ASSESSING THE EFFECTS OF CLIMATE POLICY ON FIRMS' GREENHOUSE GAS EMISSIONS

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Overview

As a response to the public concern for global warming more and more national policies aiming at tackling climate change have been implemented over the past years. Yet, the global public good character of the climate raises concerns that these unilateral efforts fall short in effectively triggering greenhouse gas emissions reductions. Thus, it is important to learn from past experiences and improve instruments that are found not to induce emission reductions. Our contribution consists thus in assessing the effectiveness of the implemented policies and addressing the question whether it is possible to identify particularly effective policy measures.

Methods

To carry out the assessment we use policy data for 39 OECD and BRICS countries and firm-level emissions data of the largest companies worldwide measured by market capitalization. Corporate emissions data for the year 2007 to 2012 were obtained from companies' responses to surveys conducted by the Carbon Disclosure Project (CDP). Data on climate policy measures were collected from the International Energy Agency Policies and Measures Database (IEA, 2013), the OECD and European Environment Agency Database on Instruments Used for Environmental Policy (OECD, 2012) as well as the World Energy Council Overview of Energy Efficiency Policy Measures (World Energy Council, 2009). As *Table 1* depicts, the final dataset groups similar measures in six different categories according to their policy target.

Table 1: Policy types

Category	Target	Description
resloans	Increase the use of renewable energy sources for electricity generation	Grants and loans at reduced or market interest rates to electricity companies
chp	Expansion of combined generation of heat and power	Grants, subsidies and loans
ind_audit	Auditing the energy use of companies	Financial incentives or legal requirements
ind_loans	Increasing energy efficiency and expanding the use of renewable energy sources in companies	Granting access to loans at reduced or market interest rates
ind_subs	Increasing energy efficiency and expanding the use of renewable energy sources in companies	Grants and subsidies
ets	Cap emissions by covered companies/sectors	Emissions trading system

We conduct econometric regressions, where companies' emissions by country are to be explained by a set of dummy variables indicating whether a certain policy measure was in place in the respective year and country. Although it is clear that particular design and implementation details are important determinants of the effectiveness of a policy, this dummy variable approach represents the only possibility allowing comparability across countries given the current scarcity of data. In order to separate the business-as-usual emissions path from the policy effect, companies' economic activity is considered by including their revenues as a control variable. We also take into account

heterogeneity across firms by considering other characteristics such as firm size, industry sector and home country as explanatory variables. However, the voluntary nature of emissions disclosures to CDP raises concerns on the representativeness of the data due to a possible self-selection of companies into disclosure and non-disclosure based on the level of their emissions. If that is the case, the sample will be a biased representation of the population of companies and the analysis will consequently yield biased results. In order to test and correct for sample selection, a Heckman two-stage procedure is implemented, where we estimate the effect of climate policy on companies' GHG emissions under consideration of each company's disclosure probability.

Results

We find that controlling for self-selection is crucial when working with voluntarily reported emissions data, since disclosure decisions are found to be related to companies' emissions.

Preliminary results indicate that only emissions trading systems (ETS) as well as grants and loans to increase the use of renewables in electricity generation have a significant and negative effect on firms' emissions. Moreover, while the latter type of measures is found to reduce emissions by utility companies, it also seems to increase emissions in the remaining sectors. If both utilities and other sectors are covered by the same ETS, as is the case in the European Union, the described situation is a plausible effect of the interaction of these two policy types.

For the remaining policy measures, i.e. loans and subsidies to increase energy efficiency and the use of renewable energy sources (RES) in companies, grants and subsidies for combined heat and power generation and measures incentivizing or requiring energy audits, no emissions reduction effect could be detected.

Conclusions

We study the effect of climate policy on companies' GHG emissions using emissions data for headquarters and subsidiaries of the world's biggest companies. Our results suggest that efforts should be focused on implementing, extending and strengthening emission trading schemes. Special attention shall be put to interactions with other policies that might undermine the effectiveness of ETS.

Current work is directed to refining the data in order to allow for a more detailed analysis of the determinants of subsidiaries' emissions.

References

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