

Preferences of social tenants in energy efficiency investments and the effect of information provision

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Summary

Introduction

The European Union has set ambitious goals in terms of reducing energy consumption in the building stock. The Dutch government has translated these goals and has obliged housing associations to reduce the gas and energy use in the social housing stock. Energy efficiency investments (energy retrofitting) are necessary to achieve these goals. Dutch law states that housing associations are required to obtain consent of at least 70% of the tenants in a building complex to renovate and set a consequential rent increase. Literature suggests limited attention, the absence of knowledge about the benefits and unwillingness to obtain it, could lead to less adaption of energy efficient behavior. Information provision could decrease this effect. Therefore this research focusses on answering the research question: how much can information provision affect tenants' willingness to accept the energy efficiency investment and the corresponding rent increase?

The research is built up by first studying literature describing the underlying behavioral motives in environmental behavior, the relative importance of these motives and the influence information appealing to these motives has on environmental behavior. The energy efficiency investments used in practice are then examined. Then the valuation tenants have for the attributes of these investments is studied in a stated choice experiment. The experiment includes information treatment in order to derive the effect information provision has on the preference of social tenants for energy retrofitting. The results of the experiment are used to determine which information approach could best be used for four different retrofitting approaches widely applied in the Netherlands. Literature research on the behavioral motives of environmental behavior suggests three behavioral motives as basic motivation to engage in environmental behavior; the gain motive, hedonic motive and normative motive. The gain motive describes the motivation to engage in pro-environmental behavior because of the monetary advantages. The hedonic motive is based on the enjoyability and easiness of the new situation or behavior. The normative motive describes the motivation to behave a certain way because it is the right thing to do. The literature shows that information appealing to the behavioral motives (feedback on energy use, In-house displays, posters and online dashboard with information, information about health effects, etc.) does affect individual energy-saving behavior.

Method

A stated choice experiment conducted in this research has quantified the social housings tenants' preferences for six attributes of the energy efficiency investments and the effect information treatment has on this valuation. The six attributes are based on the measures used in practice. Social housing associations have two main routes in which they can improve the energy efficiency of their dwellings: insulating to reduce energy use or installing solar panels to produce energy. Insulation can be done in two extents and combined with the production of energy. Furthermore, the replacement of dwelling appliances such as boilers and heating systems with new, HR versions, can additionally contribute to reducing energy consumption. Using the four approaches developed by Aedes, the following attributes of retrofitting seem to be important choice variables when designing the retrofitting package: (i) technique used: insulation or solar panels; (ii) yes or no gas displacement; (iii) energy savings achieved; (iv) rent increase faced by tenants; (v) reduction in CO₂ emissions; (vi)

additional stimulating measures like renewal of the facilities in the dwelling. The information treatments included in this experiment are based on the hedonic and gain motive. A treatment related to the normative motive has been designed but was not included.

Results

The experiment was run by a questionnaire distributed in September and October 2018 by 4 housing associations around the Netherlands. After data cleaning, 606 full questionnaires were obtained. The results are modelled by the nested logit model. In general a social housing tenant is willing to cooperate with renovation and all aspects of the energy investments used in this research are shown to be of importance. The renewal of facilities is of highest importance to the tenants, respectively followed by higher emission reduction, higher energy savings, lower rent increase, the displacement of gas and insulation used as technology instead of solar panels. The hedonic treatment increases the preference for insulation strongly. The gain treatment does influence the preference for high energy savings, leading to a more rational distribution of the preferences for energy savings, but also increases the preference for not renovating.

The translation of these outcomes into predicted probabilities that tenants would agree with renovation packages of Aedes leads to practically applicable results. It is shown that providing information to social housing tenants does influence their decision for renovating or not. The hedonic treatment has shown to an effective way to stimulate tenants to agree with renovation, while the gain treatment increases the probability for not renovating making the tenants more critical. Offering a renewal of the dwelling facilities as an extra is shown to be the most effective way to increase the probability that tenants choose for renovation.

Social housing tenants have shown to be willing to accept energy efficiency investments if offered the right attributes. The renewal of the facilities has shown to be of most importance for them. The best information approach is the hedonic information approach based on the effect this information approach has on the value of the renovation packages and the preference for not renovating.

Conclusion and discussion

These conclusions have been drawn from a stated choice experiment. Though arguably resembling real situations, the stated choice remains a fictional situation and therefore real decision making could differ. The size of the dataset has led towards a necessary focus in order to get significant results. A larger dataset could be used to look for interregional or international differences in valuation, include other aspects such as nuisance, separate attributes for solar panels and insulation and include other treatments. Finally, it is optional to use mixed logit models to see if a better fit can be reached and latent class analysis to further analyze the data for heterogeneity.