Household Solar Analysis forPolicymakers:
Evidence from U.S. Data

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Prior research on household solar-panel adoption has reached a range of conclusions. There are differing results for multiple important explanatory variables including income, age, race, and education. Greater understanding of these influences has substantial potential for enhancing the policy process, as subsidies for solar systems are increasingly referring to variables such as income. More targeted policy support can help to promote emissions reduction more efficiently through lower subsidy spending for a given level of solar-panel adoption that substitutes for fossil fuels. Energy insecurity for households can also be reduced more efficiently through more precise identification of which households face the most binding constraints for solar-panel adoption.

This paper uses the 2019 American Housing Survey to give a large sample that is representative of the United States (U.S.). We use multiple methods to assess the impact of key socioeconomic variables on residential solar-panel adoption. These include logit and probit models to account for the dichotomous nature of solar-panel uptake, a linear probability model for further assessment of robustness, and entropy balancing to justify causal interpretations of the results. We progressively add key explanatory variables to the regression models to assess the impacts for debated influences on solar-panel adoption. Interaction analysis supports the baseline regressions. Subsample analysis is also conducted to uncover similar results for key groups.

The key conclusions of the paper include the important impacts of wealth and age on solar-panel adoption. Higher housing wealth and older age are generally associated with greater solar-panel uptake. These results are robust across each of the methods employed. The impact of wealth is an often-omitted influence for household-level studies of solar-panel uptake that is shown to be crucial in understanding the influence of other aspects such as education, income, and race. The wealth influence is consistent with economic theory, as the upfront capital constraint is more difficult to overcome for households with lower levels of wealth. The paper also finds some evidence that public housing tenants are more likely to have access to solar panels than private tenants.

In contrast to recent policy approaches that have increasingly been based on income targeting, our analysis suggests that wealth thresholds will be considerably more effective in identifying constrained households who require policy assistance to obtain solar panels. There are likely to be major benefits from data collectors including components of wealth in future household surveys.

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