IMPACT OF THE ADOPTION OF PHOTOVOLTAIC SYSTEM ON HOUSEHOLDS' ENERGY CONSUMPTION: THE EVIDENCE FROM THE URBAN AREA IN JAFFNA DISTRICT IN NORTHERN SRI LANKA

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ABSTRACT

Adoption of renewable energy sources plays a vital role to mitigate the climate risks and foster environmental stability. Photovoltaic system (PV) is a classic example of renewable energy sources and a potential alternative for fossil fuels to satisfy the energy needs of the households and industries. However, the adoption rate of PV at the household level remains very low, especially in the developing countries since the adoption can be influenced by several other factors such as socioeconomic conditions of the households, market situations, and other policy factors. This study investigates the effect of the adoption of PV on the electricity usage of urban households in Jaffna district in northern Sri Lanka. The sample of 303 households including both the adopters and non-adopters of PV were randomly selected from urban population in the Jaffna district. The sample includes 151 households with PV installation and 152 households without PV installation. The data were collected from the sample households using questionnaire surveys and key informant interviews. The data mainly include household's adoption status of PV, households' total electricity consumption, and other socioeconomic characteristics of the sample households. To account for the selection bias problem, this study employs propensity score matching method and estimate the impact of adopting PV on households' welfare using average treatment effect (ATE) and the average treatment effect on the treated (ATET). The outcome of ATEs and ATET prove that the adoption of PV has a significant positive effect on household's energy consumption, coefficients with a value of 45.743 ($p < 0.01$) and 29.372 ($p < 0.1$) respectively. Also, the selection model indicates that household's awareness on government incentives, gender, and number of electrical appliances used in the household are the significant determinants of the adoption of PV. The results clearly show the adoption of PV at the household level significantly and positively increases household's total electricity consumption, suggesting the significance of promoting renewable energy sources as a potential way to tackle the issues of climate change and ensure clean development.

Keywords: *Energy needs, Electricity consumption, Photovoltaic system, Propensity score matching, Renewable energy source*

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