USE OF CARBON AUCTIONS REVENUES TO SUPPORT RENEWABLE ENERGY AND IMPACT ON THE COMPETITIVENESS OF THE EUROPEAN INDUSTRY

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Overview

While the use of emissions trading schemes (ETS) to mitigate greenhouse gases emissions is developing in the world, behavioural economic studies show that the public and political acceptability of these market-based instruments can be improved by the way carbon revenues are used. The economic, environmental and social impacts of different carbon revenues recycling options may vary and need to be examined.

This study focuses on the European Union, where the ETS has existed since 2005 and auctions have taken place several times a week since 2013. The 2030 climate and energy framework (EC, 2014) adopted by the EU in 2014 includes (i) a binding EU target to domestically reduce GHG emissions by at least 40% by 2030 compared to the levels of 1990, (ii) a binding target to increase the share of renewable energy consumed in the EU to at least 27% by 2030 and (iii) an indicative target to improve energy efficiency by at least 27% by 2030. As underlined in the Impact Assessment, emissions from the sectors covered by the Emissions Trading System (ETS) need to be cut by around 43% and non-ETS emissions by around 30% (both compared to 2005) to achieve the 40% GHG reduction target efficiently. In parallel of these climate objectives, the European Commission has also set competiveness goals in its energy union strategy (EC, 2015). This aims at establishing a "resilient Energy Union with an ambitious climate policy" and hence at transforming the EU's energy system in order to provide "secure, sustainable, competitive and affordable energy" to consumers.

This work focuses on the analysis of the impact of one auctions revenues recycling option on the competitiveness on the European industry, namely the use of these revenues to support renewable energy.

Methods

The analysis employs the PACE (Policy Analysis based on Computable Equilibrium) model. The regional disaggregation includes the major economies in the world, and differentiates eight European regions, among which the six largest EU Member States. The sectoral disaggregation includes 36 sectors, with a special focus on energy intensive industries and extractive activities.

The model was developed (i) to replace public support (originally paid by tax payers in the model) to electricity generation from renewable energy in some Member States with an electricity levy paid by the industrial sectors, and (ii) to introduce the possibility for Member States to use carbon auction revenues to reduce this levy.

The two main policy scenarios considered reflect different ways of using carbon auction revenues : lump-sum transfer to households or reduction of the electricity levy paid by industrial sectors to support electricity generation from renewable energy. The main characteristics of the EU ETS and the 2030 framework as well as some differences between Member States in the use of an electricity levy are taken into account in the simulation. Two variants of these scenarios are also examined. In these, an electricity levy is considered in all Member States. In the first variant, all ETS sectors are exempted from it while, in the second one, no sector is exempted.

Results

When ETS auction revenues are recycled to support renewable electricity, at least three mechanisms can take place. On the one hand, households do not receive the auction revenues as lump-sum transfer any more as they do otherwise.This should result in a reduction of their aggregate consumption (income effect). On the other hand, when auction revenues are directly used to support electricity generation from renewable energy, the electricity levy that households have to pay for their electricity consumption to support power generation from RE is reduced. This results in a positive income effect that partly balances the negative income effect mentioned previously. We also expect the reduction in the electricity levy to induce a rise in the electricity consumption by households (price effect). In parallel and similarly, industries that initially have to pay the electricity levy should also increase their electricity consumption when auctions revenues are used to support power generation from RE.

What we observe is indeed a rise in electricity demand in the whole economy. This directly induces a higher ETS price in the scenarios with the renewable subsidy. For the ETS sectors, the impact on output depends on the exemption rules. If they initially have to pay the electricity levy, they are better off when auction revenues are used to subsidize power generation from RE. They use more electricity as well as more fossil fuel (income effect). If the ETS sectors are initially exempted, the use of auction revenues to subsidize renewable electricity generation make them worse off. The reason is that, despite the subsidy to RE electricity, the increased electricity demand in the whole economy results in a slight increase in the price of electricity in some countries. By substitution effect, the ETS sectors tend to use slightly more fossil fuel. In terms of competitiveness, the auction revenues recycling option seems to have no significant impact on the world market shares of the EU ETS sectors, except for electricity, which is obviously better off when benefiting from the subsidy.

For the non-ETS sectors, at least two effects can take place. On the one hand, using auction revenues to subsidize RE electricity generation should make the non-ETS sectors better off because the electricity levy they have to pay is reduced. On the other hand, they can be disadvantaged by a possible increase in the energy prices (small electricity price increase due to a larger demand from the whole economy, small price increase for some fossil fuels due to slightly increased demand from ETS sectors). The final effect is a balance of the two. For example the "Food and beverage" sector, which is relatively electricity-intensive relative to the other non-ETS sectors benefits. For the manufacturing sectors on the contrary, the impact is minor. "Inland Transport" benefits from this recycling option due to a demand effect from the non-ETS sectors that initially have to pay the electricity levy and are better off when the latter is reduced. In terms of competitiveness, we observe no significant impact of this recycling option on the non-ETS sectors world market shares. In aggregate, despite the fact that the activity of some non-ETS sectors is higher when auctions revenues are used to support renewable electricity, the non-ETS carbon price is 4% smaller. We suggest that the reduced electricity levy allows these sectors to make use of cheaper abatement opportunities, in particular through a 2.3% larger use of electricity.

In aggregate for the whole economy, the positive GDP change is driven by the increased output in some non-ETS sectors. Those are initially not exempted from the levy, but they have a significant use of electricity and benefit from recycling auction revenues to support RE electricity.

Conclusions

Using ETS auctions revenues to support electricity generation from renewable sources results in a rise in electricity demand in the whole economy due to the reduced electricity levy that electricity consumers have to pay to support the renewable energy in the power sector. As a consequence, the ETS carbon price increases. For the ETS sectors other than electricity, the impact depends on the exemption rules. If they initially have to pay the electricity levy, they are better off when auctions revenues are used to subsidize power generation from RE. They then use more energy (electricity and fossil fuel). If the ETS sectors are initially exempted, the use of auctions revenues to subsidize renewable electricity generation make them worse off, due to a slightly higher electricity price induced by the increased electricity demand in the rest of the economy. However, in terms of competitiveness, we observe no significant impact of this recycling option on the world market shares of the EU ETS sectors, except for electricity, which gains as it benefits from the subsidy.

For the non-ETS sectors, the effect varies. Sectors such as "Food and beverage" that are relatively electricity-intensive relative to the other non-ETS sectors see their output rise as consequence of this auctions revenue recycling. In other sectors, such as the manufacturing industries, the impact is hardly visible. "Inland Transport" benefits from this recycling option due to a demand effect from the non-ETS sectors, which initially have to pay the electricity levy and are better off when the latter is reduced. In terms of competitiveness, we observe no significant impact of this recycling option on the world market shares of these non-ETS sectors.

In aggregate for the whole economy, this auction revenue recycling option induces a gain in GDP. The non-ETS carbon price is reduced as a consequence of the possibility for the non-ETS sectors to use cheaper abatement opportunities, including through a larger use of electricity.

References

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