

# ***FUEL POVERTY, HEALTH AND SUBJECTIVE ASSESSMENT: A LATENT CLASS APPROACH AND APPLICATION TO THE CASE OF SPAIN***

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## **Overview**

The rising energy prices along with the decline in per capita income in recent years have resulted in increasing the risk of being in fuel poverty for households in many countries (see Bouzarovski and Petrova, 2015). Fuel poverty occurs when a household cannot afford the basic levels of energy services such as space heating, space cooling, lighting or cooking. This issue is generally related to high fuel prices/expenditure, low income levels and poor energy efficiency of the dwellings (Boardman, 2010). This circumstance can pose a social policy problem even in milder climates. According to the Association of Environmental Sciences in Spain, in 2014, 5.1 million people could not afford to keep their homes at an adequate temperature during the winter, a 22% growth from 2012 (Tirado Herrero *et al.*, 2016). Moreover, it is generally recognised that fuel poverty has a detrimental effect on health. The World Health Organization identifies several diseases and health issues that are related to fuel poverty, mainly cardiovascular and respiratory problems, less resistance to infections and poor mental health (anxiety and stress) (Braubach *et al.*, 2011). Nevertheless, there are difficulties in defining and measuring the effect of fuel poverty on health and well-being. Furthermore, despite its relevance and the compelling need for addressing fuel poverty, this issue is not a high priority policy matter.

## **Methods**

This paper uses a latent class ordered probit model to analyse the effect of fuel poverty on individual self-assessed health. This model is applied to a sample of Spanish households for the period 2011-2014. A health production function is approximated through an ordered probit model in which a set of variables that have a direct influence on health such as age, income, employment situation or education are included. The use of a latent class framework allows to control for unobserved heterogeneity among the individuals. In addition, by including a subjective measure of fuel poverty in the probabilities of class membership, this approach allows us to purge the influence of 'objective' fuel poverty on self-assessed health that is based on personal perceptions.

## **Results**

Our findings show that poor housing conditions, fuel poverty and material deprivation have a negative impact on health. In the latent class model we find two classes. One of them predominantly includes individuals who rate themselves to be in a situation of fuel poverty. The estimates show that those individuals who are in a 'subjective' situation of fuel poverty tend to report poor health status regardless of their living conditions. We also observe that the effect of fuel poverty on health appears weaker when individual perceptions are not controlled in the model. This may be evidence of obtaining biased results due to model misspecification when individual heterogeneity is not taken into account.

## **Conclusions**

This extension of the link between health and fuel poverty has not been explored previously and can help target the affected individuals and groups more accurately. Classifying households using a subjective measure of fuel poverty yields different results from the use of objective measures. Moreover, this issue may also bias the results when analysing the effect of fuel poverty on health. In general, we can state that if objective measures of fuel poverty are used, subjectivity needs to be controlled. These results can serve to guide energy policies oriented to tackle fuel poverty, since it is increasingly recognised that subjectivity is a relevant feature when measuring it. Our approach

may help to mitigate the mismatch between the definition of fuel poverty and the eligibility for assistance that frequently arises and increases the total costs of tackling the problem (Boardman, 2010).

## References

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