**THE ROLE OF SOCIAL CAPITAL AND HOUSING RELATED LIFESTYLE IN FOSTERING ENERGY-EFFICIENT RETROFITS IN SLOVENIA**

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## Overview

In 2018, household energy consumption represented 26% of final energy consumption in the EU, as reported by Eurostat. Space heating has the largest share in residential energy consumption, accounting for 64% of energy consumed in EU households in 2018. In the same year, households were responsible for 19.5% of greenhouse gas (GHG) emissions in the EU. Although it is encouraging that the residential sector has decreased its GHG emissions by 8.2% in the period from 2008 to 2018, the potential for energy savings in this sector is still substantial. This is shown also in the JRC Technical report (2019) on achieving the cost-effective energy transformation of Europe’s buildings, which highlights that almost 75% of EU building stock is energy inefficient according to current building standards, where only 0.4 -1.2% of the building stock in the EU is renovated each year, with slight differences among member states. These facts demonstrate that the topic of energy-efficient household renovations merits attention, as energy-efficient renovations impact the energy consumption for space heating, which is the main component of residential energy consumption. There is already a vast body of literature unveiling various barriers and drivers to energy-efficient household renovations such as technical factors (building characteristics), economic factors, socio-economic characteristics of households, behavioral factors, and information and policy measures (Achtnicht and Madlener, 2014; Banfi et al., 2008; Hrovatin and Zorić, 2018; Wilson et al., 2015). Our research focuses on exploring the role of social capital and housing-related lifestyle, providing evidence from a new EU member state, Slovenia. To the best of our knowledge, these factors have not been substantially studied in the area of energy-efficient retrofits.

## Methods

The sample includes 3,000 respondents from Slovenia, economic decision-makers within the household. Both single-family and multiple-family dwellings were included in the sample to analyze possible differences due to individual and collective decision-making and to further explore the impact of social capital on energy-efficient renovation decision-making (Cirman et al., 2013). The data was collected from an online household survey with the help of a market research agency in August 2020 as part of the EU-funded Care4Climate project Characteristics of respondents in the sample closely resemble population with respect to the region, gender and age, with a slight over-representation of individuals with higher levels of education due to the on-line survey procedure. When exploring the impact of social capital, we included three components in our analysis: participation in resident associations, prosocial norms, and a building’s formal organization (Saegert et al., 2002). We also consider the influence of household related lifestyle, as operationalized by Thogersen (2017). It bears to mention, that in the wake of the on-going COVID-19 pandemic, we have included questions related to the change of the respondent’s financial status, as well as the respondent’s concern about the present and the future due to the pandemic.

We employ the random utility theory and the method of revealed preference, where the revealed preference refers to the decision on conducting energy-efficient retrofit in the respondent’s home in the past. According to the random utility theory, a choice to renovate in an energy efficient way or not can be represented in the following way (Train, 2009):

$$U\_{nj}=V\_{nj}+ε\_{nj}$$

where $U\_{nj}$ is the individual’s utility obtained from alternative j, $V\_{nj}$ is the component of utility we are attempting to estimate, and the $ε\_{nj}$ represents the unknown component. The $V\_{nj}=β'X\_{nj}$ is assumed to be linear in parameters and includes all of the previously discussed variables (building characteristics, household characteristics, social capital, housing-related lifestyle, etc.) The probability that an individual *n* opts for an energy-efficient retrofitcan be modeled through its utility, that is the individual will choose to perform an energy-efficient retrofit only if the choice increases its underlying utility.

Prob (‘individual opts for an energy-efficient retrofit’) = Prob ($U\_{ni}\geq U\_{nj}$) = Prob ($V\_{ni}+ε\_{ni}\geq V\_{nj}+ε\_{nj}$)

Different discrete choice methods will be employed to estimate the specified model (Hoffman & Duncan, 1988; McFadden & Train, 2000; Train, 2009).

## Preliminary results and conclusions

Preliminary results of data analysis reveal that age, gender, income, education, and homeownership significantly influence an individual’s decision to renovate. We have also found the significant impact of the age and condition of the building, level of noise in the neighborhood, as well as the type of building and the respondent’s financial conditions, such as taking out a loan. Unsurprisingly so, we noted that residing in a multi-dwelling building reduces the probability of an energy-efficient retrofit. These findings are in line with the previous empirical research. As anticipated, social capital and housing-related lifestyle seem to have a significant impact on household decisions to renovate. Related to social capital, variables explaining the ease of agreement among residents as well as the helpfulness of a building manager have a significant impact on an individual’s decision to renovate, as well as the variables pertaining to the fluctuation of neighbors. We have also found that higher scores across all categories in the housing-related lifestyle instrument, as operationalized by Thogersen (2017) increase the probability of energy efficient retrofit.

There is still significant room for improvement in residential energy efficiency. With this research, we aimed to build upon the existing literature by asserting the role of social capital and housing-related lifestyle in the energy efficient renovation decision-making process. By including housing-related lifestyle and social capital in our research we provide valuable inputs for better-targeted energy efficiency policy aimed towards different housing-related lifestyle groups, as well as for policies fostering good practices when it comes to residents’s participation, prosocial norms and building’s formal organization.

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