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Household Energy Expenditure and Income Groups: Evidence from Great Britain

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Household energy use is increasingly important in the context of fuel poverty and the equity debate as well as in relation to energy saving and efficiency policies. In order to achieve climate change objectives and to reduce carbon emissions domestic energy consumption can be reduced. At the same time households who already spend a large share of their income on energy will face additional hardship from policy measures such as carbon taxes. Higher energy bills might lead to more difficulties in warming homes adequately.

This paper intends to contribute to the discussion of how households differ in their energy spending and their responses to energy price and income changes. We first explore the link between household energy spending and income in general. The analysis is based on a panel dataset from a comprehensive survey of UK households from 1991 to 2007 comprising over 77,000 observations of households. Households across the UK have been reinterviewed over the whole 17 year period.

We find an S-shaped Engel curve, i.e. energy spending is first increasing in income then briefly stabilizes while income continues increase. At higher income levels energy spending increases again in income. An inflection point is reached when the increase in household energy spending briefly stabilizes and we interpret this as a point where the essential energy needs are likely to have been met. At this point a further increase in income is only spent on energy to lower extents compared to an income increase at lower income levels.

We then examine the effect of a set of socio-economic determinants and drivers such as income, energy price, housing types, and household size on household energy spending. We explore this effect for all households together as well as for different household groups according to income. We use fixed effects econometric models which allow for taking into account unobservable household characteristics. These characteristics might include factors such as environmental awareness that will have impacts on energy spending. We find significant differences among the income groups in their energy spending behaviour. In particular the income and price

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elasticities differ across household groups. Households on low incomes are more sensitive to electricity price changes. If the price of electricity increases these households decrease their energy spending to larger extents than richer households. At the same time poorer households are less responsive to gas price changes than higher income households. They will likely maintain a certain level of spending on gas as this is mainly used for heating. If the price of gas increases they will hardly reduce their energy spending. Moreover, higher gas prices lead to lower electricity expenditures, except for the highest incomes.

Based on these results we discuss that a carbon taxation that increases energy prices will affect low income households more strongly than high income households.The results underline the importance of designing differentiated policy measures to address energy, climate change, and fuel poverty objectives in the household segment. Further increases in energy prices could lead to low income households being worse off while high income households not having strong incentives to reduce their energy consumption. Consequently, different policy measures may be needed for different income groups.

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