

# Did the EU ETS Make a Difference?

## An Empirical Assessment Using Lithuanian Firm-Level Data

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Emissions trading systems, with the possibility they offer to link emissions reduction efforts across space and time, seem poised to become one of the pillars upon which future cost-effective mitigation efforts will be built. As a consequence, there is considerable interest in understanding how these market-based instruments perform in practice. In particular, there is a growing appetite on the part of policy makers for empirical analyses that shed light on how participation in emissions trading systems affects the economic and environmental performance of regulated entities. To date, however, only a handful of studies have attempted such an analysis.

In this paper we exploit a previously unexplored firm-level dataset to investigate these questions in the context of the European Union Emissions Trading System (EU ETS). A rich dataset of about 5,000 Lithuanian firms spanning the years between 2003 and 2010 allows us to investigate the impact of the EU ETS on the environmental and economic performance of participating firms.

Our analysis adds to the scant *ex-post* empirical literature on the EU ETS by investigating the causal effects of the EU ETS on firm-level environmental and economic performance. The contribution of this paper is threefold. Firstly, we are the first – to the best of our knowledge – to be able to compare the evolution over time of CO<sub>2</sub> emissions by ETS firms to that of firms outside of the EU ETS. We do this within a classic non-experimental program evaluation framework, using matching algorithms to derive causal inferences on the impact of the program. Secondly, by exploiting a richer dataset than previously done in the literature, we are able to investigate the effect of the EU ETS on the economic

performance of firms in greater detail. For example, we complement the analysis of firms' profitability with a discussion of investment decisions. Finally, our dataset spans the first and (most of) the second phase of the EU ETS (2004-2010), thus extending and updating previous results.

Our results indicate that the EU ETS overall did not cause reduction in CO<sub>2</sub> emissions over the whole first trading period. This is understandable, due to the marked over-allocation of the firms in our dataset. We do observe, however, that CO<sub>2</sub> emission intensity decreased between 2006 and 2007, albeit slightly. We also find that Lithuanian ETS firms shifted out of expensive energy carriers, like oil and gas, into coal, which remained competitive due to the low price of allowances after 2006. We argue that two factors external to the participation in the ETS, namely the closing of the first reactor of the Ignalina NPP and the high gas prices, led ETS firms in Lithuania to increase their imports of cheaper electricity from neighboring countries, causing a possible degree of carbon leakage.

Also, our analysis suggests that the EU ETS induced the retirement of old (and less efficient) capital stock during the first trading years, and lead to some additional investments into new capital equipment from 2010. The latter effect was probably compounded by the introduction of Lithuanian law XI-329, which required the earmarking of allowance sales' revenues for environmental investments. The injection of new, likely more efficient, capital into the existing Lithuanian capital stock suggests that more substantial emission reductions are to be expected in the near future when capital is fully operational.

In terms of economic effects, our results indicate that the EU ETS did not represent a drag on the profitability of Lithuanian ETS firms. At the same time, our findings do not support common speculations that the generous permit allocation generated huge windfall profits for the largest polluters.

Overall, our results lend support to the idea that the stringency of the first two phases of the EU ETS was modest at best, as we find that the EU ETS made very little difference in terms of the environmental and economic performance of the firms involved in the scheme.