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Impacts of National vs European Carbon Pricing on Agriculture

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The agricultural sector has the potential to contribute to reaching both global and national climate targets. Lately, frequent discussions emerge among academics as well as policymakers regarding whether the agricultural sector should be subject to carbon pricing under different emission trading systems. Germany has set ambitious climate targets envisaging to reach carbon neutrality by 2045, and the EU plans reaching carbon neutrality by 2050. However, the current GHG emission mitigation trends are not in line with this goal. In this study, we quantitatively analyze the environmental and economic effects of the possible inclusion of the agricultural sector into a carbon pricing scheme, once for Germany only, and second for the EU. Moreover, we evaluate the role of already existing and novel technological mitigation options in the GHG emissions mitigation quest. For this study, we have applied the well-known Common Agricultural Regionalized Impact Analysis (CAPRI) model. CAPRI explicitly accounts for a number of already existing or innovative GHG mitigation technologies for EU agriculture.

The results reveal several important implications of such a policy option. First, even if Germany chooses to take this step unilaterally, a net emission reduction effect is reached in the agricultural sector and the gap between the total projected and targeted 2030 emissions in Germany is reduced by 10%. Although this effect is notably more substantial if the entire EU adopts a similar policy. Moreover, the EU gap in 2030 is also reduced by 14%. Second, the consideration of the effects of already existing or novel mitigation technologies has a significant impact on the results and even further contributes to emission reduction in Germany or the EU. The scenarios that ignore the possible uptake of such technological options are proven to underestimate the mitigation potential of the simulated policy options by about a factor of two. EU producers, as a result of simulated policy scenarios, lose their competitiveness which is stronger pronounced in the case of ruminants and cereal production. This leads to reduced exports from the EU and increased imports to the EU causing emission leakage in all scenarios. The leakage rate is lower in the case of EU-wide implementation of the policy, however, again the scenarios that neglect the potential of technological mitigation options overestimate this rate by a factor of three.

Our results further indicate the importance of investing in the R&D of cost-efficient and easily transferable mitigation technologies for the EU agricultural sector considering both their economic and environmental effects. Above all, with our quantitative analysis for Germany and for the European Union, we can conclude that a carbon pricing scheme for the agricultural sector could be a valuable and cost-efficient instrument to reach national or EU-wide mitigation targets under manageable side effects. Given the option that leakage rates can be further reduced by policies on the consumer side, by border taxes, the results are even more promising to further assess the option for carbon pricing for this sector.

Full paper:

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