UNILATERAL EMISSION PRICING AND OPEC'S BEHAVIOUR

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Overview

A major drawback associated with unilateral climate policies is the risk of carbon leakage: price changes in international markets for fossil fuels and energy-intensive goods might lead to the relocation of emissions from countries with emission regulation to unregulated regions. Obviously, carbon leakage hampers the cost-effectiveness of unilateral action. Branger and Quirion (2014) provide a comprehensive overview and meta-analysis of the applied literature on unilateral climate policy and carbon leakage. One common finding is that carbon leakage to a large extent takes place through price changes on international energy markets. However, most previous studies assume international energy market to be perfectly competitive, thus disregarding empirical evidence on non-competitive behaviour of members of the Organization of Petroleum Exporting Countries (OPEC) in the crude oil market (Alhajji and Huettner 2000; Hansen and Lindholt 2008).

We have shown in previous analysis (Böhringer, Rosendahl, and Schneider 2014) that the assumption of imperfect competition in the international crude oil market may substantially affect outcomes with respect to carbon leakage as well as global and regional cost implications of unilateral climate policies. The main finding is that if OPEC acts as a dominant producer, the oil price increases when the EU introduces its climate policy. This is due to OPEC's incentive to shift over climate rents from emission pricing: since the EU pursues a global emissions target, OPEC can drive down EU's CO2 price via an increased oil price. As the oil price increases, non-EU demand declines and hence leakage through the oil market turns negative.

In this paper, we elaborate on the analysis in Böhringer, Rosendahl and Schneider (2014). More specifically, we test the robustness of the conclusions to variations in four potentially critical assumptions: (i) the size of the climate coalition, (ii) the size of the oil cartel, (iii) oil-gas price linkages in the EU and Japan, and (iv) subsidies to domestic oil consumption within OPEC. Our primary objective is to foster our understanding on how such variations affect the implicatctions of OPEC's strategic behaviour.

Methods

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For our policy analysis we use a canonical static computable general equilibrium (CGE) model of global trade and energy use. Parameterization of the model is based on the version 9 of the Global Trade Analysis Project dataset (Narayanan, Aguiar, and McDougall 2015) with the base-year 2011. In order to introduce imperfect competition on the crude oil market, we assume a fixed cost markup within the respective cartel (OPEC, OPEC core, or Saudi Arabia) that is calibrated consistently with crude oil profit maximization to the base-year data.

Results

Our analysis indicates that OPEC's ability to lower the coalition's CO2 price and thus to shift over rents is reduced markedly when China becomes part of the abatement coalition. The reason is that China provides lots of low-cost coal-related abatement options to the coalition. As a consequence, effects on the oil market get attenuated, and likewise OPEC's strong incentive to cut back crude oil supply. Regarding the implications of cartel size, we find that when only OPEC-core or Saudi Arabia act dominantly instead of OPEC as a whole, the respective economic effects resemble to a large extent the results for a fully competitive crude oil market setting: The cartel's market share in these cases is simply not large enough to impact markedly on the coalition's CO2 price. A price linkage between the crude oil price and gas import prices gives opposing incentives to OPEC when assuming dominant behavior, which in total leads to a market outcome which is similar to the case without the price link. Likewise, subsidies to domestic consumers in OPEC do not markedly change OPEC's supply decision when facing an EU climate policy.

Conclusions

Our simulation results on variations of key assumptions (i) – (iv) suggest that negative leakage through the oil market as identified in Böhringer, Rosendahl and Schneider (2014) cannot be generalized and constitutes a rather special outcome. The implications of strategic responses by OPEC to unilateral emission pricing hinge in particular on the size of the climate coalition and the size of the oil cartel. As a prime example, OPEC's ability to lower the coalition's CO2 price is reduced markedly when China is part of the coalition. We conclude that although the cause-effect chains identified in Böhringer, Rosendahl and Schneider (2014) remain robust, the phenomenon of negative oil-related leakage is a rather special outcome.

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