

# IDE Research Bulletin

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Research Summary based on papers prepared for publication  
in academic journals with the aim of contributing to the academia

## **Impact of Policies to Promote the Use of Energy-Efficient Appliances in Emerging Asian Economies**

Project Organizer

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March 2016

**IDE-JETRO**

## **IDE Research Bulletin**

### **Impact of Policies to Promote the Use of Energy-Efficient Appliances in Emerging Asian Economies**

**Period:** April 2014 – March 2016

#### **Members of the Research Project**

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Michikazu Kojima

Cheng Fang Ting (Since May 2014)

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#### **Background of Objectives:**

Sustained economic growth and rising incomes in the emerging economies of Asia have been accompanied by an increasing demand for energy. With an eye towards avoiding future energy shortages, many of these countries have adopted policies to promote the use of energy-efficient electrical appliances such as minimum energy performance standards and mandated labeling of energy consumption information. Some countries have also begun subsidizing the purchase of energy-efficient appliances. This research project evaluates such policies in the context of the air conditioner markets in Japan, China, and Thailand. We analyze detailed market data in order to quantify the welfare and energy-consumption impacts of standards and labeling. In addition we analyzed the international cooperation in energy efficiency. We made four papers under this research project, which abstracts are as follows.

#### **1. Should Energy Efficiency Be Traded Off for Other Product Attributes?**

##### **An Analysis of Air-Conditioner Regulation in Japan**

**Kensuke Kubo, Mariko Watanabe, and Michikazu Kojima**

This paper examines the functioning of energy efficiency standards and labeling policies for air conditioners in Japan. The results of our empirical analysis suggest that consumers respond more to label information, which benchmarks the energy efficiency performance of each product to a pre-specified target, than to direct performance measures. This finding provides justification for the setting, and regular updating, of

target standards as well as their use in calculating relative performance measures.

We also find, through graphical analysis, that air conditioner manufacturers face a tradeoff between energy efficiency and product compactness when they develop their products. This tradeoff, combined with the semi-regular upward revision of minimum energy efficiency standards, has led to the growth in indoor unit size of air conditioners in recent years. In the face of this phenomenon, regulatory rules were revised so that manufacturers could adhere to less stringent standards if the indoor unit size of their product remains below a certain size.

Our demand estimates provide no evidence that larger indoor unit size causes disutility to consumers. It is therefore possible that the regulatory change was not warranted from a consumer welfare point of view.

## **2. Energy Efficiency Standard and Labeling Program and Consumer Welfare: A Case of Air Conditioner Market in China**

Mariko Watanabe and Michikazu Kojima

Improving energy efficiency is an unarguable emergent issue in developing economies and energy efficiency standard and labeling program is an ideal mechanism to achieve this target. However, there is a concern whether the consumers will chose the high energy efficient apparatus because of high cost and high price. This paper estimates how the consumer responds to introduction of the energy efficiency standard and labeling in China. To quantify evaluation by consumers, we estimated their consumer surplus and benefits of products based on the estimated parameters of demand function. We found following points: First, we found that evaluation of energy efficiency label by consumer does not monotonically correlated with the number of grades. The highest efficiency label (Label 1) is not evaluated no less higher than label 2 and 3, and is sometimes lower than the least energy efficient label (Label UI). This is against the design of the policy intervention. Secondly, we found the several government policies affects in mixed direction: The subsidies for energy saving policy to the highest degree of the labels contributed to expand consumer welfare as the program designed. On the other hand, the replacement to new appliances policies decreased the welfare.

## **3. Effectiveness of Promoting Energy Efficiency in Thailand: the Case of Air Conditioners**

Michikazu Kojima and Mariko Watanabe

This paper aims to identify the magnitude of energy efficiency improvement, which has

been promoted through energy efficiency labeling and the Minimum Energy Performance Standard, and to compare this against the increase in the number of products and the average increase in cooling capacity. Air conditioners (ACs) are one of the major contributors to energy consumption in a household. To assess the magnitude of this factor, we developed a formula to decompose total energy consumption from ACs into the number of ACs, their average cooling capacity, and energy efficiency. In the case of ACs in Thailand, energy efficiency improvement has offset the increase in the average AC cooling capacity. However, energy consumption from ACs increases with the number of ACs.

#### **4. The Roles Played by Public–Private Partnerships (PPPs) in International Political Issues: Case of the Sino-U.S. Cooperation on Energy and Climate Change**

Fang-Ting CHENG

The study argues that *public–private partnerships* (PPPs) can play “*strategic*,” “*practical*,” or “*regulative*” roles by making use of “*instrumental*,” “*institutional*,” and “*normative*” approaches in tackling political issues between countries. PPPs have often been discussed in studies of urban development, service provision, health care, and so on, but they have rarely been analyzed in terms of international relations and political problems so far. This study takes an environmental issue—Sino-U.S. energy and climate change cooperation—as a case study to inspect the possible roles and approaches of PPPs.

International negotiations to resolve the adverse impacts of climate change were considered to have stagnated because of the U.S. and China’s dispute over responsibility during the past 20 years. Nonetheless, Sino-U.S. cooperation has been launched under the *Strategic & Economic Dialogue* (S&ED) by both administrations, which has significantly contributed to their reconciliation of domestic abatement policies in energy, environmental protection, and climate change. The establishment of schemes such as the Ten-Year Framework for Cooperation on Energy and Environment (TYF), the EcoPartnerships, and wide-ranging dialogues and initiatives on clean energy and clean vehicles, in which both public and private actors participate, are among the important approaches of facilitating bilateral cooperation. The study concludes that these schemes have played strategic and practical roles in strengthening the degree of mutual trust and in facilitating the progress of cooperation, although more investigations are needed to considerate their regulative roles. The application of instrumental, institutional, and normative approaches have been observed through the implementation of the TYF and

EcoPartnerships.

### **Overall Findings**

Setting energy efficiency standard and labeling stimulates innovation and demand for energy efficient equipment. Updating the standard is important to push continuous effort to improve energy efficiency by manufacturers. Inappropriate policy such as subsidy to purchase of energy inefficient product may prevent consumers from choosing energy efficient product. To diffuse policies for improving energy efficiency in developing countries, public private partnership is important, because not only regulatory capacity, but also capacity of testing organization and manufacturer, coordination mechanism among stakeholders should be developed.