CONSUMER INATTENTION AND ENERGY EFFICIENCY: THE CAUSAL EFFECT OF LABEL ELEMENTS

Stephan Sommer, Rheinisch-Westfälisches Institutt für Wirtschaftsforschung, +49 201 8149 233, sommer@rwi-essen.de
Mark Andor, Rheinisch-Westfälisches Institutt für Wirtschaftsforschung, +49 201 8149 216, andor@rwi-essen.de
Andreas Gerster, Rheinisch-Westfälisches Institutt für Wirtschaftsforschung, +49 201 8149 521, gerster@rwi-essen.de

Overview

Inattention to energy use when purchasing energy-using durables is one factor that helps to explain the low tendency of consumers to invest into cost-effective technologies, which is commonly referred to as the "energy-efficiency-gap". In order to bridge this gap and to foster the uptake of these technologies, many countries have implemented energy label schemes. Despite their wide application, however, little is known about the effects of specific label designs. Based on the EU Energy Efficiency Label, in this paper, we uncover which label elements can help to mitigate consumers' inattention to energy efficiency. Our analysis is based on a hypothetical discrete choice experiment among about 5,000 households. We find that a large share of consumers value efficiency certification per se – i.e. independent of energy consumption levels – and take this as an evidence for the employment of decision heuristics. Furthermore, supplementing the label with operating cost information increases the effectiveness of the EU label to guide consumers to more energy efficient appliances. On the other hand, increasing the complexity of the label by displaying further product characteristics has the opposite effect. From a policy perspective, our results suggest that simplifying the label and providing annual cost information enhance the effectiveness of the label to induce consumers to choose more energy efficient appliances.

Methods

We frame our discrete choice experiment as a purchase decision of refrigerators. In four randomly ordered choice sets, participants are asked to choose between two appliances that are equal in all quality dimensions except from purchase cost, electricity consumption levels, and efficiency classes. Given cost minimizing behavior and building upon Geraden et al.'s (2015) model, we assume consumers to choose the more energy efficient, but also more expensive, alternative A if its perceived present value of cost (PPVC) is smaller than that of alternative B:

$$PPVC_A - PPVC_B = \Delta\mathrm{K} + \theta(\mathrm{S},\mathrm{N})\Delta\mathrm{PVO} + \tau(\mathrm{S},\mathrm{N})\Delta\mathrm{EC},$$

where ΔK corresponds to the difference in purchase cost, ΔPVO denotes the difference in the present values of operating cost, and ΔEC represents the difference in efficiency classes. The attention parameter θ captures the degree to which operating costs are considered in the decision rule (DellaVigna, 2009). Operating costs are assumed to be an opaque value component that is only partially considered in the decision rule since its computation requires beliefs over electricity prices and the lifespan of the appliances as well as discounting future costs. Finally, τ reflects the valuation of efficiency class differences. Two treatments are implemented that aim at altering the attention paid to operating cost differences (θ) and the valuation of efficiency class differences (τ): The first treatment raises the salience of operating cost (S) by additionally providing information on annual electricity cost of the appliances, whereas the second treatment raises the complexity of the label by displaying further product attributes (N) on the label, such as capacity and the noise level of the refrigerator.

The careful design of our choice sets allows us to investigate three different situations: firstly, we analyze situations, in which both EC and PVO differ. In addition, we are also able to separate the channels through which our treatments work. By choosing two choice sets, in which either $\Delta EC = 0$ or $\Delta PVO = 0$, we can establish a direct link between the uptake of energy efficient appliances and a change in the attention to operating cost or the valuaton of efficiency class differences, respectively. We estimate the following linear probability model:

$$Y_i = \alpha + \boldsymbol{\beta}' T_i + \boldsymbol{\gamma}' X_i + \boldsymbol{\delta}' T_i X_i + \varepsilon_i,$$

where the binary dependent variable Y_i takes the value one if respondent i chooses the more energy-efficient appliance and zero otherwise. T_i represents her treatment group and X_i is a vector of her socio-economic characteristics. The Interaction term $T_i X_i$ is included to analyze heterogeneity of the treatment effects and ε_i is an idiosyncratic error term.

Results

In situations, where both efficiency classes and electricity consumption levels differ among the two alternatives, we find that providing annual cost information raises the choice probability of the more energy efficient appliance. In contrast, increasing the number of competing stimuli on the label significantly decreases the choice of the more energy efficient appliance.

Analyzing a choice that neglects differences in electricity consumption levels allows us investigate whether consumers value differences in efficiency classes per se. We find that almost two thirds of the respondents are willing to pay a substantial premimum for the upgrade of efficiency classes independent from electricity consumption levels. This indicates that a large share of consumers use the efficiency label as a decision heuristic in purchase decisions. Our results further indicate that individuals with high information search or decision cost are more likely to resort to this heuristic. It is especially employed by individuals that are uninformed about electricity prices and individuals with low educational attainments. The inclusion of cost information in this particular setting acts as a substitute for more coarse efficiency classes. This indicates that some individuals change the basis for their decision making as soon as more readily available information is provided, which is in line with information search models (e.g. Houde, 2014).

When the choice does not feature differences in efficiency classes, we observe that providing annual cost information significantly raises the attention paid to operating cost. Thus, we detect that increasing the salience of operating cost has two opposite effects: While it increases the attention to operating costs, it reduces the valuation of efficiency class differences.

Conclusions

Building upon behavioral insights, our findings indicate that a large share of respondents employ the EU efficiency label as a decision heuristic. Interestingly, we observe an information substitution effect when we supplement the label with information on operating cost. Overall, our results suggest that both providing information on operating cost and simplifying the label by removing information that is unrelated to energy efficiency increase the uptake of energy efficient appliances.

This is especially relevant in the EU because energy efficiency labels affect millions of purchase decisions each year, for instance, in 2014 about 15 million refrigerators were sold. However, the insights gained from this study also carry over to other appliances. Investments into efficient appliances can save a great deal of electricity, which in turn,would result in a substantial reduction of negative externalities associated with the generation of electricity.

References

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