

# ***DO SOCIAL NORMS MATTER TO ENERGY SAVING BEHAVIOR? ENDOGENOUS SOCIAL AND CORRELATED EFFECTS***

Toshi H. Arimura, School of Political Science and Economics, Waseda University.  
1-6-1 Nishiwaseda, Shinjuku-ku, Tokyo 169-8050, Japan.

E-mail: [toshi.arimura@gmail.com](mailto:toshi.arimura@gmail.com)

Hajime Katayama, School of Commerce, Waseda University.  
1-6-1 Nishiwaseda, Shinjuku-ku, Tokyo 169-8050, Japan.

E-mail: [hajime.katayama@waseda.jp](mailto:hajime.katayama@waseda.jp)

Mari Sakudo, Research Institute of Capital Foundation, Development Bank of Japan.  
9-7 Otemachi 1-chome, Chiyoda-ku, Tokyo 100-8187, Japan.

Phone (+81)3-3244-1241, E-mail: [marisakudo@gmail.com](mailto:marisakudo@gmail.com)

## **Overview**

Many environmental issues, such as global warming, overflowing landfills and water scarcity, are primarily, if not exclusively, caused by human behavior (Gardner and Stern, 2002; Lehman and Geller, 2004; Vlek and Steg, 2007). Although new technologies mitigate environmental impacts from human behavior, efficiency gains from technological progress may not be enough to achieve environmental sustainability. Changes in human behavior, in particular, increasing pro-environmental behavior, seem to be essential (Steg and Vlek, 2009).

## **Methods**

This study examines the relationship between social norms and pro-environmental behavior, using survey data on Japanese households with regard to their energy saving behavior. Unlike previous studies in the literature, we attempt to deal with simultaneity and between-peer correlation in unobserved characteristics by using a structural approach. We estimate a structural model of social interactions where an individual's utility is allowed to depend on the actions of others in his/her social group. A game theoretic framework is used to determine which combinations of choices are possible equilibria; once they are determined, probabilities of observed choices are computed.

## **Results**

Our results show that the influence of social norms on energy saving behavior (i.e., the endogenous social effect) is small or insignificant, while estimates from simple reduced-form methods are found to be large and highly significant as in previous survey-based studies. This suggests that evidence in those studies may mainly reflect the correlated effect, not the endogenous social effect.

## **Conclusions**

In this study, we used data from a Japanese household survey and examined the influence of social norms on energy-saving practice, in particular, social norms among close friends. Unlike previous survey-based studies, this study adopted a structural estimation approach and dealt with simultaneity and between-peer correlation in unobserved characteristics that are inherent in the estimation of social interaction effects. We found that the endogenous social effects are insignificant or small, if any. In contrast, a standard reduced-form method provides large and significant estimates of the effects. These results suggest that (1) standard methods often used in previous survey-based studies may severely overestimate the influence of social norms and (2) large and significant coefficients on social norm variables in reduced-form studies seem to mainly reflect correlated effects, not endogenous social effects.