DIW BERLIN

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DIW Roundup
Politik im Fokus

Deutsches Institut für Wirtschaftsforschung 2015

Europe's Mechanism for Countering the Risk of Carbon Leakage

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July 9, 2015

The EU's Emissions Trading System (EU ETS) is a regional cap-and-trade program in a world with no binding international climate agreement. This climate regulation may induce a relocation of production away from Europe, with potentially negative consequences for the European economy. This relocation could lead to carbon leakage, i.e. a shift of greenhouse gas emissions from Europe into regions with less stringent climate policy. In response, installations in sectors deemed to be vulnerable receive compensatory free emissions allowances. The European Commission compiles a carbon leakage list of vulnerable sectors. The current mechanism distinguishes two levels of leakage risk. The criteria used lead to the majority of European industry regulated under the EU ETS benefiting from the additional compensation. Whereas industry representatives argue that the current level of compensation should be maintained if not increased, the evidence suggests that under the current framework overcompensation may occur. We describe the mechanism currently used to address the risk of carbon leakage in Europe, and for comparison outline the more differentiated system of assessing leakage risk used in the Californian cap-and-trade system. Applying such a more differentiated mechanism in the European context would lead to a re-distribution of compensation from sectors with an intermediate level of leakage risk to high-risk sectors.

Carbon Leakage Risk - A Result of Partial Climate Policy Coverage

The EU ETS is the world's largest trading scheme for greenhouse gas (GHG) emission permits, covering around 45% of the EU's GHG emissions (European Commission, 2015a). It was implemented in 2005 and has evolved substantially since. The main innovations since the start of Phase III (2013-2020) are an EU-wide cap, a substantial increase in auctioning and harmonized rules for free allocation (cf. Ellerman et al., 2014). However, on the global level the EU ETS only covers a small share of the world's emissions. Companies regulated under the EU ETS therefore face an asymmetry in terms of climate regulation, a higher price for carbon emissions inside the EU and a lower one outside it. The size of the asymmetry depends on the share of climate-related costs in total production costs and the ability to pass through the cost of the required emission allowances into product prices (Graichen et al., 2008). If companies face a high regulatory burden and cannot pass through the additional cost they may be confronted with the choice whether to continue producing their output in Europe or relocate production either partially or entirely into a region with no climate regulation (Graichen et al., 2008). Conversely,

competitors whose production is based outside of Europe may expand their market share at the expense of EU-based companies due to their lower cost of production as a result of not having to face climate regulation. This process may lead to carbon leakage, a shift of GHG emissions from Europe to other parts of the world (Görlach et al., 2008; Marcu et al., 2013; Martin et al., 2014a). According to the European Commission, "the absence of binding action at the international level could lead to an increase in greenhouse gas emissions in third countries where industry is not subject to comparable carbon constraints" (European Commission (2014a), Art 10a (2)). The potential relocation of production with losses of employment, investment, tax income and overall welfare are a major concern in the policy debate, with a strong desire to avoid such adverse consequences for the European economy due to the EU ETS (European Commission, 2015b).

While a binding international agreement on climate policy would eliminate the leakage problem (Grubb and Neuhoff, 2006), the current debate focuses on regional climate policies using an appropriate policy mix to deal with carbon leakage, given that an international agreement seems unlikely in the near future (Böhringer, 2014; Meunier et al., 2014). Voluntary sectoral agreements at the international level may also address the issue for sectors at particular risk, but this option is considered unrealistic as well (Colombier and Neuhoff, 2007). Alternatively, border carbon adjustments may mitigate leakage effectively and if designed appropriately may be compatible with WTO rules (Ismer and Neuhoff, 2007; Dröge et al., 2009; Fischer and Fox, 2012; Martin et al., 2014b). Alternative ways of addressing leakage are free allocation based on historical activity levels, special provisions concerning changes in productive capacity, entry or exit of installations, as well as output-based allocation (Diekmann, 2006; Quirion, 2009; Zhang, 2012).

The solution currently pursued in Europe is to allocate emission allowances to sectors deemed to be exposed to a significant risk of carbon leakage for free, in combination with dynamic rules concerning changes in capacity, partial cessation, entries and exits (European Commission, 2014a). From a theoretical perspective the effectiveness of distributing permits for free based on historical data to solve the carbon leakage problem is ambiguous. On one hand the value of the permits received reduces the company's average production cost, so that the company has an incentive to continue producing in Europe. However, as long as allocation is based on historical data the company can always increase its profits at the margin by relocating some of its production into a region with no climate regulation. It will therefore also have an incentive to decrease production in the regulated region at any level of free allocation. (Graichen et al. 2008; Grubb and Neuhoff, 2006).

However, companies may shift production and thus GHG emissions across national boundaries and outside the EU for reasons unrelated to climate policy. The literature shows that in practice companies relocate production primarily based on other considerations such as energy costs, proximity to product markets, high-quality infrastructure and availability of skilled labor; the cost of climate regulation plays a minor role (Brockmann et al., 2012; Clò, 2010). It is difficult to quantify the risk of carbon leakage ex ante, as vulnerability of companies to carbon pricing is not directly observable and therefore difficult to capture (Martin et al., 2014a). Furthermore, country-level heterogeneity within sectors may lead to different levels of leakage risk in the same sectors across Europe (Sato et al., 2015).

Mitigating the Risk of Carbon Leakage under Asymmetric Climate Policy – The European Case

The sectors deemed to be at risk are defined on the carbon leakage list (CLL), based on a combination of quantitative and qualitative criteria (Table 1). The CLL is revised

every five years by the European Commission (European Parliament and Council (2009), art. 10a (13)). Sectors must meet either one of three ***quantitative*** criteria to be added to the CLL. Even if the quantitative criteria are not met sectors or sub-sectors may be added to the list following an assessment based on three ***qualitative*** criteria (European Parliament and Council (2009), art. 10a (17)).

Table 1: Criteria used to Identify Sectors at Risk of Carbon Leakage in the EU ETS

Quantitative Criteria	Qualitative Criteria
a) Direct and indirect costs increase production costs by at least 5% of gross value added and trade intensity is over 10%	Emissions levels and electricity consumption reduction potential of individual installations in the sector,
or	
b) Direct and indirect costs increase production costs by at least 30%	Current and projected market characteristics and
or	
c) Trade intensity is over 30%	Profit margins as an indicator of long-term investment or relocation decisions

Source: European Parliament and Council (2009)
Note: Direct costs are calculated as the value of direct CO_2 emissions using a proxy price of 30€/t CO_2. Indirect costs are calculated as exposure of a sector to electricity prices, calculated as electricity consumption in MWh x average emission intensity of electricity generation in EU27 countries, 0.465 tCO_2/MWh. Trade intensity is defined as Imports + Exports/Turnover + Imports. Trade intensity refers to trade outside the EU.

167 sectors, and in some cases sub-sectors, were added to the CLL based on the quantitative criteria, of which 10 meet more than one criterion: 24 sectors meet criterion a), 6 meet criterion b), while 147 sectors meet criterion c). 6 sectors were added based on the qualitative criteria.

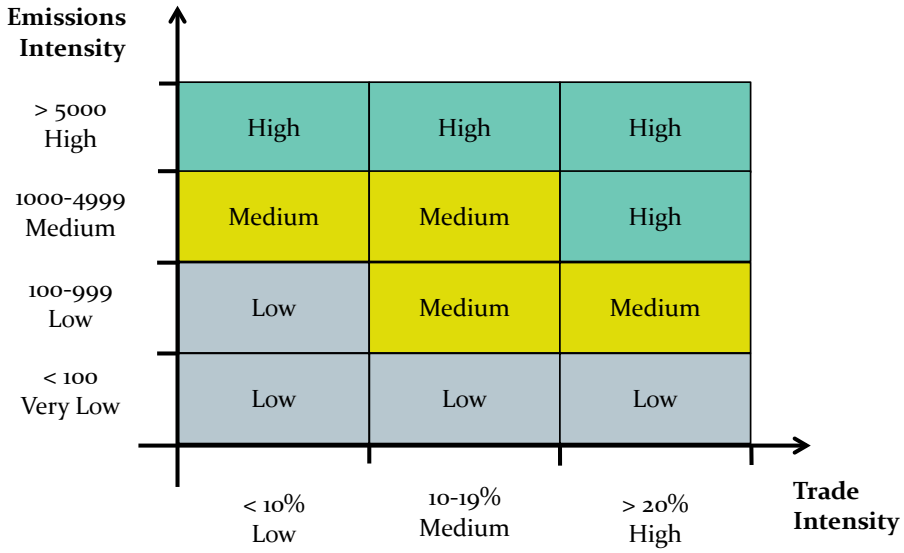
In trading Phase III (2013-2020) allocations to installations in sectors not deemed to be at risk of carbon leakage are adjusted using an allocation factor such that they received 80% of their original gross allocation in 2013 for free, decreasing to 30% by 2020 (Directive 2009/29/EC, art. 10a (11)). However, if a sector is on the CLL installations continue receiving 100% of the original gross allocation for free. The design of the provision for the period after 2020 is currently under discussion (European Commission, 2015c).

There are different views on the adequacy of the current two categories leakage risk in the EU. According to a recent stakeholder consultation by the European Commission 56% of industry respondents are in favor in maintaining the current system with two categories of leakage risk, whereas 21% believe that all sectors should be deemed at risk. Only 15% of respondents believe that more differentiation through additional leakage risk categories should be introduced (European Commission, 2014b). However, the empirical evidence suggests that parts of industry may be overcompensated at the current level of free allocation (Heilmeyr and Bradbury, 2011). Martin et al. (2014a) find that a large number of sectors benefited from receiving free allowances in excess of what would be required to neutralize the risk of carbon leakage.

Using Differentiated Criteria to Classify Leakage Risk – The Californian Example

One way of addressing overcompensation of some sectors while maintaining the CLL mechanism may be to differentiate the levels of leakage risk into more than the two categories currently used in Europe. The Californian cap-and-trade system provides an example of greater differentiation.

Figure 1: Californian Assessment of Carbon Leakage Risk



Source: California Environmental Protection Agency – Air Resources Board
Note: Emissions intensity defined as tCO_2e/million US dollar in value added. Trade intensity is defined as Imports + Exports/Value of Shipments + Imports.

The assessment is based on the quantitative criteria trade exposure and emissions intensity, leading to a division of installations into three carbon leakage risk categories (Figure 1). This classification system achieves some differentiation of leakage risk, classifying 15 sectors in the high risk category, 14 as medium risk and 3 as low risk (Marcu et al., 2014). Similar to the EU ETS, allocation factors depending on the overall risk level adjust the amount allocated for free. Installations in high risk sectors receive 100% of their allocation for the entire period 2013-2020, while the allocation sinks from 100% in 2013-2014 to 75% in 2015-2017 and 50% in 2018-2020 for the medium category. Free allocation sinks even faster in the low-risk group, from 100% in 2013-2014 to 50% in 2015-2017 and 30% in 2018-2020 (California Code of Regulations, 2011).

In the Californian cap-and-trade system differentiating according to leakage risk leads to a greater number of allowances available for auctioning. However, in the EU ETS adding an additional category with a lower level of free allocation would raise the cross-sectional correction factor, which adjusts the aggregate free allocation to industry to fit the industrial sector cap. This would lead to a re-distribution of compensatory free allocation between sectors, taking some allowances from the lower-risk category and giving additional compensation to sectors classified as high risk. However, in a more extreme case in which the aggregate amount of free allocation to industry is lower than the industrial sector cap, the cross-sectoral correction factor becomes one, i.e. cross-sectoral correction no longer takes place. The mechanics of the EU ETS imply that, for this extreme case only, further reducing

the free allocation factors would increase the number of allowances available for auction in the EU ETS as well.

Conclusion

The debate about the risk of carbon leakage is likely to continue for the foreseeable future. The empirical evidence suggests that the current mechanism for dealing with carbon leakage in Europe may overcompensate some sectors, so that there may be potential for differentiating the EU's current criteria for allocating emission permits for free more strongly to account for different levels of leakage risk. The Californian cap-and-trade system provides an example of how this could be done. With greater differentiation, while maintaining the remainder of the EU ETS unchanged, the mechanics of the system will lead to a re-distribution of free allocation away from sectors with lower leakage risk towards more exposed ones. Further debate may involve the effects of considering a larger number of criteria using various threshold levels.

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ISSN 2198-3925