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***Affordability of utilities' services: extent,
practice, policy***

***Research Paper 9: The Relationships between
Objective and Subjective Indicators of Utility
Affordability in the EU***

***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

This document uses Eurostat data to compare 'objective' and 'subjective' indicators of affordability difficulties at the Member State level. The aim is to identify the extent to which the 'objective' and 'subjective' indicators are correlated, i.e. how far do they tell the same story. The 'objective' indicators we use are the average expenditure shares devoted to energy, water and telecoms in different countries in 2005 and 2010. The 'subjective' indicators come from the EU Statistics on Income and Living Conditions (EU-SILC).

The three subjective indicators we consider from EU-SILC are the following:

- Percentage of population reporting an enforced inability to keep warm.
- Percentage of population reporting an inability to afford a computer despite wanting one.
- Percentage of population reporting arrears on their utility bills in the past 12 months due to financial difficulties.

We describe these indicators as subjective because they are reliant on an individual's perception of their situation and its implications rather than on a record of their consumption/expenditure.

When investigating the correlations between the objective and subjective measures we pool all of the data from 2005 and 2010 for both new Member States and the EU15 to maximise the quantity of data available for analysis. In the charts below, each blue dot represents a country-year pair and a red dashed line is plotted when a correlation between the two charted variables is statistically significant. Even where there is a statistically significant correlation between the variables, in all the charts there is considerable variation in the position of individual country-year combinations. As a result, at the individual member state level one cannot assume that the objective and subjective indicators of affordability difficulties will provide the same picture. Unfortunately we do not know how much the picture would change if we had microdata from the countries involved; the charts rely on averages across the whole population rather than looking at the correlation between objective and subjective indicators reported by individual households.¹

A final point to note is that a correlation between two variables does not imply causation. For example, we cannot say that a changing expenditure share is causing households' subjective reports of utility affordability to change. All we can say is that two indicators appear to be related. It could be that the changes in each of the indicators are being driven by a common underlying (unobserved) factor.

¹To conduct such analysis at the individual household level it would be necessary for a single survey to record both a household's utility expenditure and its responses to the EU-SILC questions. No attempt has been made to investigate whether any national household surveys combine these two types of question.

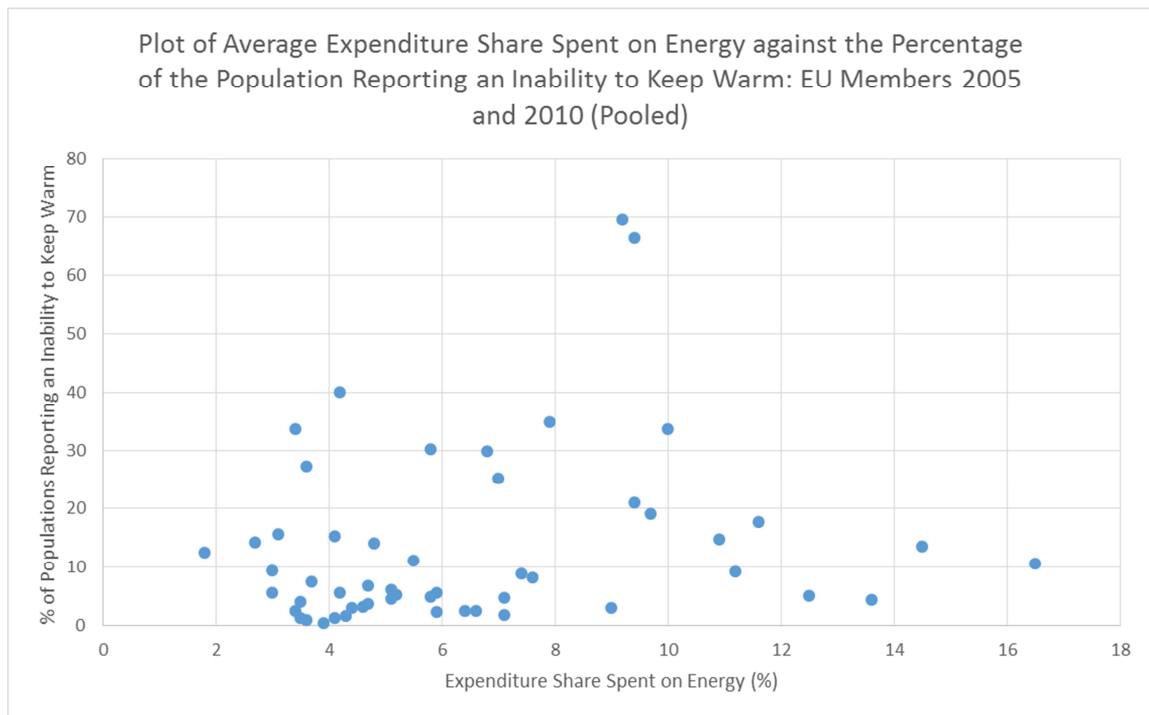


2. Analysis

Chart 1 plots two potential measures of energy affordability difficulties: the share of expenditure spent on energy and the percentage of the population reporting an inability to keep warm. The correlation between these two indicators is not statistically significant. The implication of this is that using each of these indicators separately is likely to give different pictures of the prevalence of fuel poverty across the EU.

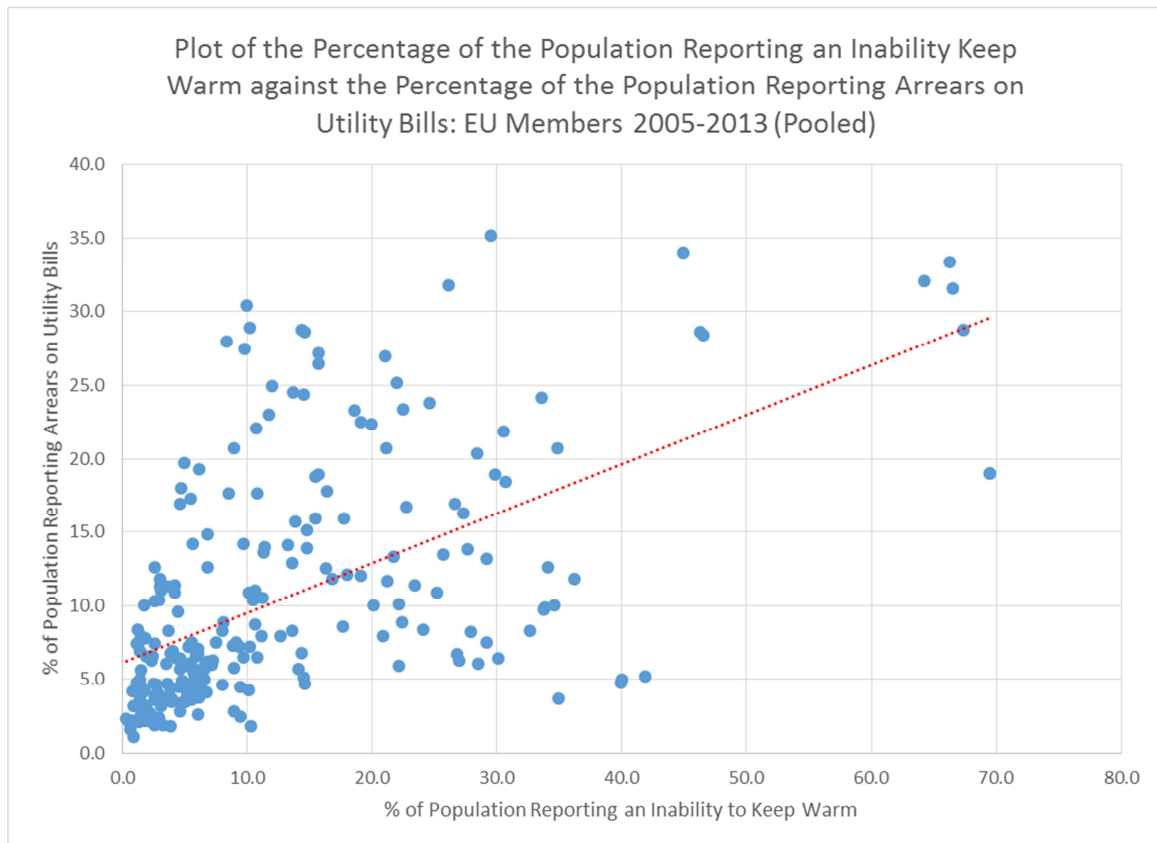
In those cases where the correlation between the indicators in levels was not significant, the possibility of a correlation between the percentage point changes in the value of indicators between 2005 and 2010 was also considered. No instances were found of a correlation between the percentage point changes of indicators between 2005 and 2010.

Chart 1: Plot of Average Expenditure Share Spent on Energy against the Percentage of the Population Reporting an Inability to Keep Warm: EU Members 2005 and 2010 (Pooled)



Source: Eurostat

Chart 2: Plot of the Percentage of the Population Reporting an Inability to Keep Warm against the Percentage of the Population Reporting Arrears on Utility Bills: EU Members 2005 - 2013 (Pooled)



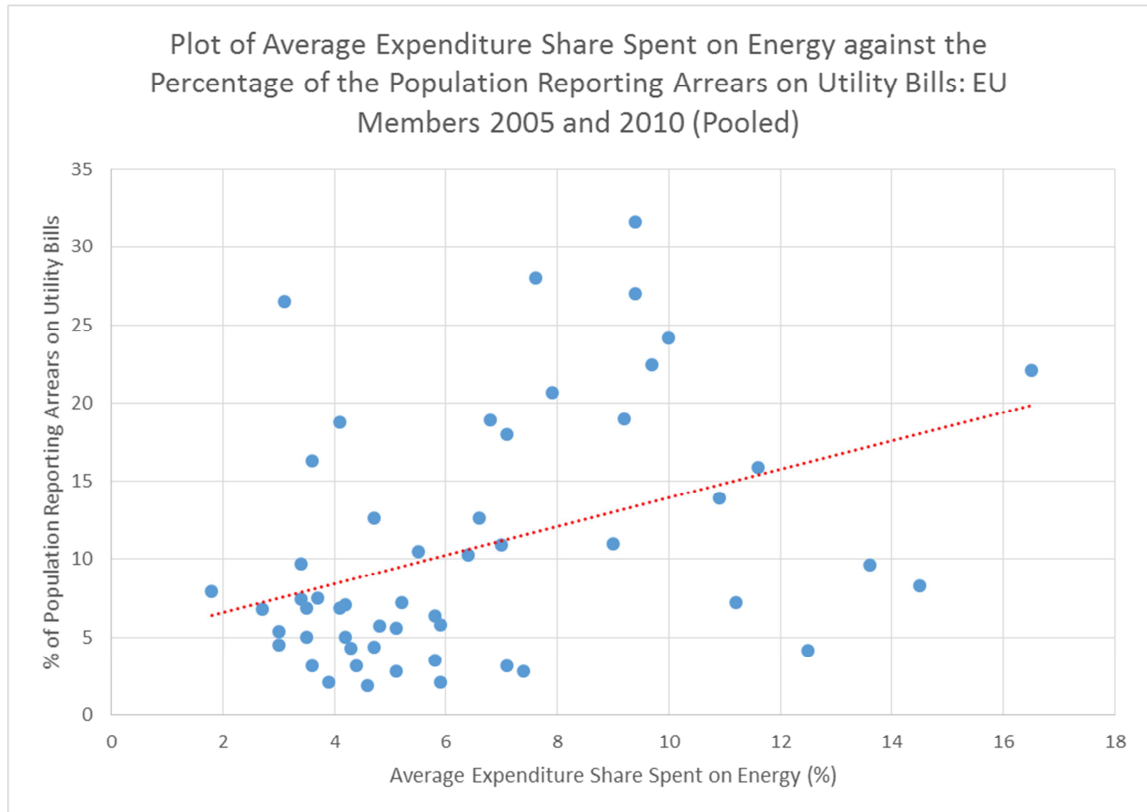
Source: Eurostat

While Chart 1 shows that the objective and subjective measures of energy affordability difficulties may provide rather different pictures, Chart 2 shows that there is a statistically significant positive correlation between two subjective indicators of affordability difficulties. Chart 2 plots the percentage of the population reporting an inability to keep warm against the percentage of the population reporting arrears on utility bills for each year between 2005 and 2013. The correlation coefficient between these two indicators is 0.57 which is statistically significant at the 1% level.

Chart 3 returns to charting an objective measure of affordability against a subjective measure. In Chart 3 the average expenditure share spent on energy is plotted against the percentage of the population reporting arrears on their utility bills. A statistically significant positive correlation is found between these two indicators with the correlation coefficient being 0.39, a figure which is significant at the 1% level.



Chart 3: Plot of Average Expenditure Share Spent on Energy against the Percentage of the Population Reporting Arrears on Utility Bills: EU Members 2005 and 2010 (Pooled)



Source: Eurostat

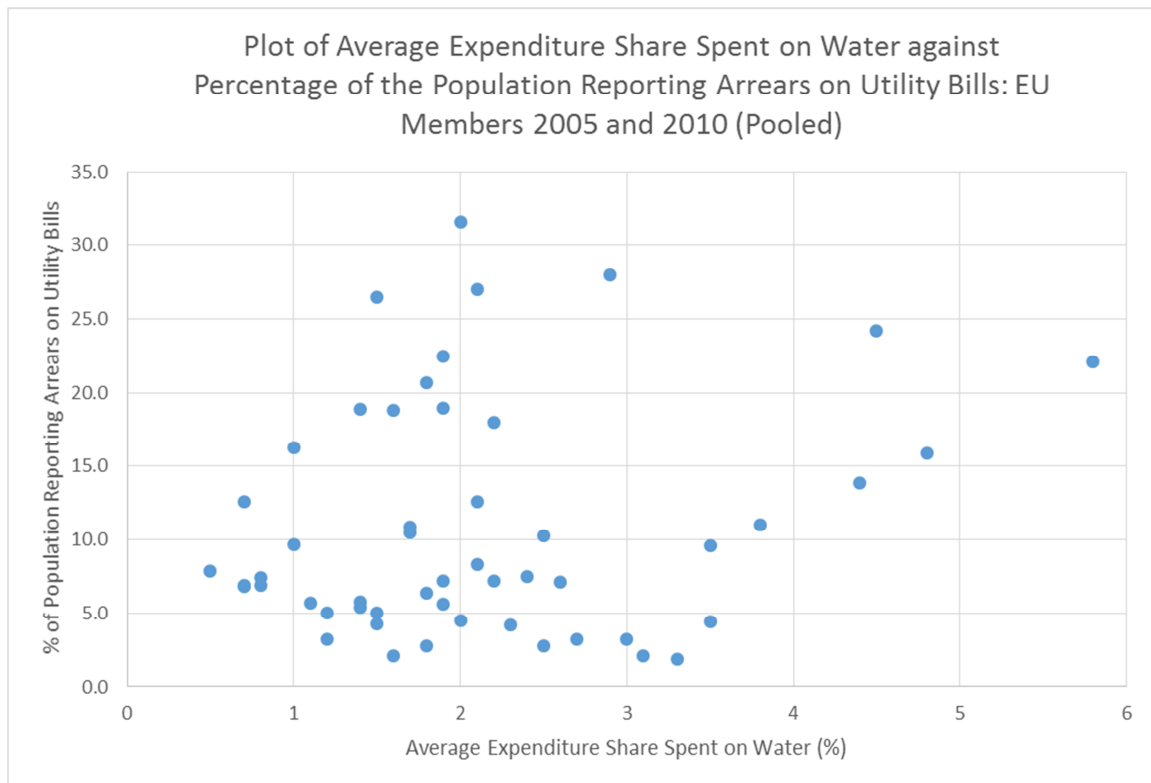
Appreciating that arrears on utility bills are likely to result only from the build-up of affordability difficulties over a period of time, investigations were also conducted into whether the level of utility arrears reported in 2010 was correlated to the change in expenditure shares devoted to energy, water and all utilities combined between 2005 and 2010. In none of these three instances was a statistically significant correlation found. This might be because the percentage of the population reporting utility arrears is more closely linked to changes in expenditure shares over a shorter time period than the previous 5 years. The changes in the previous 1 or 2 years may be more appropriate. Unfortunately the availability of the expenditure share data is limited to 5 yearly intervals.

Chart 4 plots the average expenditure share devoted to water against the percentage of the population reporting arrears on their utility bills. In contrast to Chart 3 the correlation between these two indicators is not statistically significant. The difference in statistical significance between Charts 3 and 4 may result from the fact that the expenditure share households devote to water is much lower than that for energy and so water is probably a weaker driver of households being pushed into financial difficulties and arrears. The consumption of water may also be more evenly



distributed throughout the year than energy consumption, implying a lower risk of ‘bill shock’ and being confronted with a particularly high bill which is difficult to pay.

Chart 4: Plot of Average Expenditure Share Spent on Water against the Percentage of the Population Reporting Arrears on Utility Bills: EU Members 2005 and 2010 (Pooled)



Source: Eurostat

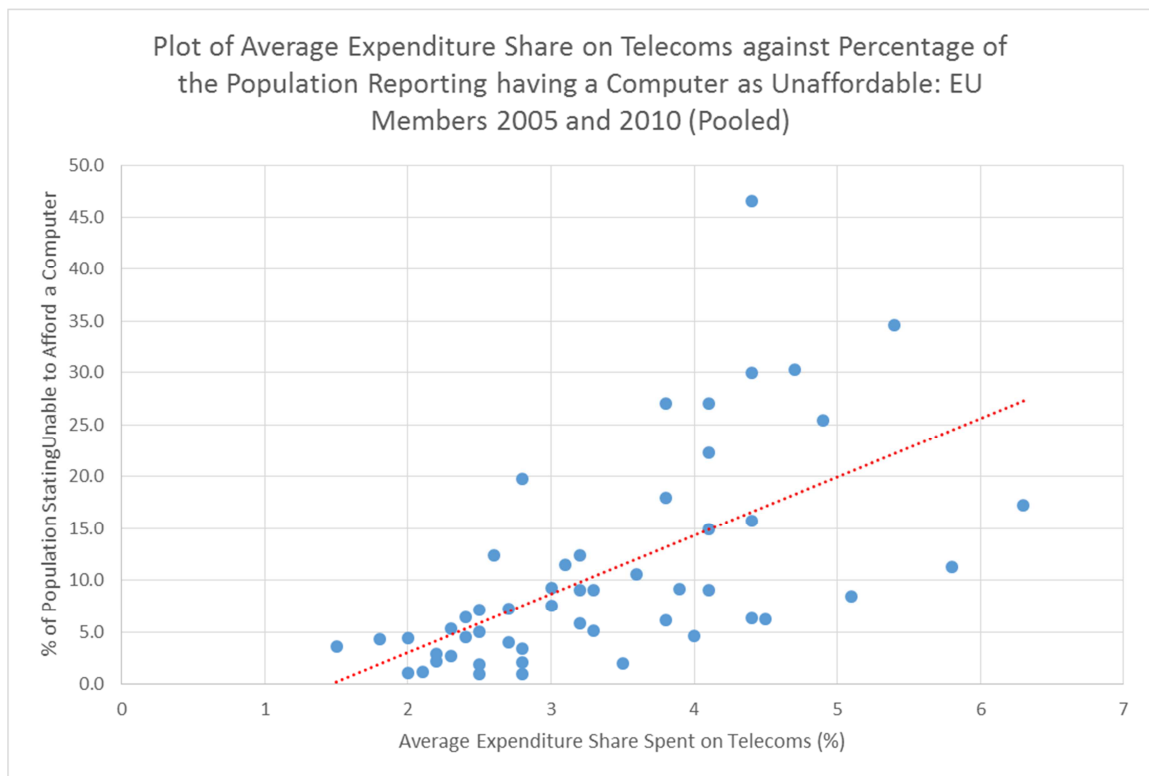
Chart 5 shows that there is a statistically significant positive correlation between the average expenditure share devoted to telecoms services and the percentage of the population reporting that having a computer in a household is unaffordable. The correlation coefficient between these two indicators is 0.61 which is significant at the 1% level. An explanation for this strong correlation could be that the costs of computer and telecoms equipment are strongly related. However, the fact that the correlation is positive is possibly evidence that undermines the notion that computer ownership is a key condition for additional consumption of telecoms services. A negative correlation between computers being unaffordable and the expenditure devoted to telecoms services would seem more consistent, at a simplistic level, with computers being a gateway technology to increased telecoms consumption.²

² Of course, a rising expenditure share is not a guarantee of either increased expenditure on telecoms or increased telecoms usage.



Finally Chart 6 plots the expenditure share spent on all utilities combined against the percentage of the population reporting arrears related to their utility bills. There is a statistically significant positive correlation between these two indicators, with a correlation coefficient of 0.35, which is significant at the 5% level. That energy expenditure is a sub-component of total utility expenditure and the higher correlation coefficient between the energy expenditure share and utility arrears suggests that the correlation in Chart 6 is probably driven primarily by that between energy expenditure shares and reported utility arrears.

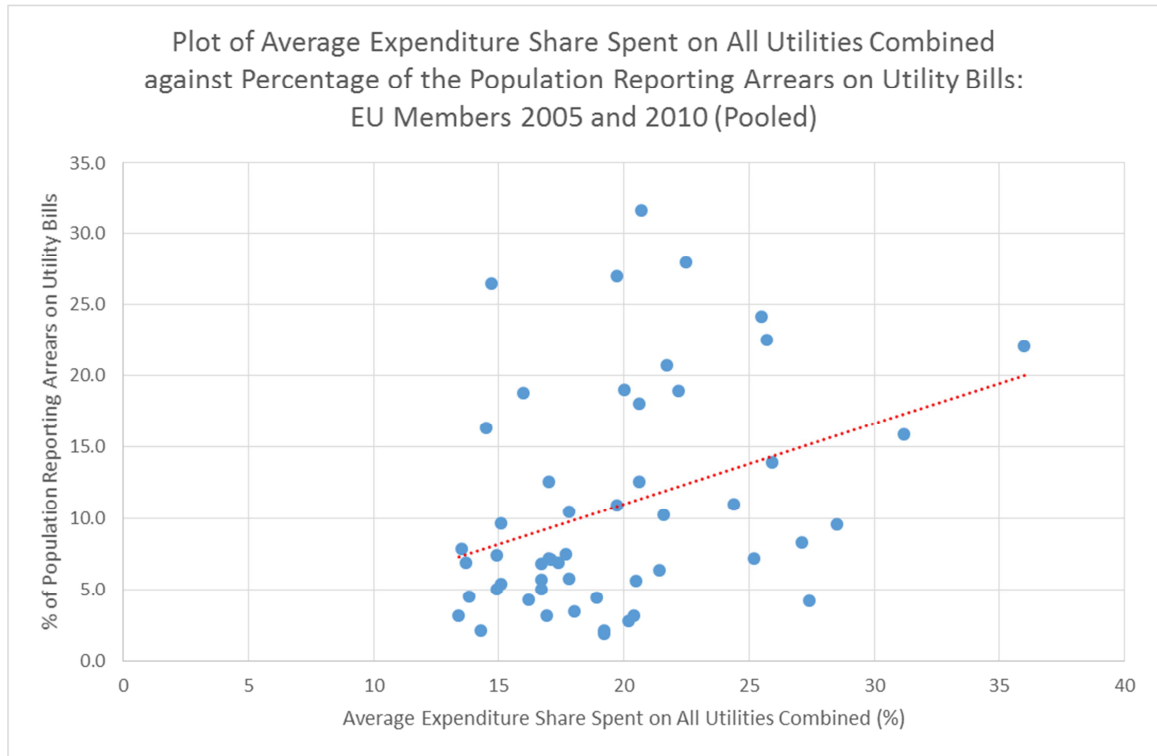
Chart 5: Plot of Average Expenditure Share Spent on Telecoms against the Percentage of the Population Reporting having a Computer as Unaffordable: EU Members 2005 and 2010 (Pooled)



Source: Eurostat



Chart 6: Plot of Average Expenditure Share Spent on All Utilities Combined against the Percentage of the Population Reporting Arrears on Utility Bills: EU Members 2005 and 2010 (Pooled)



Source: Eurostat