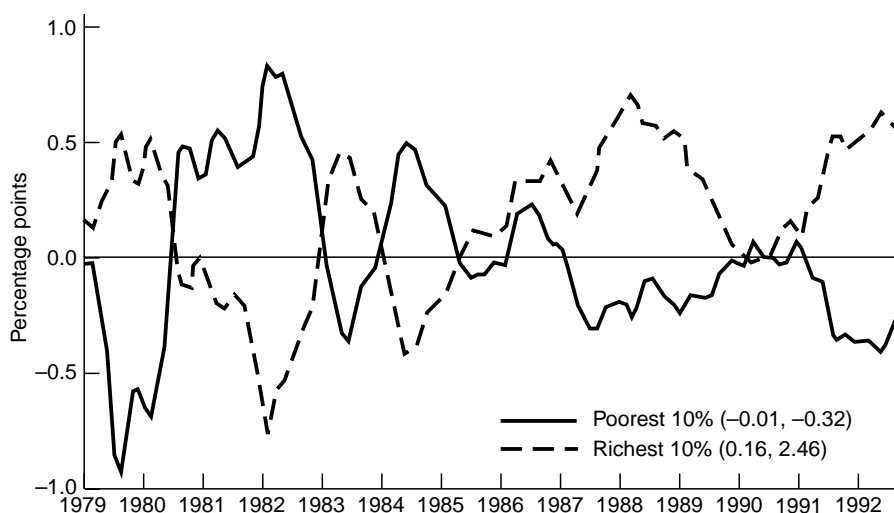
FIGURE 3

Inflation Rates by Income Group

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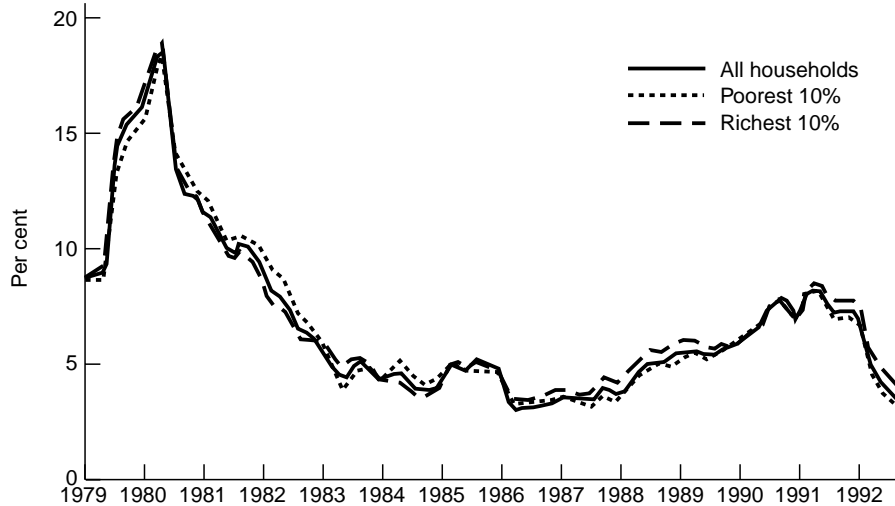
[9] The final year has been calculated as a Laspeyres index.

FIGURE 4

**Difference in Inflation Rates by Income Group**

all-households inflation measure is around 8 per cent (see Figure 3), Figure 4 shows that the richest 10 per cent of households saw their cost of living increasing at a rate approximately 0.8 percentage points slower than average (i.e. at around 7.2 per cent), while the cost of living of the poorest 10 per cent was increasing at a rate approximately 0.8 percentage points faster than average (i.e. at around 8.8 per cent). The difference in inflation rates between the richest and poorest households was thus about 1.6 percentage points at this time.

Figure 4 shows the cycling nature of the indices more clearly than Figure 3. The first number in parentheses in the legend for richer households is the average difference from the all-households index for the whole period. This says that on average, inflation for richer households was 0.16 percentage points higher than the average for all households between 1979 and the end of 1992. The second number in parentheses gives the difference in the *level* of the cost-of-living index at the end of the period expressed as a percentage of the all-households average index *level*. This shows that at the end of the period, the cost of living of richer households had grown 2.46 per cent faster than average, and follows directly from their higher-than- average inflation rate. The corresponding numbers for poorer households show that, on average, their inflation rate was 0.01 percentage points lower than the average, and that by the end of the period their cost of living had grown 0.32 per cent less than the average.

The overall downward effect on relative inflation for poorer households is largely a product of falls in the relative price of necessities such as food and clothing and (since the early 1980s) domestic fuels (which form a relatively large

FIGURE 5

The Relative Price of Necessities: Food, Fuel (Electricity)[a] and Clothing
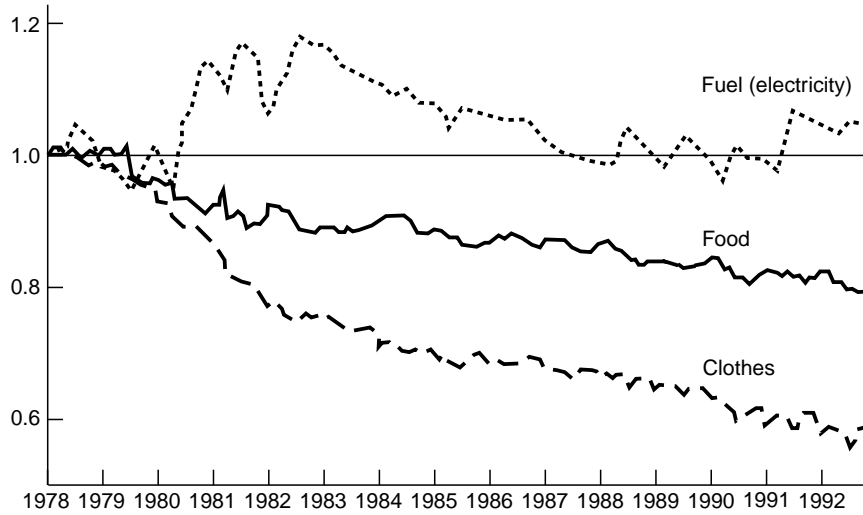
[a]Poorer households' fuel consumption consists predominantly of electricity. See baker and Crawford (1993).

FIGURE 6

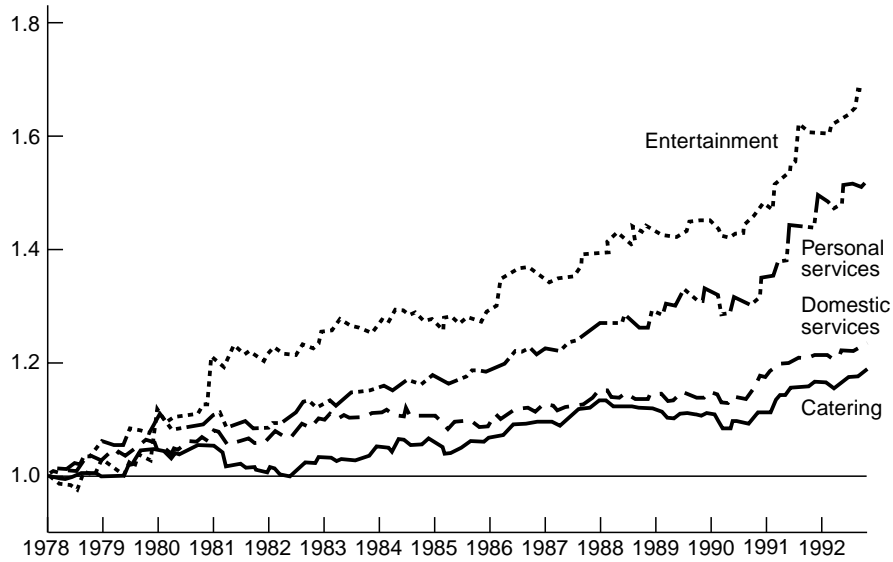**The Relative Price of Luxuries: Catering, Entertainment and Services**

7

TABLE 1

**Proportion of Total Non-Housing Expenditure Allocated across Goods,
FES, 1978 and 1992**

Group	Year	All	Poorest 10 per cent	Richest 10 per cent
Food	1978	0.24	0.34	0.16
	1992	0.17	0.23	0.10
Catering	1978	0.04	0.03	0.05
	1992	0.04	0.03	0.05
Alcohol	1978	0.06	0.04	0.06
	1992	0.05	0.05	0.04
Tobacco	1978	0.04	0.06	0.02
	1992	0.02	0.05	0.01
Fuel	1978	0.07	0.10	0.05
	1992	0.06	0.09	0.04
Durables	1978	0.07	0.05	0.10
	1992	0.07	0.05	0.08
Clothes	1978	0.10	0.08	0.10
	1992	0.07	0.08	0.06
Motoring	1978	0.13	0.09	0.16
	1992	0.15	0.11	0.15
Fares	1978	0.03	0.03	0.03
	1992	0.04	0.04	0.03
Entertainment	1978	0.05	0.03	0.08
	1992	0.11	0.05	0.22
Other	1978	0.17	0.15	0.18
	1992	0.21	0.21	0.23

part of their total spending), and increases in the prices of many luxuries such as eating out, entertainment and other services (which form a relatively small part). Figures 5 and 6 illustrate these trends in relative prices, and Table 1 reports the average expenditure shares for each group at the beginning and end of the period.

The table shows that the average share of spending allocated to necessities (food, fuel, clothing) for all households has fallen from 0.41 to 0.30 over the sample period. The downward-sloping Engel curve relationship for necessities is apparent at both ends of the period. Richer households spend less on necessities than average (0.31 falling to 0.20), and poorer households spend more (0.52 falling to 0.40). The corresponding share increases have been in luxury goods such as entertainment and the 'other' category which is mostly services. One of the largest differences between the two groups over time is spending on

FIGURE 7

Difference in Inflation Rates by Employment Status of Head
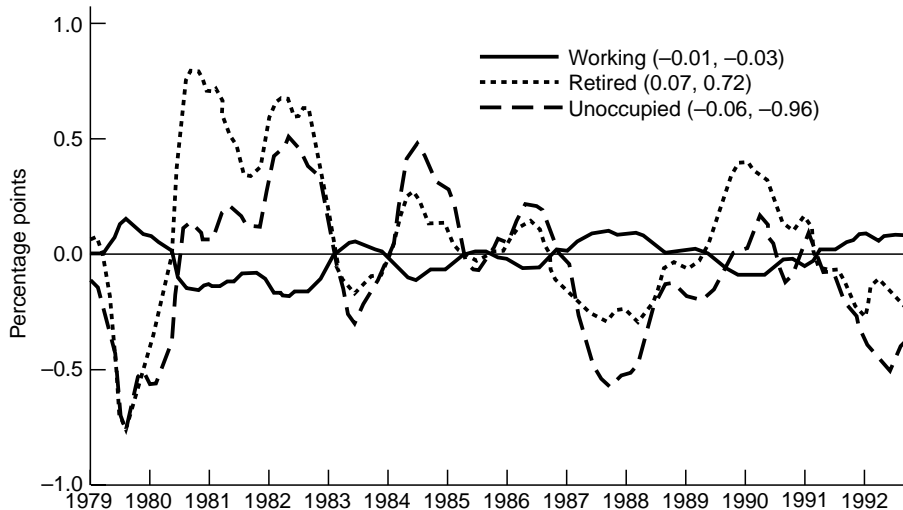
entertainment, which has grown much faster among richer households. The expenditure patterns shown in the table, coupled with the relative price movements illustrated in Figures 5 and 6, largely explain why the *non-housing* cost of living of richer households increased by more over this period than that of poorer households did.

Figure 7 illustrates the difference from the all-households inflation index by employment status of the head of household. Employment status and income are closely related and therefore it is not surprising that the cycles of the retired and unoccupied groups are similar to those of the poorer households in Figure 4. The main differences lie in the period 1989–90 when inflation for these groups was above the average to a greater extent than it was for the poorer households shown in Figure 4. As with the poorer households, the average difference for the unoccupied group is negative (–0.06 percentage points) as is the percentage difference in cost-of-living growth levels at the end of the period (–0.96 per cent). However, longer periods above the average for retired households in the early 1980s and in 1989–90 mean the retired households have done, on average, slightly worse with a positive average difference over the period (+0.07 percentage points) and corresponding higher cost-of-living growth level at the end (+0.72 per cent).

It is important to remember, however, that basing cost-of-living calculations on more closely defined population subgroups does not make the problem of non-homotheticity go away. Variations in spending patterns within the group will still occur according to other household characteristics such as the presence

of children. Nevertheless, such an index should be more representative than the all-households average.

Taking the poorest 10 per cent of the population and calculating changes in their average cost of living gave Figure 4. Variations in income and total expenditure are naturally small within the group, and consequently differences in spending patterns due to households' positions along the Engel curve are also small. However, differences in household demographics within this section of the population may entail differences between Engel curves defined on these characteristics. There are, for example, poor households with children and poor households without children, young poor households and old poor households. These other factors will contribute to within-group variations in budget shares which may also be well determined.

FIGURE 8

Difference in Inflation Rates within the First Income Decile Group, by Employment Status of Head
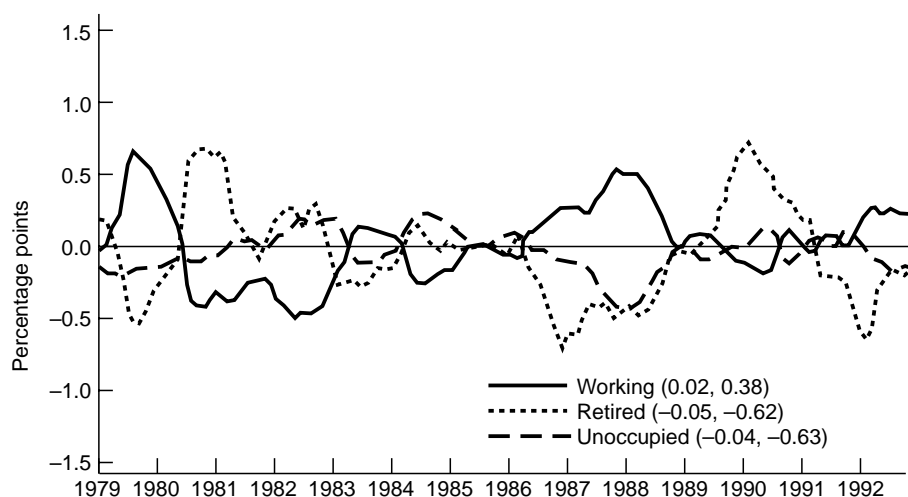
In Figure 8, the poorest 10 per cent of the population is subdivided by employment status and the differences from the average *within* the bottom decile group traced. The zero line therefore corresponds to the normalisation around the average line for the poorest 10 per cent in Figure 4. Those households that may be thought of as the poorest amongst the poorest 10 per cent of the population (those in which the head is retired and drawing a pension or unoccupied)[10] appear to have suffered least under inflation over this period. Average inflation rates for these groups are 0.05 percentage points and 0.04 percentage points

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[10] See Goodman and Webb (1994, this volume).

respectively below the average for their decile group (and therefore 0.06 percentage points and 0.05 percentage points below the all-households average for this period). By the end of the period, their cost-of-living levels are 0.62 per cent and 0.63 per cent respectively below the decile average (0.94 per cent and 0.95 per cent below the population average).

Working households within the decile have a higher-than-average inflation rate of +0.02 percentage points compared with the decile average (+0.01 percentage points compared with the population as a whole). This is because pensioners and unemployed households among the poorest 10 per cent are even more dependent on consumption of necessities than working households in the same group. Given the falls in the relative price of necessities over the period illustrated in Figure 5, their higher-than-average consumption of necessities has insulated them from inflation by more than the average for their group. The pattern that emerges across the income distribution is therefore preserved within the decile group.

A major demographic characteristic which influences households' expenditure patterns is the presence of children. However, the differences in relative inflation rates for households with and without children are small, no more than ±0.2 percentage points at the most in the very early 1980s. The presence of children makes a household take on some of the spending characteristics of poorer households (adults forgo spending on luxuries like entertainment for more spending on necessities like food and clothing). This sort of spending pattern reduces the incidence of inflation over the period on households that consume these goods. The presence of children within a household results in an average inflation rate which is 0.07 percentage points below the population average over the period, and a cost of living 1 per cent below average at the end. Households without children, like richer households, are able to spend more on luxuries and over the period had a higher-than-average inflation rate.

Households in the bottom decile group with children have experienced an average rate of inflation over the period 0.04 percentage points less than the decile group average (0.05 percentage points less than the all-households average). Poor households without children, with a little more money to spend on luxuries, had an average rate of inflation which was 0.05 percentage points above the decile group average (0.04 percentage points above the population average).

The general result that emerges from this analysis of non-housing inflation is that, because the price of luxuries has risen faster than the price of necessities over the period, households that allocate a higher proportion of total non-housing expenditure to necessities (either as a result of low household income or additional non-earning household members) have experienced a lower-than-average increase in their cost of living.

It should be obvious that conclusions based on the data presented in this section will be heavily dependent upon the period from which the data are drawn. This is demonstrated by previous studies such as Bradshaw and Godfrey (1983) and Fry and Pashardes (1986) which find an anti-poor bias in price increases based on observations over shorter time periods (1978–83 and 1974–82). Earlier studies[11] indicate that the post-war period has seen cycles in the cost of living over the longer term. For example, during the war, the price of necessities was kept low. However, in the period immediately after the war, the relative price of necessities rose fast, increasing the cost of living of poorer households. This bias was reduced in the early 1960s and then disappeared altogether by the beginning of the 1970s. However, food price rises in particular during the 1970s once more increased the cost of living of poorer households. This continued through the 1970s despite the food subsidies introduced by the government in 1974. With membership of the Common Market and the dismantling of the food subsidy schemes, food prices rose once more, and this, combined with rising fuel prices, saw the burden of inflation falling most heavily on the poor.

IV. INDIRECT TAXATION

Since 1979, there have been various reforms to the structure and rate of VAT and excise duties. This section removes the influence of tax changes from the cost-of-living indices presented in Section III. The widening of the VAT base in April 1994 to include domestic fuels does not fall within the period of this study, although its implications for households across the income distribution are obvious from Section III.[12]

In the UK, VAT is a broadly progressive tax in the sense that richer households pay more VAT as a proportion of total spending. This progressivity is entirely due to the base upon which VAT is levied and the spending patterns shown in Table 1. During the period 1979–92, food, domestic fuels, passenger transport and children's clothing, *inter alia*, were zero-rated for VAT (i.e. entirely untaxed). Given that these types of goods are more important elements of total expenditure for poorer households, zero-rating means that the burden of VAT falls most heavily on better-off households.

The incidence of excise duties is more mixed. The main dutiable goods are tobacco, alcohol and petrol. In general, petrol expenditure is higher for richer than for poorer households because of wider car-ownership amongst wealthier households. As a result, petrol excise duties are progressive when looked at

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[11] Allen, 1958; Brittain, 1960; Tipping, 1970; Muellbauer, 1977; Piachaud, 1978.>
[12] See Crawford, Smith and Webb (1993).

across the whole population.[13] Tobacco duties, however, are regressive. Table 1 shows that poorer households spend proportionately more than richer households on tobacco. This is due to higher rates of smoking in the bottom income decile rather than higher consumption by smoking households. Patterns of alcohol consumption and the incidence of duties, however, are more complex.

The Engel curve for alcohol is quadratic and has an upside-down U shape. Alcohol expenditure therefore has the characteristic of a luxury for poorer households (the upward-sloping portion of the curve) and of a necessity for richer households (downward-sloping portion of the Engel curve).[14] Within the alcohol commodity group, there are further differences, with richer households spending more on wines and spirits than poorer households, with a general shift from beer to wines and spirits over the period across all households. Because of their higher alcohol expenditure shares, the overall incidence of alcohol taxation is upon poorer households. A shift in the balance of alcohol taxation away from wines and spirits also impacts more upon poorer households.

FIGURE 9

Difference in Inflation Rates for the Poorest 10 Per Cent, with and without Taxes

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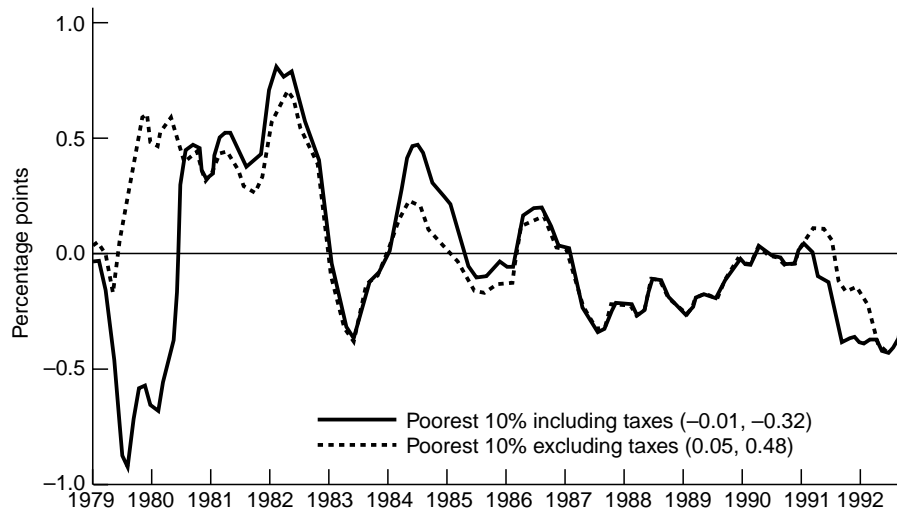
[13] Amongst car-owners, however, petrol duties are regressive and fall particularly hard on poorer rural households for which car-ownership, and therefore petrol expenditure, are more of a necessity. See Baker and Crawford (1993).

[14] Banks, Blundell and Lewbel, 1994.

FIGURE 10

Difference in Inflation Rates for the Richest 10 Per Cent, with and without Taxes
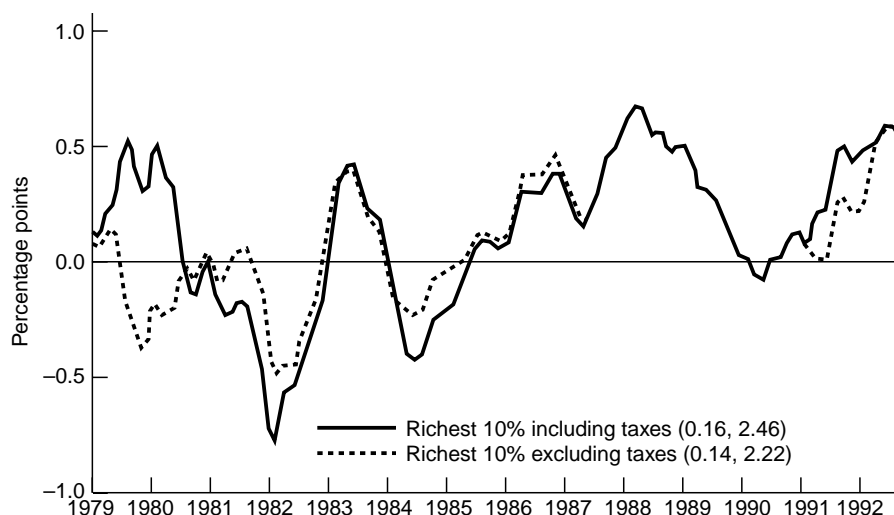
To illustrate the effects of indirect tax changes on the cost of living of different income groups, price increases due to VAT and excise duty changes have been removed from the price indices from 1978 onward and the cost-of-living indices recalculated.[15] Figures 9 and 10 show the differences from the average inflation index for the poorest and richest households. The solid lines correspond to the lines in Figure 4; however, here the indices are calculated using the Laspeyres formulation and not the Tornqvist.

The problem with the Tornqvist index in this application lies in the use of the end-period weight. The end-period weight depends on the end-period price vector, so when the counter-factual tax-exclusive price series is used, the correct end-period weights are not observed. Instead, only the base-period weights are observed and therefore the Laspeyres index is calculated.

The first major difference between the taxed and untaxed series occurs in mid-1979. This corresponds to the VAT reforms in Geoffrey Howe's first Budget. The amalgamation of the two VAT rates to a single, higher, 15 per cent rate caused the faster increase in the cost of living of richer households and the slower-than-average increase for poorer households illustrated. One year later, the effects of the VAT increase drop out of the inflation rates for both groups, and return the tax-inclusive series to close to the tax-exclusive path.

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[15] It is assumed that indirect taxes have been passed on in full to consumers.

Increases in excise duties, particularly on beer and cigarettes, and later the cut in wine duties are shown to push up inflation for poorer households between mid- 1980 and 1987. The next period was one in which most excise duties were simply uprated in line with inflation in each Budget. The final feature of note comes with the increase in the VAT rate to 17.5 per cent in 1991 by Norman Lamont. Just as it did in 1979, the VAT increase pushed up cost-of-living inflation for richer households faster than for poorer households. Again, the effects only last one year.

Overall, the effects of indirect taxes have been to slow cost-of-living inflation for poorer households relative to the average. In the absence of VAT and indirect taxes, the poorest 10 per cent of households in the income distribution would have had an average increase in their cost of living which was 0.05 percentage points higher than average instead of 0.01 percentage points lower. Richer households' cost-of-living increases would have remained higher than average due to increases in the relative price of luxuries, but by a lesser amount (0.14 percentage points rather than 0.16 percentage points).

V. HOUSING

Housing costs form one of the largest components of total household expenditure. Not only are the weights relatively large, but the contribution of mortgage payments in particular has been quite volatile. These factors together make the cost-of-living indices extremely sensitive to fluctuations in mortgage interest rates; on average, a 1 percentage point increase in mortgage interest rates raises inflation by half a percentage point. There is no reason to suppose that this increase in living costs would be distributed evenly across the population.

The treatment of shelter costs for home-owners is practically and conceptually difficult. At present, shelter costs for home-owners are represented in the RPI by nominal mortgage interest payments. Essentially, the current approach is to multiply the average outstanding mortgage debt (calculated as a weighted average of the value of mortgages taken out over the previous 25 years) by the current interest rate.

The use of the interest charge measures current expenditure by the household, but does not reflect the *price* of the shelter service which the house provides. In the same way as the price of a new consumer durable is unaffected by the monthly payments made to the finance company when it is bought on hire-purchase, there is a clear and obvious distinction between the *price* of shelter services and the *borrowing costs* of the household.[16] Mortgage costs go up and down with interest rates and fall to zero at the end of the term, but this is not related to the price of the flow of shelter services which the house provides.

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[16] See Robinson and Skinner (1989).

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While the current approach entails a high degree of sensitivity to interest rate changes, large variations in house prices hardly affect it at all due to the 25-year moving average. Current expenditure on shelter by incumbent home-owners will be unaffected, but if the price of shelter services is the imputed rent then this should rise with house prices. In the UK, however, the imputed rent approach is difficult to apply because the house rental market is heavily influenced by the provision of public housing. The use of imputed rents in the RPI was abandoned in 1975.

There is a particular problem with the measurement of shelter costs for owner-occupiers (households which own their homes outright). These households do not make mortgage payments and so the use of mortgage interest payments for them would give a zero cost. Nevertheless, there must be some cost to owner-occupation; after all, the capital invested in the house may be more profitably invested elsewhere. Furthermore, these households own an asset which is slowly deteriorating physically and technologically. It is also an asset with a capital value which fluctuates. The concept of the user cost approach is an alternative designed to deal with this.

If a household were to borrow in order to buy a house at the beginning of the year, and sell it at the end, the costs to the household would be given by

$$uc_t = \left[m_t(1 + r_t^m) + (1 - m_t)r_t^e + d_t - E\left\{ \frac{P_{t+1}^h - P_t^h}{P_t^h} \right\} \right] P_t^h$$

where m_t is the ratio of the amount borrowed to the purchase price, r_t^m is the tax-adjusted mortgage interest rate, r_t^e is the interest rate on alternative investments, d_t is the depreciation rate and transactions costs, P_t^h is the purchase price of the house, and the final term in the square brackets reflects the expected capital gain (or loss) made on the house over the year. Dougherty and van Order (1982) show that in a competitive market, user costs equal imputed rents.

Under some, not particularly uncommon, circumstances (rapid house-price inflation and relatively low real interest rates), the expected capital gain on housing can outweigh the cost of borrowing and as a result the user cost can be negative. This is illustrated in Figure 11, which shows the user cost of shelter in the UK from 1978.[17]

The house-price increases in the mid- to late 1980s show up clearly as the expected capital gains on housing sent the user cost negative at over –£3,500 p.a. at its lowest point. This simply reflects the fact that, at the time, housing represented a good investment, the returns to which substantially outweighed the costs. The house-price collapse at the beginning of the 1990s and the high interest rates at the time combine to push the user cost up to a peak of around

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[17] See the Appendix for a description of the calculation of user costs.

FIGURE 11
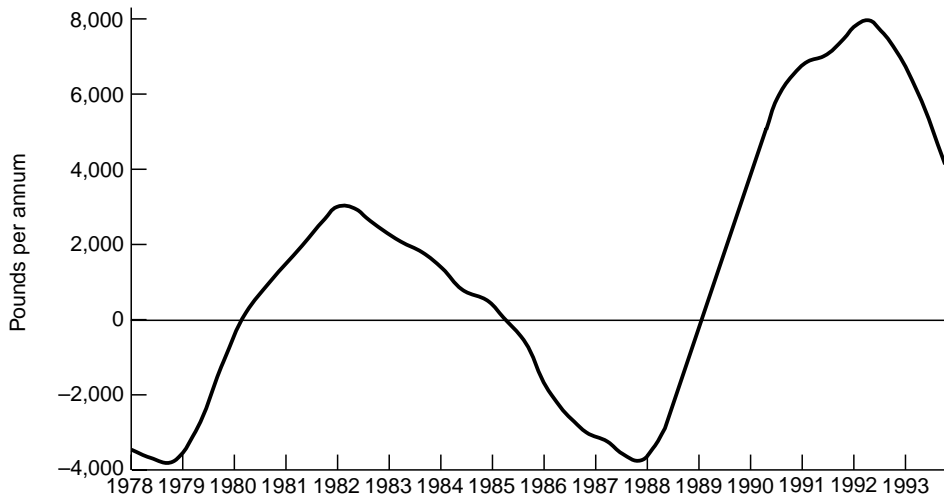
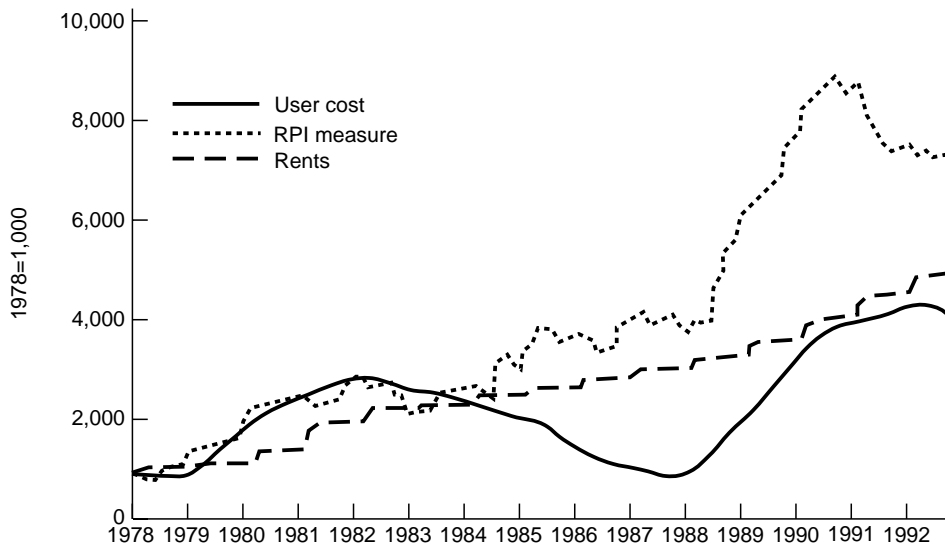**The Nominal User Cost of Shelter**

FIGURE 12

Shelter Costs: Rents, Mortgage Payments (RPI Method) and the User Cost

£8,000 p.a. The beginnings of the recovery in the housing market and the recent falls in interest rates pull the index down again at the end of the period.

Figure 12 shows the user cost index, the mortgage payment index used in the RPI and the price series for rents. The fact that the influence of house-price movements on the RPI measure is negligible is illustrated quite clearly as the RPI measure continues to rise gently in the mid-1980s when expected capital gains cause the user cost to fall. The RPI measure also peaks earlier than the user cost when interest rates first started to fall. Because the lowest point in the house-price cycle was not reached for a few months after interest rates fell, the user cost measure continues to rise, although at a slower rate. The pattern of steps in the rents series is due to the influence of annual changes in rents charged on public housing.

The issue of the appropriate weight for the user cost series is difficult to resolve. The concept of a user cost is notional. The cost is incurred by the household but accrued rather than actually paid. Mortgagers, for example, accrue capital gains and losses but only pay their monthly mortgage bills. The usual weight applied to changes in the price of a good is the expenditure share, where expenditure is price multiplied by quantity. In the case of housing, the implicit quantity is one. The expenditure is therefore the current price. This implies that the weight to apply to the user cost price series is the average nominal user cost itself.

One problem with this is that the weight is both large and extremely volatile, as can be seen from Figure 11. In 1978, for example, average total weekly non-housing expenditure was £68. The average weekly user cost was around –£70. In 1992, the average weekly user cost was around £150, while average total non-housing expenditure was £224. At other times (early 1980, 1985 and 1989), the user cost is zero. Annual increases in the user cost series reach around 100 per cent in early 1979 and in 1988, while they are negative at other times. Including the user cost price series with the nominal user cost weight would result in an unacceptably volatile index which was completely dominated by shelter costs. It is also difficult to know how to deal with a negative weight. The approach adopted here is a compromise aimed at focusing on the different effects of the two price series. The weight used under the user cost approach is mortgage payments for households with mortgages, and average mortgage payments for households that own their houses outright. This has the benefit of using similar weights to those used under the RPI method for mortgagers, but also gives a positive weight to owner-occupiers. The next subsection presents results based on housing-inclusive cost-of-living indices calculated using the RPI method, while subsection 2 discusses and compares the effects of using the user cost approach.

FIGURE 13

**Annual Increase in Cost of Living, with and without Housing Costs:
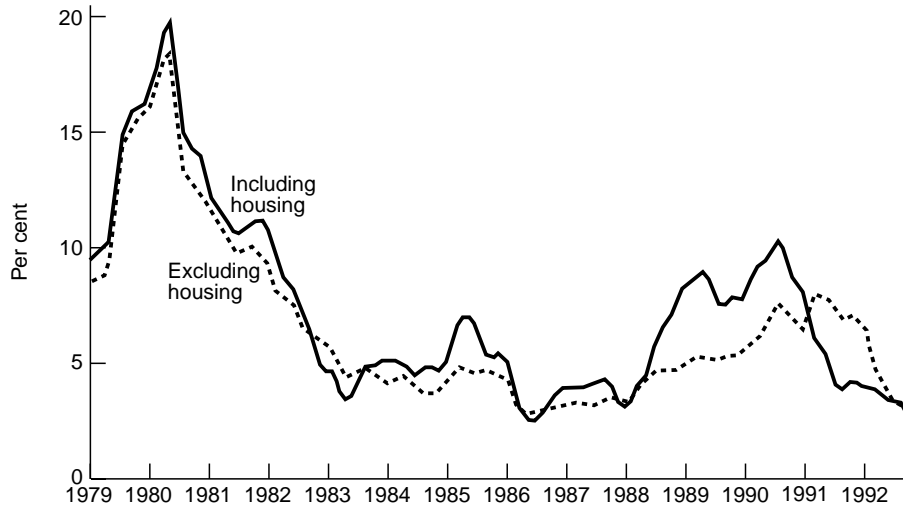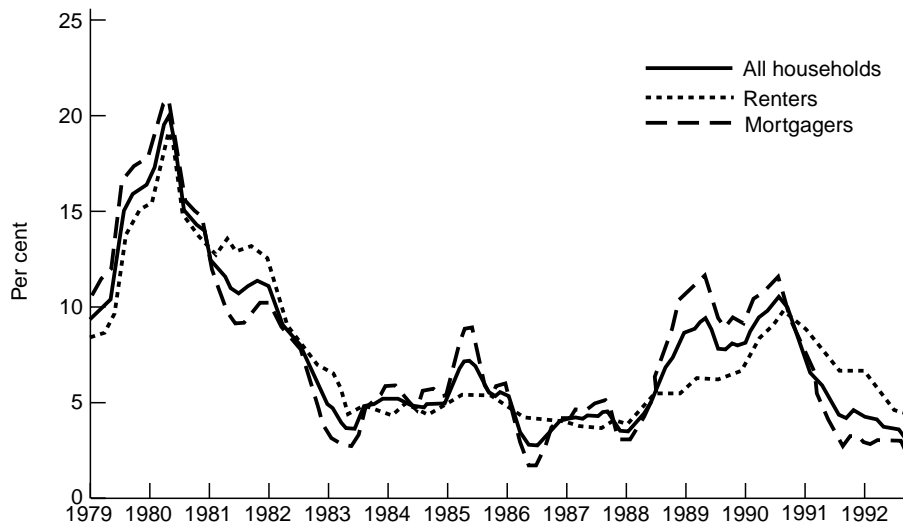All-Households, RPI Shelter Costs Measure**

FIGURE 14

Inflation Rates by Tenure: RPI Shelter Costs Measure

1. The Mortgage Interest Approach

Figure 13 shows the Tornqvist all-households average inflation rate calculated with and without housing costs using the mortgage interest payment (RPI) method.

The effects of rents and mortgage payments are clear, particularly in the late 1980s when increases in interest rates pushed inflation in the all-items index above inflation in the non-housing index. The differential effects on renters versus mortgagers are shown in Figure 14.

The first major point of departure is 1981 when local authority rents were increased sharply[18] as grants from central government were cut, and in the following year mortgage interest rates fell. The main differences, however, are apparent from 1988 onward, as increases in interest rates pushed the cost of living of home-owners up faster while rents lagged. The interest rate cuts which enter the index from early 1990 had the reverse effect, cutting the rate of increase for home-owners relative to the average and allowing the cost of living for renters to catch up with the average as rents rose more sharply and interest rate cuts for home-buyers pulled the average down. By the end of the period, the average cost of living for households with mortgages rose 1.07 per cent more than the all-households average on this measure of shelter costs.

Figure 15 shows the difference in cost-of-living inflation for households in the top and bottom 10 per cent of the income distribution.[19] To a large extent, the differences are driven by differences in tenure types between the two groups. The increase in the cost of living for poorer households in early 1981 corresponds to the timing of the rent increase. Similarly, the fall in the mid- to late 1980s coincides with the increases in mortgage rates which are shown to impact on the richer households, most of whom are home-owners.

Compared with Figure 4, the inclusion of housing costs appears to amplify the cycles in the indices. Adding housing costs increases the average difference for poorer households from –0.01 to –0.07 percentage points and the final difference in growth levels from 0.32 per cent to 0.67 per cent less than the population mean. This is because increases in housing-costs inflation generally coincide with increases in non-housing inflation. The 1981 rent increases, for example, coincided with a period of higher-than-average non-housing inflation for poorer households. Mortgage inflation at the end of the 1980s coincided with a period of higher-than- average inflation for the richer households. Only at the end of the sample period, in the 1990s, do the housing and non-housing effects appear to cancel each other out as rents rise once more relative to mortgages while non-housing inflation for the poorest 10 per cent fell

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[18] See Figure 12.

[19] Before-housing-costs measure: see Goodman and Webb (1994, this volume).

FIGURE 15

Difference in Inflation Rates by Income Group: RPI Shelter Costs Measure
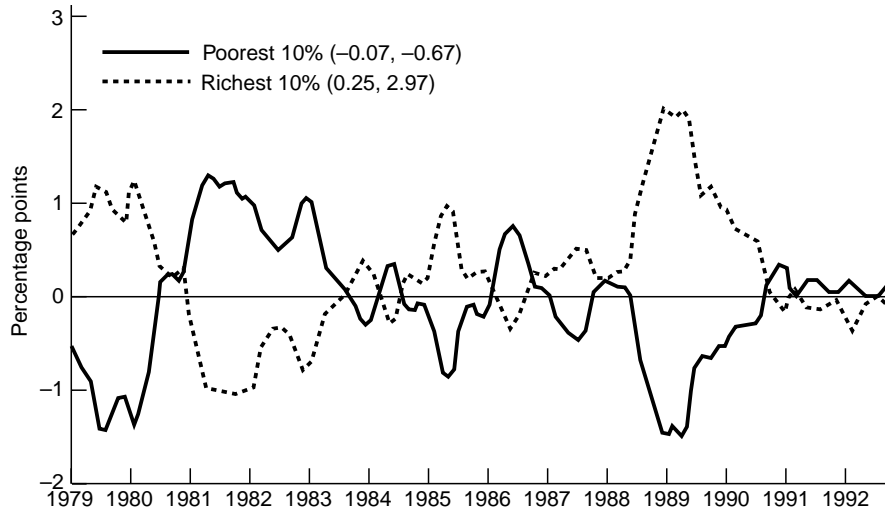

Figure 16 shows the difference in inflation rates for three broad date-of-birth cohorts: households in which the head was born before 1931 (i.e. those where the head was aged 48 or more at the start of the period and over 62 at the end), those in which the head was born after 1930 but before 1961, and those in which the head was born after 1960 (i.e. households in which the head was under 19 at the beginning and under 32 at the end).

The path for the youngest cohort is similar to that for renters and poorer households until about 1983. They seemed to be particularly hard hit in early 1981 by the combined effects of the rent increase and other, non-housing inflation. During the mid-1980s, this cohort appears to take on some of the characteristics of richer home-owners, possibly as a result of the right to buy council houses and as part of the general shift towards house-purchase. This turns out to be unfortunate since they then enter the period of high interest rates with more members who are mortgagers. The average difference from the all-households inflation rate is therefore quite high, at 0.22 percentage points above average, and consequently their cost-of-living level at the end has grown 2.68 per cent more than average. There therefore appears to be quite a strong cohort-specific effect in which an ill-timed move into house-buying increased the cost of living of younger households. In contrast to those born after 1960, the eldest households did relatively well, finishing the period with a cost of living that has grown 0.45 per cent slower than average.

21

FIGURE 16

**Difference in Inflation Rates by Head's Date-of-Birth Cohort:
RPI Shelter Costs Measure**
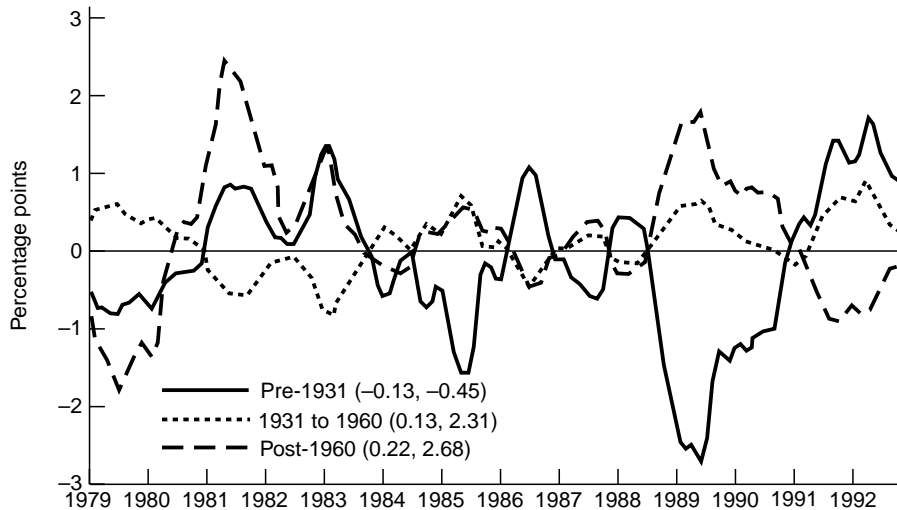
2. The User Cost Approach

Figure 17 shows Tornqvist average inflation rates calculated exclusive and inclusive of housing costs, with shelter costs measured by the user cost method as well as the RPI mortgage interest payments method. Because the user cost and mortgage interest payment indices start off similarly, the differences from Figure 13 in the time path of the all-items index up to the early 1980s are slight. From that point onwards, however, they are quite striking. As the expected capital gains on housing impact upon the shelter costs index during the mid-1980s, the user cost method gives an average all-items inflation index which goes negative in 1986. Increased interest rates and capital losses at the end of the 1980s combine to push the all-items user cost measure well above the RPI measure.

Figure 18 shows the effects of this pattern by tenure type. As expected, home-owners do relatively well during the housing boom, enjoying falls in their cost of living. Home-owners who own their houses outright in particular did very well in this period as their shelter costs reflect the capital gains without the mortgage costs. This, however, had the consequence that they were more exposed to the capital losses in the next few years. This gave owner-occupiers an inflation rate which was 1.56 percentage points higher than average over the whole period, but by the end of 1992 their cost of living had grown nearly 19 per cent faster than average. This was due to their exposure to capital losses on their homes in the late 1980s.

FIGURE 17

**Annual Increase in Cost of Living, with and without Housing Costs:
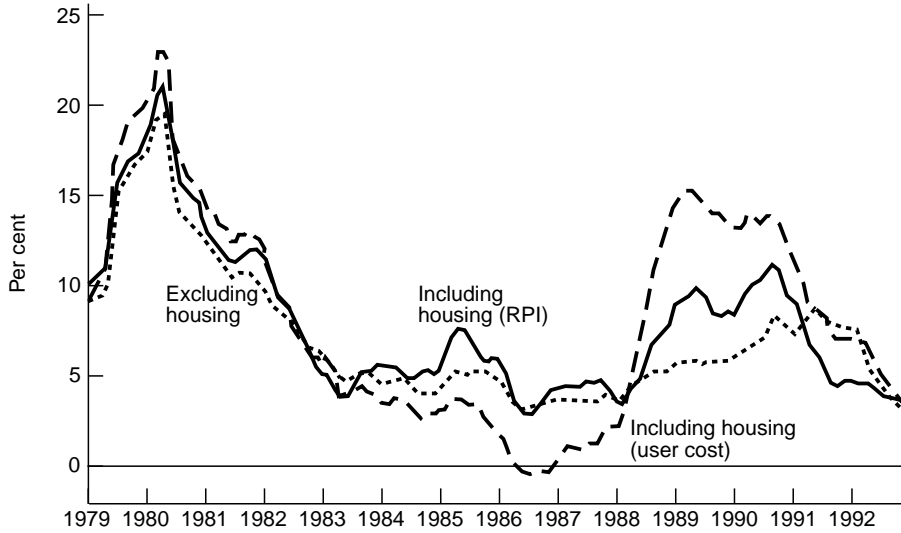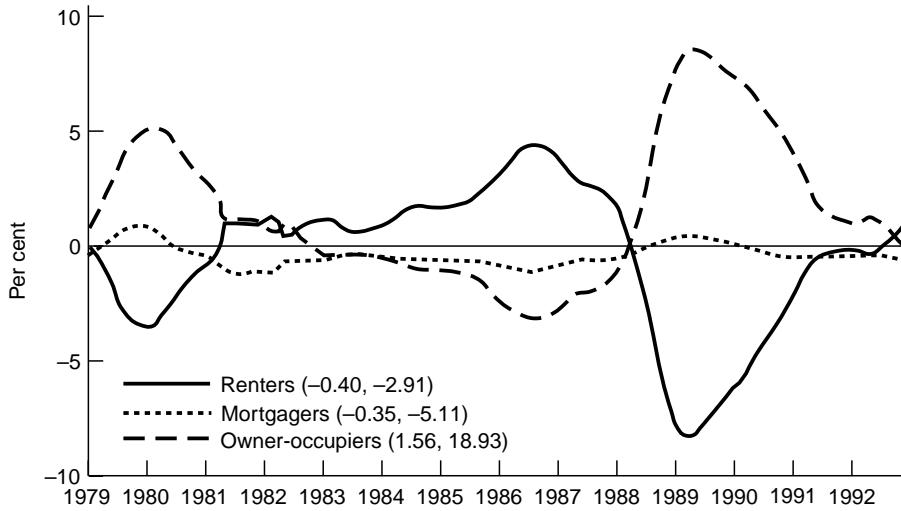All Households, User Cost Measure and RPI Shelter Costs Measure**

FIGURE 18

Difference in Inflation Rates by Tenure: User Cost Measure

The previous section picked up the relationship between the proportion of mortgage-payers and income bracket — households on higher incomes were more likely to be paying a mortgage, and the size of mortgage was likely to be greater than that of less-well-off households. The mortgage interest payments method, therefore, fails to pick up the large number of usually older households in the bottom income decile that own their homes outright.[20] The user cost of housing does apply to these households because they experience capital gains and losses on the value of their homes. Figure 19 shows the difference from average inflation for the poorest and richest 10 per cent of the population. As expected, because of the number of owner-occupiers in the bottom decile, this is quite different from the corresponding figure using the RPI measure (Figure 15). Now, inflation in the bottom decile is 0.75 percentage points higher than average over the period, leaving the bottom decile with a cost of living 9.19 per cent above average at the end of the period.

FIGURE 19

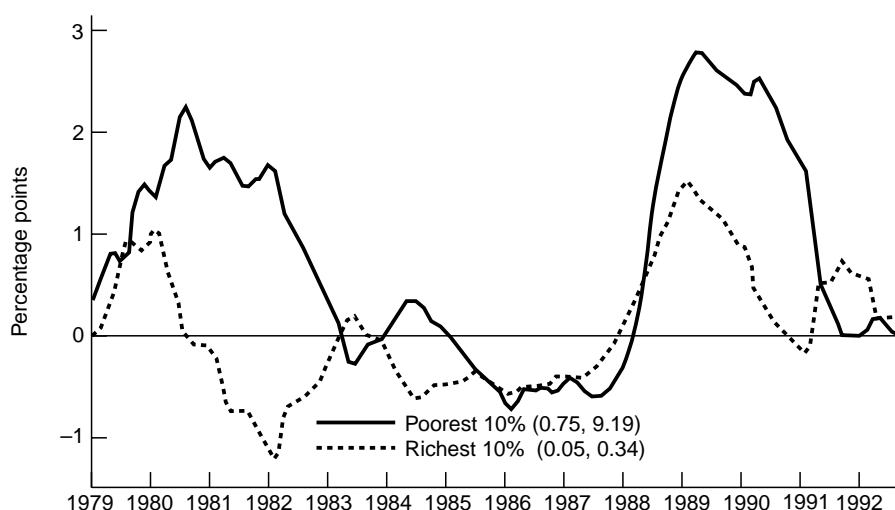**Difference in Inflation Rates by Income Group: User Cost Measure**

Figure 20 shows the cohort differences corresponding to Figure 16. The pattern here is again markedly different. The oldest households now do worst, with an average inflation rate 0.88 percentage points higher than average and a cost-of- living growth at the end of the period which is 11.47 per cent faster than average. This is clearly due to what happens after 1987. The reason for the large hump in inflation for the eldest cohort is probably the treatment of households

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[20] In 1991–92, in the bottom income decile (before-housing-costs measure), 24 per cent of households own their homes outright and 28 per cent have a mortgage (Department of Social Security, 1994).

that own their houses outright. These sorts of households were therefore exposed to the capital losses on their homes which the user cost measure includes and this completely alters the picture to one where the cohort-specific effect falls not on the young but on the old.

FIGURE 20

Differences in Inflation Rates by Head's Date-of-Birth Cohort: User Cost Measure
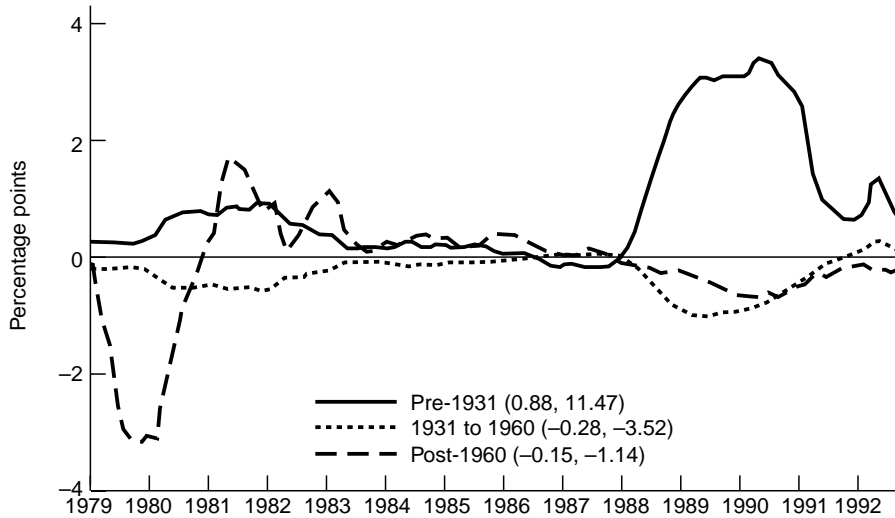
VI. CONCLUSIONS

Several criticisms can be made of the approach adopted in this paper. Firstly, differences in spending patterns could be a function of differences in prices which we do not observe in these data. Apart from regional price variation, which is not examined, differences in prices could also be correlated with household characteristics which are examined. For example, poorer households without private transport may be forced to buy goods at the corner shop rather than the edge- of-town superstore. The prices they face may be higher than those paid by richer households. However, this only matters if the rates of change in these different sets of prices are different over time.

Secondly, the issue of quality changes has not been addressed. Quality improvements in goods and services over the period may mean that more utility is derived from consumption of some goods, e.g. video-recorders are better now than in 1979. This means that cost-of-living indices like those calculated here may overestimate cost increases because they do not adjust for quality improvements. A counter-argument may be that consumers become harder to

please as quality improves over time. Higher quality would then be needed to elicit the same level of welfare in 1992 as in 1979. It is not possible to address the issue of quality with these data.

This paper does not resolve the issue of the treatment of housing costs. The sensitivity of the results to different measures of shelter costs is illustrated but further work is required to develop truly sensible treatment of shelter costs with an appropriate weight. This would provide enough material for a long paper in its own right.

It is important to reiterate that these results are entirely dependent upon the period studied. A different period would have given different results. The run of data from 1979 to 1992 does, however, nest two other papers (Bradshaw and Godfrey (1983) and Fry and Pashardes (1986)) and shows that their results, like those here, do not apply more widely than over the period from which they draw their data.

The object of this paper has been to examine the extent and pattern of differences in the cost of living for subgroups of the population. The main result is that differences in the growth in cost of living at the end of the period studied are small. However, relative inflation rates for different households cycle over the period and there are several periods in which inflation rates differ widely between the top and bottom of the income distribution and between demographic groups.

The fall in the relative price of necessities and the corresponding increase in the price of luxuries over the period, and the difference in expenditure patterns between rich and poor households, have meant that the cost of living has increased faster for richer households than it has for poorer households. The progressive nature of indirect taxes between 1979 and 1992 has been shown to have contributed to this effect. This means that the real income of poorer households is higher at the moment, and the real income of richer households is lower at the moment, than standard low income statistics suggest, and this narrows the increase in real income inequality. However, this does not imply that it is good to be poor. The differences are small and the welfare effects of low income massively outweigh the effects of a slightly lower-than-average increase in their cost of living.[21]

Given that these differences between groups are small, the obvious question is whether they matter when uprating benefits etc. Benefit uprating is designed to compensate poor households for year-to-year increases in the cost of living. On average, cost-of-living increases in line with the average index over the period would have been broadly accurate (in fact, they have been overly generous by a very small amount). This should not be taken to imply, however, that there is no need for the government to use an index more representative of the cost of living of poorer households to uprate benefits. This paper has demonstrated that

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[21] See Stoker (1986).

households in receipt of benefits have had both periods of higher-than-average and periods of lower-than-average increases in living costs in the order of around ±2 per cent. These periods can last up to one or two years. Benefit uprating on the basis of average increases has therefore overcompensated them for increases in their cost of living at some times and undercompensated them at other times. These period-to-period errors matter if there are liquidity constraints and households cannot reallocate the excess from one period to another to smooth their consumption. There almost certainly are such constraints, and this means that using the 'wrong' index imposes costs on poorer households even if the overall increase is more or less right when viewed over a longer period.

APPENDIX: THE USER COST MEASURE OF SHELTER COSTS

User costs were calculated using average monthly house-price data supplied by the Department of the Environment. Expected capital gains were estimated non-parametrically using these data. Essentially, this process applied a 12-month weighted moving average around each data point. Following the Bank of England's treatment of user costs in its housing-adjusted retail price index, depreciation was set at 0.5 per cent, transactions costs at 2 per cent and average proportion of the price borrowed at 65 per cent. The mortgage interest rate is from Table 7.1L in *Financial Statistics* (HMSO). The opportunity cost calculations are based on the Treasury Bill yield from Table 38 in *Economic Trends* (HMSO).

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