Are voluntary environmental management programs effective? Evidence from German manufacturing firms

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Overview

A more efficient use of energy is an essential pillar for reaching national climate policy targets and constitutes the main attenuating effect on global greenhouse gas emissions growth [IEA 2017]. From an industry perspective, an efficient use of energy is incentivized by energy costs and environmental regulation, such as fuel taxes or the EU ETS. However, empirical studies point out the importance of management quality as another decisive factor for remaining differences in energy efficiency and emissions of manufacturing firms [Martin et al. 2012, Boyd/Curtis 2014]. To address this issue, voluntary environmental management programs for firms have become an increasingly popular instrument of environmental policy. The core idea is a credible certification of firms' overcompliance with regulatory standards. This in turn may lead to decreasing marginal abatement costs, reduce remaining inefficiencies in resource and energy usage and spur pro-environmental investments [Barla 2007].

In the literature, the conclusion on program effectiveness is ambiguous. In part this is owing to a largevariation in program types and studied regions, foremost the U.S. and Japan [e.g. Arimura et al. 2008,Barla 2007, Blackman et al. 2010, Bui/Kapon 2012 and Vidovic/Khanna 2007]. However, what is missing is an impact evaluation of the Eco-Management and Audit Scheme (EMAS), introduced by the European Union in 1995 as its 'premium certification' for firms committing to continuous pro-environmental efforts. Participating firms are required to assess their environmental impact in an initial audit, to annually report on their performance to the public and to set new targets for improvements. The program is distinct from other programs, e.g. the more widespread ISO14001 certification, as national law mandates compliance to improvements and incentivises participation via a reduced electricity tax rate, exemptions from the renewable energy surcharge and regulatory facilitations.

Methods

While previous studies rely on self-reported firm surveys [e.g. Rennings et al. 2006, Frondel et al. 2004], we are the first, to our knowledge, to evaluate the impact of EMAS on firms' environmental performance. We focus on the German manufacturing sector, a major energy consuming sector that is directly responsible for at least 20% of national greenhouse gas emissions [UBA 2016]. A representative census firm-dataset over the years 1995-2014 comprises detailed economic characteristics and information on energy use by fuel type, allowing us to estimate respective carbon dioxide emissions. The econometric analysis is based on the well-established two-step instrumental variable approach in order account for self-selection on unobservables. First, we model the participation decision using lagged firm characteristics and a set of instrumental variables, based on factors found to be decisive for program participation in the related literature [e.g. Bracke et al. 2008] and an incidental firm survey (N=130). The second stage estimates include firm-level and year fixed-effects.

Results

Preliminary results suggest only a small effect of EMAS certification on certified firms' environmental performance.

Conclusions

A conclusion based upon more detailed results will be appended soon.

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