

Impact of Japanese House Insulation Subsidy System on Home Owners' Energy-Saving Awareness

Mieko Fujisawa^a and Mika Goto^b

1. Motivation underlying the research

Achieving a massive reduction of carbon dioxide emissions in the household sector requires consumers being made aware of the underlying issue. In other words, if consumers update their energy-saving awareness and related behaviors, the energy-efficiency effect can be expected to endure.

The Japanese government has addressed the issue of improving the thermal insulation performance of houses through various policy measures. For example, it provides subsidies and tax benefits directly to those consumers who consider a high level of insulation performance when they build their homes. This study investigates one such subsidy, the housing eco-points system, which has been in place in Japan since 2010, by focusing on its indirect effects. “Eco-points” is a Japanese–English term that combines ecological (eco) and reward (points) aspects. The basic premise of this study is that the subsidy not only directly affects the functionality of houses in terms of improving their insulation performance, but also indirectly affects consumers' behaviors by improving their energy conservation awareness.

This study thus analyzes the indirect effects of the housing eco-point system in Japan. To this end, it covers the introduction of the system from 2010 to 2012, which allows to accurately measure its newly generated indirect effects.

We develop and examine three hypotheses related to the indirect effects of energy-saving consciousness: (1) consumers exposed to the learning effects would become more conscious about energy conservation (H1); (2) a subsidy system based on self-declaration enhances consumers' energy-saving consciousness (H2); and (3) consumers living in existing houses develop greater awareness about energy saving than those living in new houses once they realize the benefits of performance improvement after insulation repairs (H3).

2. A short account of the research performed

We collected original data using a questionnaire survey on consumers who used the subsidy system. We randomly sampled those consumers who used the housing eco-point system and then collected data using a stratified sampling method that classifies them into two strata: those living in new houses and those living in existing houses. Therefore, the survey was divided into two phases.

The first phase was a preliminary investigation used to select the respondents (monitors) and the second phase was the final investigation (final survey) of the respondents who had used housing eco-points. For the final survey, we invited 1,254 monitors from the preliminary investigation to participate in the survey via e-mail. The response rate was 80.3% (1,007 responses), which was sufficient for the empirical analysis. Among the effective responses, 50.3% (507 respondents) were residents living in new houses and 49.7% (500 respondents) owned existing houses.

The final survey respondents included similar percentages of men and women, most of whom were married. The age range of the respondents varied for those who lived in new and existing houses. Respondents living in new houses were mostly in their 30s, followed by those in their 40s, while respondents living in existing houses were mostly in their 60s, followed by those in their 50s. Since the average age of the respondents living in existing houses was relatively high, they did not have live-in children. Most respondents lived in detached houses. The differences between those respondents living in new

a Corresponding author. Kanazawa University, Kakuma-machi, Kanazawa, Ishikawa 920-1192, Japan. E-mail: Fujisawa@staff.kanazawa-u.ac.jp

b Tokyo Institute of Technology, 3-3-6, Shibaura, Minato-ku, Tokyo 108-0023, Japan. E-mail: goto.m.af@m.titech.ac.jp

and existing houses are statistically significant—at least at the 5% significance level by the Chi-square test.

We performed a logistic regression using the dataset from the questionnaire survey. The dependent variable was a latent variable indicating consumers' perception of changes in awareness of energy-saving—whether they began to think about energy savings or not.

The results of the logistic regression analysis reveal that the following factors exert a positive effect on energy-saving awareness: realization of the insulation-performance effect, understanding of insulation and energy conservation standards, experience of the environmentally-concerned respondents, timely receipt of the subsidy, and the self-declaration system. Further, the results show that when consumers are exposed to a learning effect through experience and understanding, they become more conscious of energy conservation. This indicates that the housing eco-points subsidy indirectly affected energy saving behaviors.

3. Main conclusions and policy implications

The results indicate that H1 (consumers exposed to the learning effect become more conscious about energy conservation) was supported, as was H2 (the design of subsidy system is important because it has the power to change consumer consciousness). However, the results do not support H3. That is, consumers gain energy-saving consciousness through experience and understanding rather than simply through financial incentives.

This study provides policymakers with useful guidance for policymaking and institutional design by proposing a novel method for reducing carbon dioxide emissions through the optimized usage of limited resources amid financial constraints.