Affordability of utilities' services: extent, practice, policy

Research Paper 12: Relationship between Average Expenditure and the Expenditure Share Devoted to Particular Utilities

Dr David Deller (Centre for Competition Policy, University of East Anglia)

Professor Catherine Waddams (Joint Academic Director, CERRE and Centre for Competition Policy, University of East Anglia)

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1. Introduction

The purpose of this document is to establish whether the relationships between household expenditure, and the expenditure share devoted to each of the four utilities considered (energy, water, telecoms and transport), that is shown within the UK, are replicated at country level. For reference, the chart showing the relationships for the UK based on data from the Living Costs and Food Survey in 2012 is shown below:

Chart 1: Estimated Median Expenditure Share Spent on Different Utilities by Total Expenditure (Proxy Income)
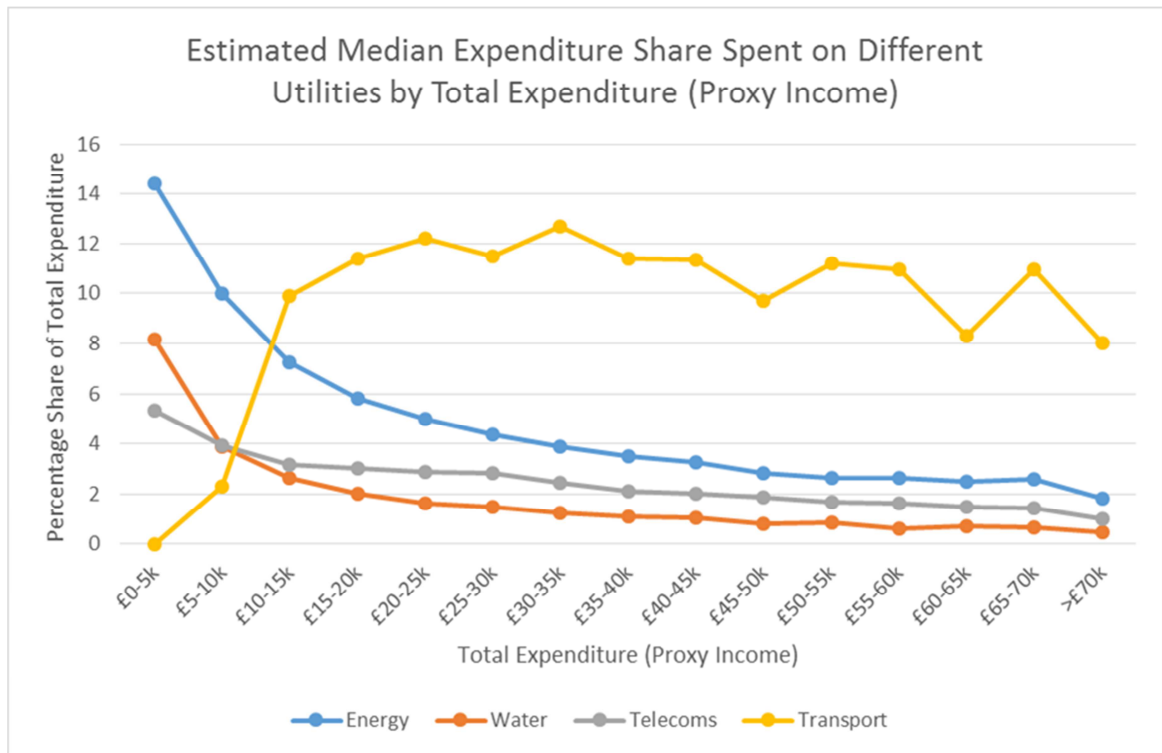
*Source: Living Costs and Food Survey, 2012*

2. Analysis

At aggregate level the cross-country patterns reported below do seem to relate reasonably well to the total expenditure-expenditure share relationships within the UK that are shown in Chart 1.

The data for the cross-country comparisons has been obtained from Eurostat's database which is based on household budget surveys conducted by national authorities across the EU. As we are basing the correlations on cross-country analysis it is important to recognise Eurostat's warning that the methodologies of the household budget surveys vary across member states and so variations between countries' figures may, in part, be due to differences in survey methodologies. We utilise data for all 28 member states from 2010. In the charts below, each data point represents a single country. To provide figures that are close to the 'real' economic circumstances of different countries the mean expenditure figures have been calculated using purchasing power parity exchange rates. These exchange rates account for the fact that in some member states products are cheaper than in others and so a given level of expenditure can purchase a larger quantity of goods. Additionally, mean expenditure is charted 'per equivalised adult' rather than per household to account for any variations in the average size of households across countries.

Ordinary-least squares regressions have been performed using heteroskedastic robust standard errors to establish whether statistically significant relationships exist between expenditure per equivalised adult and the sector-specific expenditure share. Red dashed lines are plotted where a relationship exists that is significant at the 5% level.

Chart 2 shows that the negative non-linear relationship between total expenditure and the expenditure share devoted to energy shown in the UK is replicated when comparing aggregate measures in EU member states.

Chart 2: Relationship Between Mean Annual Expenditure per Equivalised Adult and Mean Expenditure Share Devoted to Energy (2010 Figures, Purchasing Power Parity Exchange Rates)
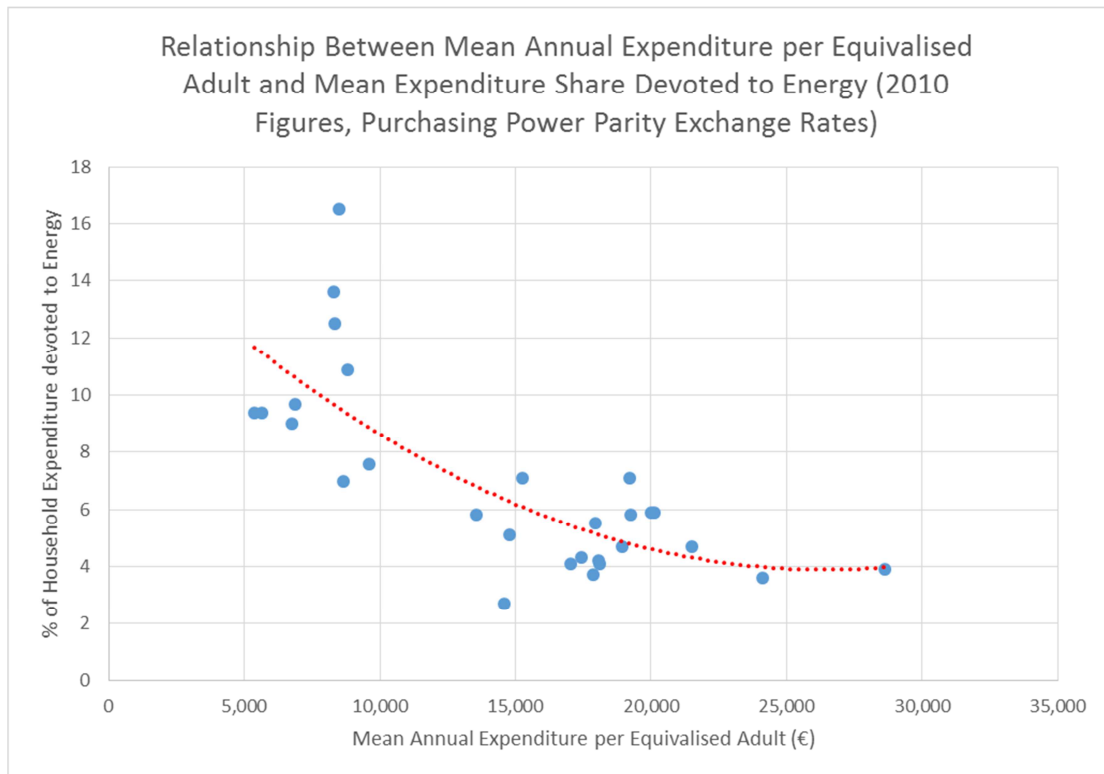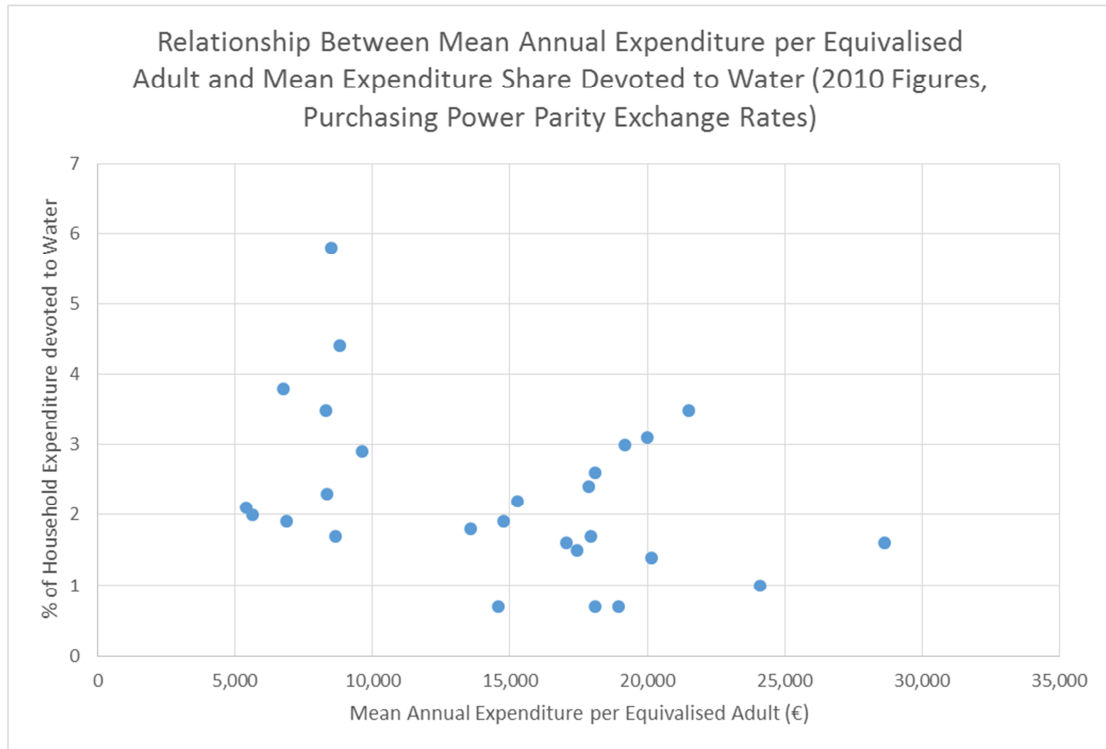

Source: Eurostat

Chart 3 plots the relationship between total expenditure and the expenditure share devoted to water. Water is the only sector where the relationship between the expenditure share and mean annual expenditure per equivalised adult was found to be insignificant, so no line of best fit is shown in Chart 3. Such lack of a significant relationship is likely to result from the variation in the ways that consumers pay for water across countries, for example, via general taxation, flat charges or increasing block tariffs.

Chart 4 shows that across the EU's members there is a significant negative linear relationship between mean expenditure per equivalised adult and the telecoms expenditure share. In comparison to the non-linear relationship for energy, the linear relationship for telecoms may suggest that telecoms services are regarded as less of a necessity than energy, making it easier for consumers in poorer countries to economise on telecoms expenditure.
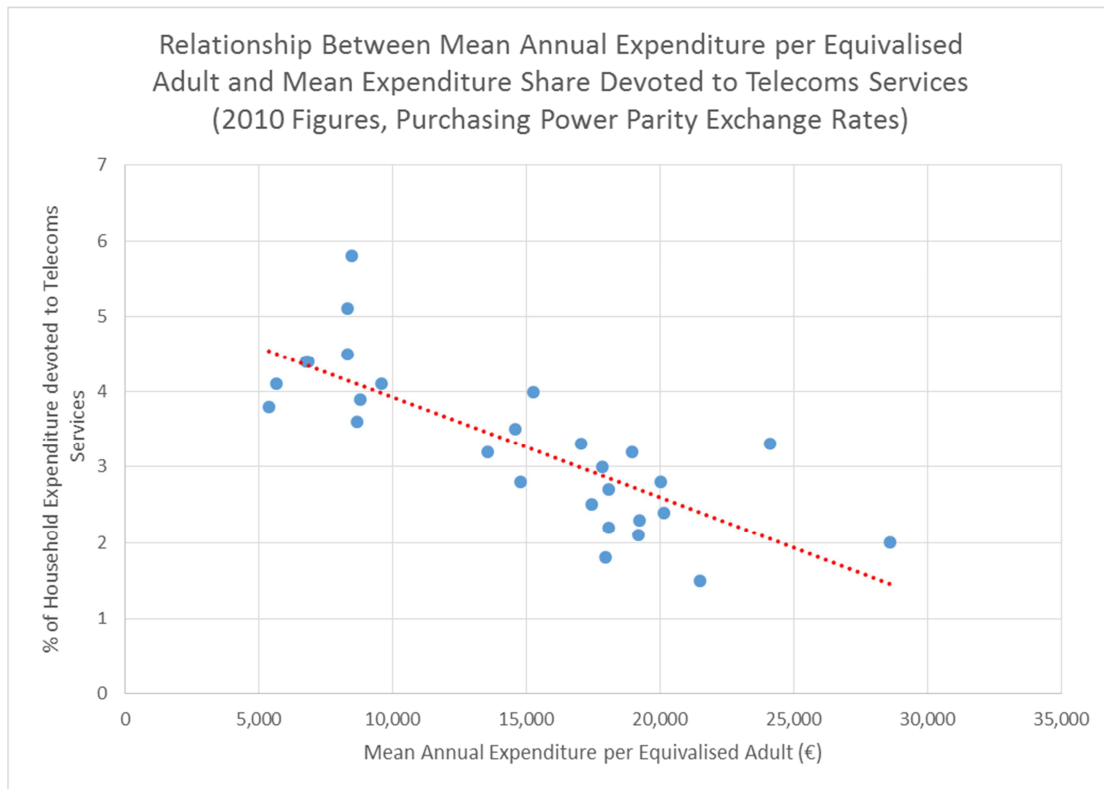
Chart 3: Relationship Between Mean Annual Expenditure per Equivalised Adult and Mean Expenditure Share Devoted to Water (2010 Figures, Purchasing Power Parity Exchange Rates)
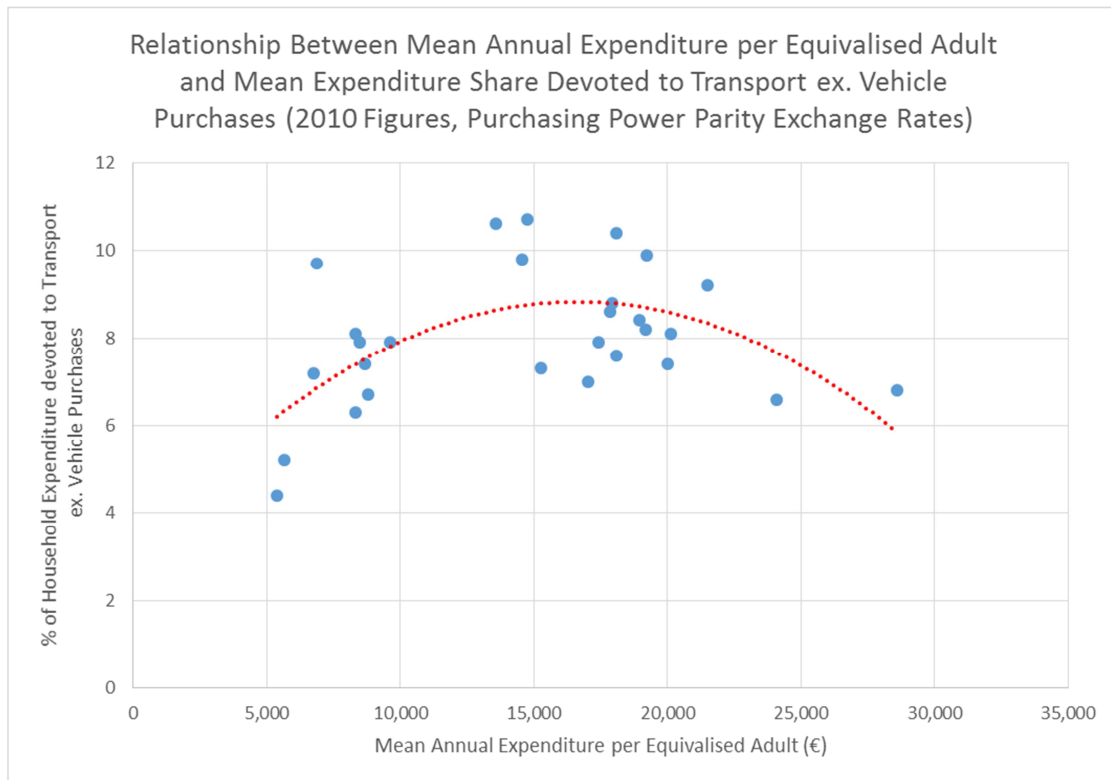

Source: Eurostat

Chart 4: Relationship Between Mean Annual Expenditure per Equivalised Adult and Mean Expenditure Share Devoted to Telecoms Services (2010 Figures, Purchasing Power Parity Exchange Rates)

Relationship Between Mean Annual Expenditure per Equivalised Adult and Mean Expenditure Share Devoted to Telecoms Services (2010 Figures, Purchasing Power Parity Exchange Rates)

Source: Eurostat

The final chart, Chart 5, reports the relationship between mean expenditure per equivalised adult and the expenditure share devoted to transport (excluding the purchase of vehicles). The relationship in the transport sector is very different to that in the other sectors, although, again, the relationship across EU members broadly mirrors that found between different groups within the UK. A significant non-linear inverted U-shape relationship exists. In other words, for low to moderate total expenditure, transport expenditure shares increase with income, but as average incomes continue to rise, the average expenditure share devoted to transport falls.

Chart 5: Relationship Between Mean Annual Expenditure per Equivalised Adult and Mean Expenditure Share Devoted to Transport ex. Vehicle Purchases (2010 Figures, Purchasing Power Parity Exchange Rates)

Relationship Between Mean Annual Expenditure per Equivalised Adult and Mean Expenditure Share Devoted to Transport ex. Vehicle Purchases (2010 Figures, Purchasing Power Parity Exchange Rates)

Source: Eurostat

In terms of the robustness of the results, it is worth noting that in each chart there are three very distinct groups of countries: (i) those with mean equivalised adult expenditure of €5-10,000, (ii) those with mean expenditure of €15-20,000, and (iii) outliers with very high mean expenditure. As a result a key part of the relationships found across countries is driven by differences between countries which are at different levels of economic development.

The regressions have been repeated using mean expenditure figures which have not been corrected for purchasing power parity. Using the mean expenditure figures without this correction does not change the nature of any of the relationships, which remain significant at the 5% level, although this difference does alter the precise coefficients which describe the relationships.