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Discussion paper (*draft version*)

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The spatial diffusion of photovoltaics in Germany

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Abstract

In several countries, electricity production from photovoltaics (PV) is subject to generous subsidies, especially in residential areas. The resulting investments in photovoltaic installations depend on the subsidy level, spatial variations in global radiation, available installation space and the income level. Furthermore, we suppose that the knowledge and experience level regarding PV installations within a certain geographical unit, which can be measured by previously installed PV systems, determine the installation density. The purpose of this paper is to describe the evolution of photovoltaic installations quantitatively and to test if preexisting photovoltaic systems stimulate further installations nearby. In order to do so, we develop and apply a spatial econometric model, which can be used to describe the heterogeneous geographical diffusion of PV installations. The model is discrete in time and continuous in space, and may be used to study the diffusion of decentral renewable energy technologies in general. We employ a geocoded dataset covering the PV installations in Germany until 2009 (some 570 000). Our analysis shows that the installation process is highly dependent on the geographic proximity of previous installations. This suggests that even strong subsidies do not immediately lead to the adoption of decentral renewable energy technologies. It takes several years until a wide diffusion is reached since knowledge and experience regarding the technology has to be built on the local level.

Key words: PV, photovoltaics, knowledge, technology, diffusion, adoption, spatial econometrics, continuous spatial modeling

JEL classification: O33, Q42, R12

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