

INVESTMENT LITERACY AND CHOICE OF ELECTRIC APPLIANCES: THE IMPACT OF EDUCATIONAL PROGRAMS AND ONLINE SUPPORT TOOLS

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Overview

This paper explores the possibility that enhancing individuals' energy and investment literacy increases the rate at which households identify the most cost-effective, and ideally also most energy-efficient, electrical appliances. We define energy literacy to be the individual's prior energy-related knowledge and investment literacy to be the individual's cognitive ability to perform an investment analysis. The latter is closely linked to the concept of financial literacy, i.e. an individual's knowledge of tools that allow to control, invest and manage own finances, which enables an individual to optimize the use of scarce financial resources. The literature on financial literacy suggests that individuals with strong financial skills are able to make efficient financial decisions in various domains (Lusardi 2011/2014). In this paper, we argue that a high level of financial literacy, especially investment literacy, has a positive impact on decisions related to investments in efficient electrical appliances. As shown by Attari et al. (2010) for the US, by Brounen et al. (2013) for the Netherlands and by Blasch et al. (2017) for Switzerland, the level of energy-related knowledge and investment literacy in the population tends to be relatively low. Moreover, Blasch et al. (2016) show that a great share of individuals seems to not consider the lifetime cost of electrical appliances when choosing between two appliances. As energy-efficient electrical appliances are usually more costly than less efficient appliances, boundedly-rational consumers will tend to opt for the less efficient appliances with lower upfront cost. This situation can be classified as a behavioural failure (Broberg and Kazukauskas 2015). In this paper, we are therefore particularly interested in studying the behavioural failure related to the fact that consumers lack financial and investment literacy.

To test the influence of enhancing an individual's investment literacy on the choice of appliances, we develop an online randomized control trial and implement it on two independently chosen samples of the Swiss population. One treatment offers a short education program - via a set of information slides. The second intervention provides access to an online calculator that supports the investment decision-making of the individual. Results across the two samples are encouraging. We find that i) pre-treatment investment literacy positively impacts on the probability of identifying the most cost-effective appliance; ii) the reinforcement of the energy and investment literacy increases the rate at which individuals identify the most cost-effective appliance; and iii) while both interventions are effective in increasing the chances that a cost-effective appliance is chosen, the online calculator turned out to be more effective than the educational program. Public policy implications are discussed.

Methods

The impact of the information slides and of the online calculator was analyzed by performing an online randomized control trial among two independent samples of Swiss households in which participants had to evaluate the lifetime cost of two appliances differing in purchase price and energy consumption. The first sample of 916 households represents the consumers living in the city of Bern (HSEU-Bern), whereas the second sample of 5,015 households represents the households living in the German- and French-speaking parts of Switzerland (SHEDS).

The online randomized controlled experiment was embedded within two household surveys. All respondents were randomly assigned to one of the three groups - control group, a treatment group with education-slides, and another treatment group with access to an online calculator. Within HSEU-Bern, each respondents had an equal probability of being assigned to any of the three groups. In the SHEDS experiment however, about 20% of the total 5,015 respondents were randomly selected to be part of one of the two treatment groups with equal probability, the rest being the control. The respondents were asked to imagine a situation in which they need to replace their refrigerator. They were given a choice between two refrigerators that differed only in terms of their purchase price and their energy consumption (in kWh/year). Respondents were asked which of the two refrigerators would minimize their expenditure on the cooling of food and beverages during 10 years of planned usage. The two refrigerator

alternatives, and the two answer options within the decision making question, were presented to the respondents in a random order to control for any order bias.

Empirically, our interest is on identifying the determinants of two decisions - whether a respondent identifies the most cost-effective refrigerator, and whether he or she carries out an investment calculation. Among the determinants of such decisions, we pay particular attention to the two treatments. Similarly to Blasch et al. (2016), our identification strategy relies on the estimation of a recursive bivariate probit. This econometric strategy is equipped to handle i) the binary nature of both decisions; ii) their correlation; and iii) the sequential nature of the decision process. The correlation in the decisions under analysis arises from their simultaneity, and can be modelled through a bivariate probit (BP) model. The BP models the two binary decisions as a seemingly unrelated system of two probit equations, and captures the correlation in the decisions via the correlation between the errors terms.

Results

We find that the investment calculator is highly effective in increasing the probability that a consumer identifies the electrical appliance with the lower lifetime cost. This supports the insight that the cognitive effort to calculate and compare the lifetime cost is a major barrier for individuals in identifying the most efficient appliance. At the same time, a simple online calculator is a low cost tool that could support boundedly rational consumers substantially. The educational slides presenting information on how to compute the lifetime cost of an electrical appliance were also effective but to a lesser extent than the investment calculator. This suggests that the information slides reduce the cognitive cost of making the calculation, yet not as strongly as the online calculator. Our results are robust in that they manifest in two independently drawn samples of Swiss households. We conclude that online tools such as simple investment calculators that could be provided through mobile phone applications can be particularly effective in supporting consumers' decisions to choose efficient electrical appliances. From a policy point of view, they provide a cost-effective and easy to implement instrument to empower the boundedly rational consumer in the domain of appliance choice.

Conclusions

We designed two online random control trials and implemented them on two independently chosen samples of the Swiss population. One intervention consisted in providing a short education program - via information slides. The second intervention consisted on providing an online calculator supporting the respondent's investment decision. The similarities in the results obtained from the two samples are encouraging. In both samples, evidence suggest that pre-treatment investment literacy positively impacts on the probability of selecting the most cost-effective refrigerator. Also, results on both samples support our hypothesis that the reinforcement of the energy and investment literacy increases the rate at which individuals select the most cost-effective refrigerator. A relevant nuance has become clear in both samples: while both interventions are effective at increasing the chances that a cost-effective refrigerator is chosen, the online calculator is more effective than the educational program. This suggests that making an investment calculation is one important barrier for boundedly rational consumers when it comes to the choice of electric appliances. From an energy policy point of view, the results imply that the promotion of web-based educational programs to improve the level of investment literacy as well as the provision of online or mobile phone calculator tools could be effective instruments to promote energy-efficient investment decisions of households.

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