Universität Basel

Research Project

Measuring the effectiveness and efficiency of the European Union Emissions Trading Scheme

Third-party funded project

Project title Measuring the effectiveness and efficiency of the European Union Emissions Trading Scheme
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Organisation / Research unit
Departement Wirtschaftswissenschaften / Public Economics / Public Finance (Hintermann)
Department
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Our proposed research project contributes to the empirical literature that analyzes the performance of the European Union Emissions Trading Scheme (EU ETS) and extends it along a number of dimensions. The research develops along three main lines of inquiry, which we define in terms of Work Packages (WPs). For all WPs, we rely on German administrative data from plants in the manufacturing sector. Broadly speaking, the first WP takes an aggregate look at economic outcomes at the firm level. The second WP aims to identify the mechanisms underlying these economic outcomes in terms of changes in efficiency. The last WP uses the firms in the sample as a case study to assess the efficiency of emissions trading as a policy instrument more generally.

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The first WP consists of a thorough analysis of the impacts of the EU ETS on regulated firms in the German manufacturing industry. Building on recent contributions, we apply a matching framework to investigate the causal impact of the EU ETS on treated firms in terms of a number of environmental, technical and economic indicators.

The contribution of this WP is twofold. Relative to the existing literature, we work on a finer level of sectoral disaggregation. Second, we compute an index of environmental policy stringency at the sectoral level for both ETS and non-ETS firms by estimating the shadow price of emissions. This analysis will provide us with new insights into the impact imposed by the EU ETS across different manufacturing subsectors in Germany, as well as into the efficiency of the EU ETS.

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In WP 2, we use a productivity analysis framework (using both data envelopment analysis and stochastic frontier analysis) to examine the impact of the ETS in terms of firm-level efficiency. We aim to analyze different aspects of efficiency related to production, costs, revenue and profits. Comparing ETS firms with matched control firms will offer a deeper understanding about the nature of the effect of the EU ETS on the regulated firms than is possible by focusing on economic outcomes alone. For example, a failure to find significant differences in terms of output or revenue between treated and non-treated firms may be caused by an increase in costs that is accompanied by an improvement in productive efficiency in response to the regulation.

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In the third WP, we will use an econometric approach to estimate firms' abatement cost functions. The principal cost advantage of an ETS relative to command-and-control regulation is that emissions abatement takes place where it is cheapest, rather than uniformly across firms and sectors. To date, there has been no analysis of the extent to which these gains from trade have materialized in the EU ETS (or in any other permit market, for that matter). Estimating abatement cost functions on the firm-level will enable us to compute the least-cost outcome within manufacturing firms, and compare this to the abatement costs associated with a hypothetical command-and-control regulation as well as the actual costs of abatement within German manufacturing firms.

Keywords EU ETS; Emissions trading; Program evaluation; Climate change; Emission permit markets
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4493248	Hintermann, Beat	Di Maria, Corrado, Associate Professor	University of East Anglia	01.11.2015	31.12.2023