

THE ROLE OF ENERGY LITERACY AS A COMPONENT OF FINANCIAL LITERACY: SURVEY-BASED EVIDENCE FROM FINLAND

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Overview

Due to the problems associated with global warming and the depletion of fossil fuels, promoting energy conservation has become very timely. The key role of the residential sector to the reduction of the energy demand is not negligible: unlocking the potential of the residential sector in reducing energy consumption as a result of energy efficiency investments and energy savings through behavioral changes can lead to significant abatements in environmental pressures associated with energy production and consumption. In Finland, the residential final energy consumption per capita in 2014 was the highest among the European Member States (0.92 Toe per inhabitant) and the electricity consumption increased by 46.32% over the period 1990-2014 (Eurostat, 2016). At the same time, the electricity price for Finnish domestic consumers is among the lowest in the European Union, thus undermining incentives to save energy.

The difficulties to realize energy saving potentials have been recently traced by some economists (Costa and Kahn, 2013) on several sources: first, consumers may lack the necessary information to act in their best interest; second, even if they would in principle know what is in their best interest, energy conservation may not be high on their list of priorities and consumers make suboptimal choice because of the lack of salience; third, consumers are probably rather heterogeneous with respect of their attitudes towards energy conservation and their attitudes are likely to influence the behaviour. In addition, according to Brounen et al. (2013), the failure of consumer to the adoption of energy-responsible behaviours is the lack of knowledge about energy costs, although they represent a significant part of household expenses. Thus, the understanding of how energy is used in everyday life or the awareness of the need of energy conservation are important, but the ability and willingness to use that knowledge in a functional manner and to take actions that reflects these understanding and attitudes with respect to energy behaviors are even more crucial.

These considerations can be reflected also against the literature on financial literacy that refers to the capability of consumers to manage their personal finances. Knowledge on financial issues has been shown to correlate with financial behavior, so there is a promise that by improving knowledge one might also affect behavior (see Lusardi and Mitchell 2014 for an overview). However, knowledge affects only part of the financial behavior, and attitudes and awareness of the consequences of the choices are also important determinants of the behaviour. The personal finance side of energy literacy, can be thought of consisting of various components that are relevant for energy-related decisions: among others, awareness of different actions consume energy and the price formation of household energy; how to evaluate the long-term decisions related to investments that improve energy efficiency; the willingness to take energy conserving measures; and the information needs of consumers and their willingness to gather information. Many of the behavioral biases and drivers affecting the energy awareness and energy literacy are similar to those that determine the financial literacy of the households, and the two issues are therefore assessed jointly.

The aim of this study is to analyze the socio-demographic and economic determinants of energy literacy, their connections with financial literacy, and the factors driving energy behaviours and efficiency investments of the Finnish households. This study uses a novel survey dataset of Finnish households combined with electricity consumption data provided by Vaasan Sähkö (Finnish electricity provider) in order to provide new insights on:

- Whether financial literacy and energy literacy are correlated, and how this relationship is influenced by various socio-demographic, economic, and contextual factors;
- The drivers of energy literacy and awareness and their impact on the habitual energy saving activities and the willingness to invest in energy efficiency technologies;
- How energy behaviours and energy efficiency investments are shaped by socio-demographic, economic, environmental, contextual, energy literacy, and financial literacy characteristics;
- The household's perceptions of energy use through the analysis of smart meter data and the revealed energy consumption practices.

Methods

The web-based survey data collection has been carried out in March 2017 according to the questionnaire we designed and tested in 2016. The survey consists of 57 questions including information regarding the socio-economic and demographic characteristics of the participants, and the final sample includes about 200 respondents. The questionnaire was delivered both in Finnish, Swedish and English language. Data collected through the web survey have been matched with the monthly electricity consumption data provided by Vaasan Sähkö (Finnish electricity provider) in order to analyse both the reported and actual energy behaviours.

Discrete choice models have been used to empirically investigate the following hypothesis:

- H1: Finnish households have a low level of energy awareness and energy literacy, while they have high level of financial literacy;
- H2: High level of energy literacy is associated with high level of financial literacy;
- H3: Positive daily energy behaviors are explained by the heterogeneity of households and are correlated with high level of energy and financial literacy and positive energy/environmental attitudes;
- H4: Energy efficient retrofit investments are explained by the heterogeneity of households and are correlated with high level of energy and financial literacy and positive energy/environmental attitudes;
- H5: Households that spend more on energy costs are more likely to be energy and financial illiterate.

Results

Preliminary results show that we can trace different profiles of the Finnish households with respect to energy and financial literacy. In addition, while we have found a good capability of Finnish households to manage their personal finances, it is not very common for them to be informed about their energy bills. Among the respondents who have demonstrated a high level of knowledge about the energy-related issues, we have found a large proportion of households who do not translate their knowledge into daily energy-saving behaviours and investments in energy efficiency measures.

Conclusions

This study provides novel evidence on the socio-demographic and economic factors driving the energy and financial literacy, the energy behaviours and energy efficiency investments of the Finnish households. In addition, it expands the existing literature by simultaneously investigating and comparing reported and actual energy behaviours.

Understanding the key determinants of how energy is used in everyday life is crucial for implementing effective energy conservation interventions. This means that initiatives aimed at improving energy literacy in households, trying to persuade them to cut their energy use and to invest in energy efficiency solutions, may need to be targeted towards different households.

Our findings can be used to plan educational interventions on energy issues that are motivated by the willingness to reduce market and behavioral failures such as asymmetric information, bounded rationality, heuristic decision making, and to guide consumers toward better decisions. Through the provision of more reliable and targeted information, issues of uncertain future returns and asymmetric information may be lessened.

References

- Allcott, H., Mullainathan, S., & Taubinsky, D. (2014). 'Energy Policy With Externalities and Internalities', *Journal of Public Economics*, 112:72-88.
- Brounen, Dirk, Nils Kok and John M. Quigley (2013). 'Energy Literacy, Awareness, and Conservation Behavior of Residential Households', *Energy Economics*, 38: 42-50.
- Costa, Dora L. and Matthew A. Kahn (2013). 'Energy Conservation "Nudges" and Environmentalist Ideology: Evidence from a Randomized Residential Electricity Field Experiment', *Journal of the European Economic Association* 11(3): 680-702.
- Kalmi, Panu and Olli-Pekka Ruuskanen (2015). 'Financial Literacy and Retirement Planning in Finland', working paper, University of Vaasa and University of Tampere.
- Kazukauskas, Andrius and Thomas Broberg (2016). 'Perceptions and Inattention in Private Electricity Consumption', working paper, CERE, Umeå University.
- Lusardi, A., & Mitchell, O. S. (2014). 'The Economic Importance of Financial Literacy: Theory and Evidence', *Journal of Economic Literature* 52: 5-44.