Hurdles and steps estimating demand for solar photovoltaics

Hurdles and steps: Estimating demand for solar photovoltaics. Kenneth Gillingham, Tsvetan Tsvetanov. This paper estimates demand for residential solar photovoltaic (PV) systems using a new approach to address three empirical challenges that often arise with count data: excess zeros, unobserved heterogeneity, and endogeneity of price. ...

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While several prominent recent papers on solar PV adoption have used reduced form approaches, rather than dynamic discrete choice models (see, e.g., Rogers and Sexton (2014), Hughes and Podolefsky (2015)), many economists may instinctively consider the purchase of a solar PV system as a "buy-or-wait" decision that is best modeled with a

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Quantitative Economics 10 (2019) Estimating demand for solar photovoltaics 277 At the basis of our approach is the conditional maximum likelihood (CMLE) estima-tor for fixed effects logit models introduced in a sequence of works by Rasch (1960, 1961), Andersen (1972), and Chamberlain (1980). Majo and van Soest (2011) show that this con-

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of Forestry & Environmental Studies ... K. Gillingham, T. Tsvetanov Demand for Solar Photovoltaics November 6, 2015 2 / 32. Background Motivation Data Estimation Results Conclusion Addressing Excess Zeros in Data

We estimate a price elasticity of demand for a PV system of-0.65, a finding useful to both policymakers and firms. Policymakers are often interested in how changes in PV system prices--whether due to policy or other factors--influence the sales of PV systems. Such knowledge is essential for assessing the impacts of solar PV policies.

We estimate a hurdle model based on two data generating processes: a standard logit for whether a block group has at least one adoption and a zero-truncated Poisson that models the rate of adoptions conditional on a block group having an adoption.

At the average system price and number of installations in our sample, this elasticity estimate suggests that a $1/W decrease in the installation price (well within the variation in our data) would lead to an increase in demand of approximately 0.083 additional PV systems in each block group during the respective year.

Our results imply a price elasticity of demand for solar PV systems of -0.65. Counterfactual policy simulations indicate that reducing state financial incentives in half would have led to 9 percent fewer new installations in Connecticut in 2014. ... Hurdles and Steps: Estimating Demand for Solar Photovoltaics (January 30, 2018). USAEE Working ...

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Large-scale integration of invisible solar photovoltaic generation into power systems could significantly affect the system net load and pose new challenges in the operation of ...

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The California Solar Initiative (CSI) rebate program disbursed more than two billion dollars in incentives to install solar photovoltaics (PV) over roughly a decade (2007-2016); a large proportion ...

We estimate the price elasticity of demand for solar PV systems in CT over 2008-2014 to be -0.65. This

estimate is valuable to both policymakers and firms. As module prices continue to drop, it provides useful guidance for forecasting the number of new installations, absent policy changes.

This paper estimates demand for residential solar photovoltaic (PV) systems using a new approach to address three empirical challenges that often arise with count data: excess zeros, unobserved heter...

Key takeaway: "The Poisson hurdle approach effectively estimates demand for residential solar photovoltaic systems, with a price elasticity of 0.65 and a potential 9% fewer new installations in Connecticut if state financial incentives were reduced." ... Hurdles and Steps: Estimating Demand for Solar Photovoltaics. K. Gillingham, Tsvetan G ...

This suggests that the hurdle model, as a mix of components that can exploit both binary and zero-truncated count data variation, offers a flexible approach for estimating solar demand in various settings: from emerging markets with few installations to booming higher-demand markets.

However, we provide survey and descriptive evidence in Online Appendix A of the Supplemental Material (Gillingham and Tsvetanov (2019)) suggesting that solar PV demand in CT is more similar to the many other contexts where consumers do not appear to treat adoption as a dynamic "buy-or-wait" decision.

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1 Introduction. The market for rooftop solar photovoltaic (PV) systems has been growing rapidly around the world in the past decade. In the United States, there has been an increase in new installed capacity from under 500 MW in 2008 to over 4500 MW in 2013, along with a decrease in average (preincentive) PV system prices from over $8/W in 2008 to just above $4/W in 2013 ...

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