

Necessity or Luxury Good?

Household Energy Spending and Income in Britain 1991 - 2007

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The residential demand for energy has been growing steadily and this trend is expected to continue for the foreseeable future. Household spending on energy services tends to increase with income while changes in energy prices can affect lower income consumers disproportionately. We explore household total energy spending as well as electricity and gas spending, separately. We use an extensive British household panel data with more than 77,000 observations for the period 1991-2007 to explore the drivers of energy spending using the fixed effects approach. We analyse income as a main driver of energy spending and model a third order function of income to draw Engel spending curves for energy. The results show that Engel spending curves are S-shaped for total energy spending as well as for gas and electricity spending. These spending curves exhibit inflection points and indicate U-shaped income elasticities for energy spending. These points occur only at very low income levels. Beyond these income levels, income elasticity of spending increases in income. These income elasticities, however, do not reach unity and thus suggest that energy remains a necessity for households.

A common shortcoming is the availability of energy prices in liberalized retail electricity markets at the household level. This is overcome by a new modelling approach to reflect within and between regional differences in energy prices. Households face single fuel arrangements, high concentration in the energy sector and are using differing payment methods. We hypothesize that the individual household prices are linked to differences in income levels. Thus, 'within' and 'between' regional

differences in income are used as proxy for these differences in prices. Using more disaggregated energy price data would restrict our sample period to 1998-2007 with distorting impacts on our estimation results.

We hypothesise that adjustments in household energy spending to income changes are different in the long run. Households can buy new appliances or undertake measures to improve the energy efficiency of their homes impacting on their energy spending. Long run changes in energy spending of households are approximated by exploring unit effects - i.e. we explore the cross-section set of unit effects to approximate the long run relationship between energy spending and income. The results suggest that income elasticity of energy spending is somewhat higher in the long run, though they do not exceed unity. Accordingly, an increase in income leads to a stronger increase in energy spending in the longer term. Income elasticities are highest for electricity spending. One explanation could be that households buy and use more electric appliances over the longer term. At the same time, gas spending increases strongest over time. This could be explained by households heating existing homes to larger extents or even moving to larger homes.

The results also show a dynamic link between energy spending and income changes. Income elasticity of energy spending is not constant and changes with differing income levels. Policy approaches based on a fixed budget threshold where basic needs are met are therefore not supported by our findings as household needs change with their income levels. We recommend policy measures that enable households to find their individual utility-maximizing energy spending levels, instead.

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