BEYOND COMPLIANCE: STRATEGIC USE OF EMISSIONS TRADING

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Overview

Since the start of the European Union Emissions Trading Scheme (EU ETS) in 2005, emissions trading has become a legitimate practice for business to deal with climate change. The EU ETS has since grown in terms of countries, greenhouse gases and activities covered by the system, and a considerable number of firms have become active participants in the new market for carbon allowances.

From a policy-makers perspective, emissions trading is a form of environmental regulation that acts as an alternative to either a command-and-control policy or a carbon tax. Compared to command-and-control policy, emissions trading is considered to be cost-efficient because it allows achieving a given emissions target (i.e. the cap) at minimum costs to the economy. This assumes that firms engage in the emissions market to comply with the regulatory provisions in a cost-efficient way. The market price of emission allowances signals scarcity and incentives firms to minimize compliance costs, i.e. to lower emissions internally if the associated costs are lower than the market price, and to maximize revenues, i.e. to sell any excess allowances on the market, thereby providing incentives to invest in lowering emissions and to innovate if abatement costs are below the market price (e.g., Hahn & Stavins, 1992). Thus, cost efficiency of emissions trading presumes that firms engage in the emissions market efficiently by minimizing compliance costs through buying allowances and maximizing revenues from selling allowances.

From a firms' perspective, the carbon market is also a marketplace for a financial commodity: a carbon allowance. Firms might therefore not only use the carbon market for compliance, but also as a strategic tool to generate additional revenues or hedge against market risks (Cludius, 2018; Hintermann et al., 2016; Jaraitė-Kažukauskė & Kažukauskas, 2015; Pinkse & Kolk, 2007). As for any financial market, market liquidity is a prerequisite for the carbon market to be efficient (Crossland, Li, & Roca, 2013). In the EU ETS such market liquidity may be provided by firms covered by the EU ETS, and by market intermediaries such as bank, brokers or exchanges (Cludius & Betz, 2020). The few existing studies empirically analysing firms' participation in the EU ETS conclude that many firms do not use the EU ETS to generate revenues and trade for compliance only (Martin et al., 2015; Zaklan, 2013).

In this paper, we aim to explore empirically the factors related with firms' trading activities, using the EU ETS as a case. In particular, we analyze firms' trading intensity, employment of market intermediaries such as brokers, use of forwards and futures markets, the timing of trading, and - last but not least - to which extent firms trade internally thus potentially foregoing cost savings and revenue gains.

Methods

We employ multivariate econometric analysis relying on a unique panel, compiling annual data on trading activity, allocation and verified emissions from the EU transaction log (EUTL) and firm characteristics from the ORBIS data base from 2005 to 2014, thus ranging over three trading periods. EUTL installation data including allocation and emissions per installation, account data including information on the account owner and transaction data including information on all transactions, transaction types and accounts involved have been downloaded from the European Commission (EC) website. The data was aggregated to firm level based on the company registration number of the accounts and then matched with the ORBIS database. In particular, to explore the relation of firms' trading activities with firm characteristics such as profits, size, or belonging to particular sectors (e.g. energy versus industry sectors) and whether firms are net sellers or net buyers in a particular year.

As dependent variables we developed six indicators reflecting firms' strategic use of the EU ETS.

(1) *Trading intensity* as measured by the number of trades per year is used to reflect market engagement.
(2) *Number of intermediaries* (e.g. banks or broker firms) used by a firm to carry out its trades; employing brokers and other intermediaries firms gain access to professional market information.

(3) Share of *forwards and futures* in total trades (=all traded EUAs of a firm); firms exerting more efforts in understanding the market, may exploit price variations over time, and better manage market risks.
(4) Share of *trading volume of a firm between October and December* in total trades; a high trading share during these months indicates that the firm is monitoring its greenhouse gas emissions, but is mainly trading for compliance as it only enters the market when it realizes that it is short or long (*laggards*).
(5) Share of *trading volume of a firm between February and April* in total trades; a high trading share during these months indicates that the firm is trading for compliance only (*pure compliers*).
(6) The *share of EUAs traded internally* in total trades. Such intra-firm trades are only feasible for firms with multiple accounts. Therefore, we define internally traded EUAs as EUAs which were transferred across accounts of the same firm within the same country. Trading between accounts that are linked to one and the same installation is not taken into account.

The set of covariates includes the net surplus of allowances (i.e. allocation minus verified emissions), profits, and several dummy variables indicating whether the firm (i) belonged to the energy sector (according to NACE), (ii) was considered to be at risk of carbon leakage (by the EC), or (iii) was a small or mediums-sized enterprise (SME). We further controlled for country-specific effects by including a dummy variable for each country, and captured differences across years by including a separate dummy for each year. We use panel econometric models to exploit the panel structure of our data. In particular, we employ different econometric models depending on the nature of the dependent variable. More specifically, we use Panel negative binomial and Poisson models reflecting the count data nature of (1) and (2), and Panel fractional logit and Tobit models capturing that a large share of observations for (3), (4), (5) and (6) are zero (and bounded from above at one).

Results

Preliminary findings of the multivariate analyses suggest that a more strategic use of the EU ETS is positively related with firms facing a net deficit of allowances, with belonging to the energy sector, with being at risk of carbon leakage, and with generally being profitable. In comparison, SMEs are less likely to make strategic use of the EU ETS. These findings appear robust to estimating different models, i.e. negative binomial versus Poisson and fractional logit versus Tobit.

Conclusions

To our knowledge, this paper is the first that analyses strategic trading in the EU ETS. The first results show that there is substantialy heterogeneity in the strategic use of the EU ETS by firms. Controlling for company profitability, country-specific and time effects, results from our mulitvariate analyses suggest that firms facing economic pressure (net deficit in allowances, and being at risk of carbon leakage), are more likely to use the EU ETS strategically. Likewise, firms from the energy sector, i.e. those more likely to be experienced with trading in energy commodities, are also more likely to use the EU ETS strategically. On the other hand, firms from the non-energy sectors, smaller firms, and firms with a net surplus of allowances seem to be less willing to engage in strategic trade, thus lowering liquidity in the market, and potentially threatening the cost efficiency of the EU ETS.

References

Cludius, Johanna & Betz, Regina 2020. The Role of Banks in EU Emissions Trading. The Energy Journal, forthcoming.

Cludius, Johanna 2016. Winners and Losers of EU Emissions Trading: Insights from the EUTL transfer dataset. Economics of Energy & Environmental Policy, 7(2): .

Crossland, J., Li, B., & Roca, E. 2013. Is the European Union Emissions Trading Scheme (EU ETS) informationally efficient? Evidence from momentum-based trading strategies. Applied Energy, 109: 10-23.Ellerman, A. Denny; Buchner, Barbara. K., 2007. The European Union emissions trading scheme: origins, allocation, and early results. Review of Environmental Economics and Policy, 1(1): 66-87.

Hahn, Robert W.; Stavins, Robert. N., 1992. Economic incentives for environmental protection: integrating theory and practice. The American Economic Review 82(2): 464-468.

Hintermann, B., Peterson, S., & Rickels, W. 2016. Price and Market Behavior in Phase II of the EU ETS: A Review of the Literature. Review of Environmental Economics and Policy, 10(1): 108-128.

Jaraitė-Kažukauskė, J., & Kažukauskas, A. 2015. Do Transaction Costs Influence Firm Trading Behaviour in the European Emissions Trading System? Environmental and Resource Economics, 62(3): 583-613.

Martin, R., Muûls, M., & Wagner, U. J. 2015. Trading Behavior in the EU ETS. In M. Gronwald, & B. Hintermann (Eds.), Emissions Trading as a Policy Instrument: Evaluation and Prospects: 213-238. Cambridge, MA: MIT Press.

Pinkse, Jonatan; Kolk, Ans, 2007. Multinational corporations and emissions trading: Strategic responses to new institutional constraints. European Management Journal 25(6): 441-452.

Zaklan, Aleksandar, 2013. Why Do Emitters Trade Carbon Permits? Firm-Level Evidence from the European Emission Trading Scheme. EUI Working Paper RSCAS(19).