

Author: Xingchi Shen, University of Maryland College Park

Presentation Title: The Effect Of Rebate And Loan Incentives On Residential Heat Pump Adoption: Evidence From North Carolina

Abstract: In order to achieve deep decarbonization of the economy and tackle climate change, the government should promote the electrification of most natural-gas-burning applications such as space heating. Heat-pumps offer a feasible and energy-efficient way for space-heating electrification. In most U.S. regions the penetration of heat pumps is still low. Policymakers need to adopt effective policies to promote the diffusion of this technology. This study aims to investigate the different impacts of rebate and loan incentives on heat-pump adoption based on two case studies in the U.S using a spatial regression discontinuity design, similar to Ito (2014). We examine the borderlines between two utilities with different incentives and the borderlines must be located in the same cities to avoid any confounding factors. Firstly, we estimate the effect of a rebate policy in Galion City, Ohio. The Galion city is almost equally divided by two utilities: The AEP Ohio utility provides a rebate policy for residential heat-pump adoption, while the Ohio Edison utility does not. Secondly, we estimate the effects of rebate and loan incentives on the borderline between the Union Power Cooperative utility (UPC) and Duke Energy utility (DE) in North Carolina. The UPC provides access to loans for heat-pump adoption since 2006, while the DE provides a rebate program since 2017. We obtained the information on individual household heat-pump adoption status from a nation-wide Zillow panel dataset including over 150 million residential properties in the U.S. We focus on observations within 5 miles of the utility border. We adopt Tobit/Probit models by regressing residential heat-pump installation rate on policy dummy variable, controlling for local energy prices and utility-by-year fixed effects. Our preliminary results show that the rebate program (\$250 for air-source heat-pump, \$1000 for geothermal-heat-pump) introduced by the AEP Ohio significantly increased the installation rate by 0.009, around 180% increase.