UNILATERAL POLICY INSTRUMENT AGAINST CARBON LEAKAGE

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Overview

A unilateral policymaker with a desire to reduce carbon emissions has a portfolio of potential instruments to deal with this negative environmental externality. Unilateral actions could however lead to carbon leakage, such as relocation of emission-intensive- and trade-exposed industries (EITE). Therefore, the policymaker who seeks to reduce emissions, risks losing jobs and industry. Studies have suggested border carbon adjustment in addition to unilateral climate policies as a second-best instrument. However, as carbon tariffs and export rebates could be politically difficult to implement, policy makers have typically chosen other instruments such as different variants of output-based allocation to emission-intensive- and trade-exposed industries (EITE). Output-based allocation however ends up stimulating domestic production and thereby resulting in too high consumption and production level of these goods. This paper examines the welfare effects of introducing a consumption tax on all use of emission-intensive goods in a situation where a quota system has already been implemented, together with output-based allocation on the emission-intensive goods. In particular, the paper investigates the effects of the consumption tax when only a subset of countries involved in the quota system, introduces the tax.

Methods

We build on the model framework in Böhringer et al. (2017), but extend to one more region and examine a broader range of policies. We introduce a theoretical multi-regional multi-sector model, and analyze the optimal consumption tax in a situation where a quota system combined with output-based allocation is already in place. Based on the theoretical model, we transfer our analysis to a stylized multi-regional multi-sector numerical model, calibrated to data for the world economy. We use the standard calibration procedure in numerical simulation analysis, where base-year data information defines the fixed parameter values. We assume three regions calibrated according to Norway (NOR), the European Union (EU) and rest of the world (ROW). We are particularly interested in the case of Norway, which has a joint emission trading system with the European Union (EU ETS), where a variant of output-based allocation is already in place for emission-intensive goods. Our main question here is whether it is welfare-improving for Norway to implement a consumption tax on such goods, when the effects on global emissions are also taken into account. We also include a differet sensitivity analyses to check for robustness of the results.

Results

Consider a region *i* that has a joint emission trading system with another region *j*, where output-based allocation is implemented for production of EITE-goods. Then the theoretical result suggest that a consumption tax on all use of EITE-goods would have unambiguously global welfare improving effect, while the local welfare effects in the country introducing the tax is more ambiguous. Further, it is optimal for region *i* to also impose a consumption tax on EITE-goods if it is not a net exporter of EITE-goods and producers in regions *i* and *j* react symmetrically to the consumption tax. The numerical simulation provides evidence for the global welfare improving effect, but also shows that it is welfare improving for the tax-implementing region to introduce such a consumption tax. Further, we also find that introducing an output-based allocation has a significant impact on carbon leakage, and that introducing consumption tax on top of the output-based allocation reduces the leakage significantly even further.

Conclusions

The world will rely on unilateral initiatives to meet the target of Paris climate agreement. Greenhouse gases however are global pollution and unilateral action leads to carbon leakage. To mitigate this carbon leakage, countries or regions have either excluded such industries from their regulations or found other anti-leakage solutions, such as output-based allocation. We suggest an approach with a combination of output-based allocation to production of EITE goods with a consumption tax on all use of the EITE goods. We show analytically that it is welfare improving for a region to introduce this tax when the output-based allocation is already implemented, and that the consumption tax has a global welfare improving effect. We confirm these results with a stylized numerical model calibrated to data for the world economy. The stylized numerical model also shows that consumption taxes makes output-based allocation more robust with respect to leakage. Thus, combining output-based allocation with a consumption tax is a robust policy strategy to mitigate carbon leakage.