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A BOUNDED RATIONALITY MODEL OF PRIVATE ENERGY INVESTMENT DECISIONS

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Overview

Good estimations on how public and private infrastructures and/or individual endowments with technologies change over time are of interest to both researchers and decision makers. These issues involve the change of social structures of neighbourhoods, the fuel consumption of the national passenger car fleet, and the evolution of domestic energy demand. These evolutions have in common that they mostly involve high capital investment and are therefore infrequently undertaken by private investors.

Methods

Among the methods applied to model these evolutions are the Technology Acceptance Model (Davis 1989), the Theory of Planned Behaviour (Ajzen 1991) and its application to innovation diffusion (see Venkatesh et. al. 2003 for an overview) as well as optimizing and rational choice models.

In contrast to these approaches we propose to apply bounded rationality decision models, parameterised using socio-demographic surveys, to gain more detailed insights into these evolutions. This is done by refining the large number of individual decision problems to a number of representative decision problems by aggregating the technological and infrastructural data. This *technological* aggregation is complemented by socio-economic lifestyle clustering which allows the replacement of the large number of individual decision makers by stereotyped decision makers that are representative for the lifestyle class to which they belong.

The paper (i) presents a bounded rational decision model that enables one to estimate the development of the energy demand within the residential building sector, (ii) proposes how the model parameters can be derived from socio-demographic surveys, and (iii) offers some illustrative results of its application.

Results/Conclusions

The results of this work show that the modelling approach can lead to a detailed understanding on how the energy demand within the residential sector might change in upcoming years and which set of energy conversion technologies might be to be applied. Further, they allow the capital investment by building owners into energy conversion technologies and insulation measures to be estimated. The model includes the socio-economic structure of cities into an analysis. The approach described serves as a bridge between quantitative numerical modelling and structured socio-demographic interviewing techniques.

References

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