COST-EFFICIENCY OF THE EU EMISSIONS TRADING SYSTEM (EU ETS): AN EVALUATION OF THE SECOND TRADING PERIOD

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Executive summary

1. Motivations underlying the research

According to economic theory cap and trade systems are the most cost-efficient way to achieve emission reduction targets. Regulatory measures, such as e.g. minimum standards, lack the flexibility inherent to an emissions trading system and reduction costs are thus likely higher. In practice, however, the EU Emission Trading System (EU ETS) - the largest and longest-standing carbon market - is often criticised for its limited functioning despite several reform efforts. In this context, evidence for the cost-efficiency of the scheme is a relevant factor in future discussions of climate policy instruments. A number of ex-ante studies support the efficiency claim of emissions trading, some focus on the EU ETS in particular (see e.g. Böhringer 2002; Fujimori et al. 2015; Kemfert et al. 2006; Paltsev et al. 2014; Stevens & Rose 2002).)In addition to theoretical work and ex-ante studies, this paper provides a detailed analysis of the cost-efficiency of the EU ETS looking backwards on the second trading period. Doing so, we both present estimates for the efficiency gain achieved under the EU ETS compared to a hypothetical less flexible policy, as well as providing insights into the methodology of ex-post cost-efficiency analyses of ETS. This paper thus aims to add both empirical and theoretical input into the climate policy debate.

2. A short account of the research performed

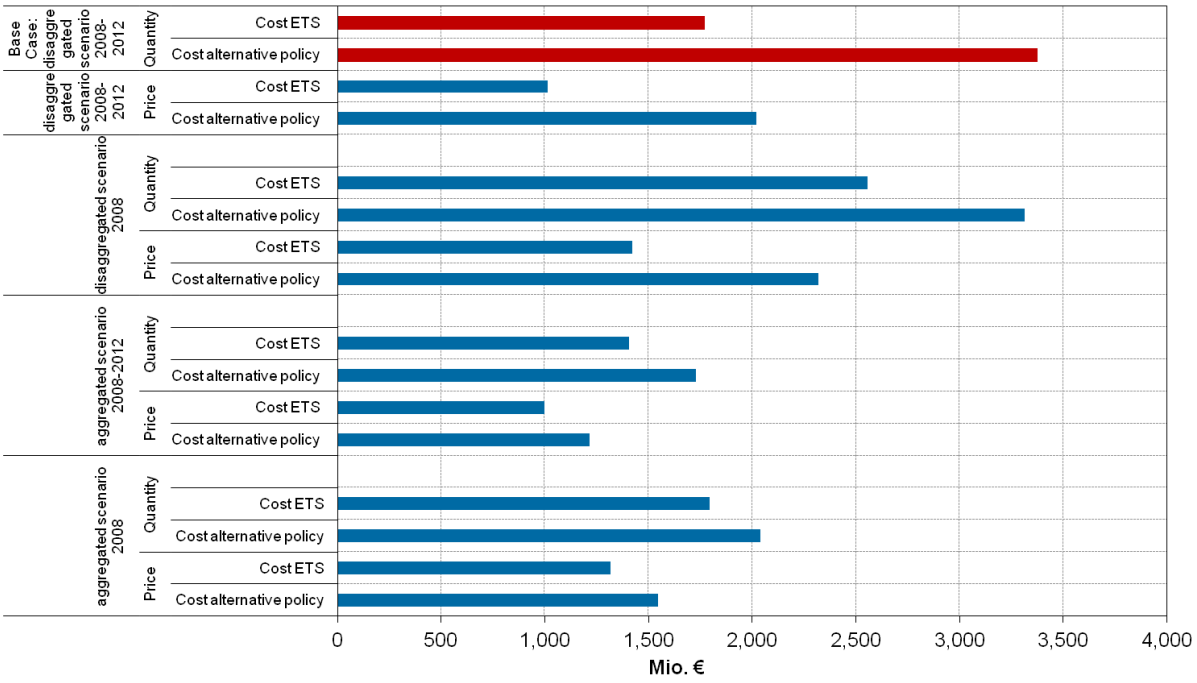
This paper presents a backward looking evaluation of the cost-efficiency of the EU ETS in its second trading period (2008-2012). The general approach for determining efficiency gains from emissions trading is to compare the costs of emission reductions under different policy scenarios. We compare an *ETS* policy scenario with an *alternative policy* scenario. Both scenarios assume equal total emission reductions, but differ in the choice of policy instruments and hence the distribution of emission reductions between sectors and countries. For our analysis we use data on verified emissions from the EU Transaction Log (EUTL). For the modelling of abatement options and associated cost we use marginal abatement cost curves from the POLES model. The POLES model also provides a counterfactual scenario without a CO_2 price in form of the baseline scenario. The same curves are used for the analysis of the EU ETS scenario and the alternative policies scenario.

In line with ex-ante results from the literature, the ex-post empirical results of this paper uniformly support the theoretical cost-efficiency of the EU ETS. Our base case accounting for trade flexibilities between a large number of countries and sectors reveals average cost savings due to the EU ETS of about 1606 million Euro p.a., an efficiency gain of 48% compared to the alternative policy scenario without trade (Figure 1). Several sensitivity scenarios vary assumptions on temporal, sectoral and regional disaggregation, which largely

determine the trading opportunities. Sensitivity analyses where the time frame or methodology are varied, but the possibility of intra-industry and inter-country trade kept intact, reveal efficiency gains of 23-39% and thus largely confirm the order of magnitude of the efficiency gain estimated in the base case. In those sensitivity scenarios in which trade is restricted to only two sectors (electricity and industry) and no inter-country trade is taken into account, the estimated efficiency gains are significantly smaller at 12-18%. These results substantiate theoretical and ex-ante findings on the importance of allowing for intra-industry and inter-country trade in order to reap the efficiency gains from an emissions trading system, especially if there are large differences in abatement costs between the countries and sectors considered.

From a methodological point of view, the analysis shows that overall abatement requirements, the distribution of these requirements under the alternative policy scenario along with the choice of marginal abatement cost curves play a key role in driving results on the cost efficiency.

Figure 1 Comparison of abatement cost for all scenarios



3. Main conclusions and policy implications of the work

Evaluations of climate policy instruments, in this case the EU ETS, are highly relevant for the future development and implementation of these instruments. Evidence for reduced mitigation costs due to trading possibilities support the continuation of the EU ETS despite current challenges in the functioning of the market and highlight the importance of reform efforts to increase the functioning of the system. Recent developments in international climate negotiations indicate that the results are relevant also well beyond the European policy context. Many jurisdictions have set up their own trading systems or are in the process of doing so. Following the Paris Agreement, many more countries will have to decide how to reach their mitigation contributions. As one of the longest-standing and largest trading systems worldwide, the EU ETS can serve as an example for the many do's and don't's related to the design, implementation and operation of an ETS.

Keywords

EU Emissions Trading System (EU ETS), cost-efficiency, ex-post analysis, alternative policy, counterfactual scenario