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WELFARE IMPLICATIONS OF EU EFFORT SHARING DECISION AND POSSIBLE IMPACT OF A HARD BREXIT

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Overview

In this paper, we evaluate the recent developments of European climate policy from the perspective of the 2050 European commitments with regards to GHG emissions reduction. We use a non-cooperative meta-game approach for assessing European burden-sharing issues. We analyze the European Effort Sharing Decision (ESD) proposed in July 2016 (European Commission 2016) and evaluate its cost per member state (MS). We simulate several other policy options regarding this sharing decision with the aim to stress the main policy implications of the new proposal. Considering the Brexit referendum that took place on June 23, 2016 in the United Kingdom, we analyze different possible scenarios of British participation in European climate policy.

Method

We use a dynamic game model proposed in (Babonneau et al. 2016) to represent the non-cooperative timing strategies of EU countries in the exploitation of their respective emissions budget share. In this game, the players are the 28 EU countries. The strategies are the supply schedules of emission rights on the European carbon market, and the payoffs are the discounted sums of welfare gains (or losses). A coupled constraint on the emission budget is imposed. The game has, therefore, a two-level structure. At the lower level, a competitive carbon market defines carbon prices and emission levels for each country based on the total emission rights supply. At the higher level, each country decides, for each period, its own emission-rights supply, considering the share of global cumulative emission budget it has received. The model is calibrated using a statistical emulation of the computable general equilibrium model called GEMINI-E3. The statistical emulation uses a space filling experimental design of 200 runs evaluating different possible European abatement policies.

Results

We first define 3 burden-sharing scenarios for the period 2011-2050 partly by extending up to 2050 the so-called ESD. The ESD sets GHG emissions targets for MSs according to their economic capacity on the basis of their relative wealth measured by GDP per capita. The scenarios then differ in how they combine European Trading Scheme (ETS) and non-ETS mechanisms in a unified EU carbon permit scheme. First, we simulate a scenario called *full ESD* using the ESD applied to all CO_2 emissions (ETS and non ETS). The *full ESD* scenario generates a high range of welfare changes. Of course, countries with high-income levels suffer significant losses, while low-income countries benefit from generous allocations. The acceptability of such a rule is, therefore, questionable and clearly not in line to what the European Commission calls a “fair sharing of effort”. Thus, it is interesting to compare this scenario with the one that corresponds to a uniform European CO_2 tax in which the European Commission determines the level of the carbon price with the aim of minimizing the aggregated European welfare loss. This scenario (called *Uniform tax*) is equivalent to an ETS market extended to all sectors, including household’s emissions with no free allowance. This scenario penalizes mainly low-income MSs in contrast to the previous scenario and demonstrates the need of emissions trading to enforce the acceptability of EU climate targets. We then combine these two scenarios with the goal to approximate the EU architecture that is based on an ETS market with a national target for other emissions sources. First, we assume that flexibility mechanisms are implemented to link the two markets (ETS and non-ETS). Second, we define an allocation for each country that is based on an effort-sharing rule for non-ETS emissions and full auctioning for the ETS market. This allocation is approximated by a weighted combination of our ESD allocations and the emissions computed in the equalization of the *Uniform tax* scenario. This scenario, called the *EU architecture*, reduces the variability of welfare changes while addressing fairness concerns. High-income countries pay for low-income countries.

We now assume that the UK fulfills its CO_2 pledges individually through a domestic carbon price and does not participate in the EU CO_2 market. The UK budget, estimated at 13.7 Gt CO_2, implies that the UK would be able to implement a 20% and 80% reduction in CO_2 emissions by 2020 and 2050, respectively, from 1990 levels. We now simulate the 3 scenarios presented in the previous numerical section but with a game that excludes the UK. Within a

Brexit scenario and without any access to emission trading with the rest of EU, the UK's discounted welfare cost would be equal to 1.65% of its discounted household consumption. This means that with respect to all scenarios, except the full effort-sharing decision rule, the UK suffers from an increase in the cost of its climate policy by leaving the EU. In comparison to the *EU architecture* scenario, the discounted cost of the British climate policy increases by US$43 billion. Indeed, in the *EU architecture* scenario, the UK receives some extra CO_2 quotas with respect to its domestic target (i.e., 13.8 Gt CO_2 - 13.7 Gt CO_2) and benefits from less abatement cost by buying some European emissions credit. The Brexit cost is exacerbated in the *uniform tax* (US$142 billion) scenario because the UK bears a relatively high welfare cost in comparison to the EU average. We now consider another situation in which the UK continues to participate in the European tradable market through as a third-country access, a similar status as the one obtained by Norway or Liechtenstein in the existing EU ETS market. In this scenario, called t*hird country status*, we assume that the budget allowed to the UK is equal to 13.7 Gt CO_2 (i.e., its domestic target), and the budget allowed to each EU MS is equal to the one computed in the EU27 architecture scenario. The UK would benefit from a third-access status with a Brexit cost reduced by 20% (shifting from 0.08% to 0.06%). This benefit is coming from the access to emissions credit with low price in comparison to domestic abatement.

Conclusions

In this paper, we have evaluated the EU climate policy ratified at COP21, on the 2050 horizon, in the context of the ESD proposed recently by the European Commission (2016). Using a meta-game approach, we approximated the EU architecture combining an ETS market with national binding commitments. We have shown that ESD allows reaching an affordable and fair burden-sharing in which, high-income MSs pay for low-income countries and, at the same time, ensure overall cost-efficiency. However, our analysis assumes that policy options already defined in the EU proposal, such as one-off flexibility between ETS and non-ETS and inter-temporal flexibility, are fully implemented.

The decision of the UK to leave the EU will no doubt impact European climate policy. The UK played a pivotal role in EU climate policy and represents the second-largest European emitter of GHG. The UK, Denmark, and Sweden belong to the MSs that have implemented an ambitious climate policy for many years. A possible exclusion of The UK from a EU CO_2 market will, of course, have a direct impact on the cost of European climate policy. Our first assessment shows that the European countries could experience some welfare improvements, if one assumes that the UK has to implement its emissions-reduction target through a domestic carbon price and is not allowed to participate in any European instrument. On its side, the UK could suffer a cost from not participating in the EU CO_2 market, a cost estimated by our model at US$43 billion within the EU architecture scenario. If the UK could negotiate a status similar to Norway's, then the Brexit cost would be reduced by 20% (i.e., US$9 billion).

These simulations assume that the EU ETS covers all sectors and not only energy-intensive industries. Considering the current EU policy design, we can argue that the non-participation of the UK in the existing EU ETS would penalize mainly these industrial sectors for which the energy prices are a key factor of their competitiveness. Of course, other sectors that are not included in the ETS would also be affected because they are already integrated into the current effort-sharing decision, but the impact would probably be less significant. However, new sectors will certainly be included in the ETS market in the forthcoming decades because increased flexibility between markets would lead to significant overall abatement cost reduction, as pointed-out in the EC, and the dichotomy between the two sectors would ultimately cease to exist. Also, as in other economic affairs and international cooperations there is a possibility for the UK to cooperate with the USA in creating or reinforcing bilateral partnerships, and, thus, mitigating this cost increase. In any case, a possible exclusion of the UK from an EU CO_2 market would reinforce the leadership role of the EU founding MSs, in particular for Germany, which emits now about a quarter of aggregated EU GHG emissions.

References

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