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Pricing Carbon at the Border: Key Questions for the EU

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With the nationally determined contributions (NDCs) by parties to the 2015 Paris Agreement, governments are naturally focused on what they can do unilaterally. Coordinated policies like joint compliance and international emissions trading are proving to be thorny issues and a point of failure in the Conference of the Parties (COP25) in Madrid. This uncoordinated landscape of divergent carbon prices with limited geographic and sectoral coverage allows scope for international trade to undermine the effectiveness of unilateral carbon-pricing regimes through carbon leakage.[1] Furthermore, fear of adverse competitiveness effects can hamper political support for strong action. Although the share of annual global greenhouse gas (GHG) emissions subject to carbon pricing continues to expand, prices remain relatively low (World Bank and Ecofys 2019). As a result, little actual carbon leakage has been observed thus far (Dechezlepretre and Sato 2017). Nevertheless, some jurisdictions that price carbon (or are planning to do so) attach measures to level the international playing field – for example, by offering free allocation of emissions allowances to industries at risk of leakage. To date, that practice has arguably resulted in substantial overcompensation of firms in the EU (Martin et al. 2014); however, ratcheting up ambition also requires ratcheting down free allocation, leaving little maneuvering room to use compensation to address leakage as carbon prices climb.

Pricing carbon at the border by introducing border carbon adjustment (BCA) is another tool for addressing carbon leakage. The BCA tool has two parts that could level the playing field for producers in high-carbon-price countries. One is to require comparable payments for the emissions embodied in imported goods (import adjustments), to help ensure that consumers face consistent prices for the carbon content of the products they buy. The other is to relieve exported goods of their embodied emissions costs (export adjustments), to keep domestic exporters on an even footing abroad. BCA may also be viewed as a lever to encourage trade partners to improve their carbon footprints. Several prominent economists and political scientists have promoted trade measures as a means for supporting carbon pricing "climate clubs" (e.g., Victor 2011, p. 245; Nordhaus 2015; Gollier and Tirole 2015).

Although the concept of BCA – shifting towards consumption-based carbon pricing – is straightforward and intuitively appealing, its design and implementation are challenging in practice. In particular, a policymaker crafting BCA provisions must make numerous, complicated regulatory choices, including scope of applicability (i.e., which policies, goods, sectors, countries), methodology for assessing the carbon content of products, type and price of the adjustment, exemptions or modifications for products from any specific countries, and use of the resulting revenues. Each of these choices has economic and environmental implications that influence the effectiveness of the BCA, as well as nuanced technical, legal, and political consequences.

In this article, we summarize some recent reviews of the scholarship on BCA (Cosbey et al. 2019; Mehling et al. 2019) and how the ideas may apply to emerging policies.[2]

WHO IS CONSIDERING BCA?

The European Union has an ambitious climate agenda under its Green Deal (European Commission 2019). It plans to deepen decarbonization in order to increase mitigation targets for 2030 and achieve climate neutrality by 2050. Carbon pricing under the EU Emissions Trading Scheme (EU ETS) will therefore need reform leading to a higher carbon price; other policy tools like energy taxation and investment schemes will be integrated into the agenda. The proposed mechanism for BCA could be the inclusion of imported goods in the EU ETS, a customs duty, or a border "tax." The latter option could be legally compatible with World Trade Organization (WTO) rules if a new EU energy taxation directive introduced carbon intensity as a tax base across the EU as a whole. The European Commission has issued a first proposal for new legislation with a mechanism that "would counteract this risk [of carbon leakage] by putting a carbon price on imports of certain goods from outside the EU" (European Commission 2020).

The EU is not alone in its attraction to border measures. Nearly every example of draft climate legislation circulating in the US Congress includes BCA. For example, the Climate Leadership Council, a US group of conservative policymakers and economic advisers, developed a bipartisan climate roadmap that describes a plan for carbon taxation with lump-sum rebates. This "carbon dividends plan" includes

[1] We define carbon leakage as the increase in emissions in foreign jurisdictions that can be attributed to the implementation of a climate policy (particularly carbon pricing) in the home jurisdiction. It is distinct from the broader concept of global trade in embodied carbon, where carbon-intensive production tends to shift towards developing countries and return as imports to industrialized countries (Peters et al. 2011).

[2] Ismer et al. (2020) also discuss policy options for the EU, including an alternative ("behind the border") design of combining free allocation with a consumption charge based on the same benchmark. Morris (2018) and Flannery et al. (2018) discuss BCA options from a US perspective.

a full BCA proposal: export rebates as well as import fees would accompany a national carbon tax (Baker et al. 2017; Climate Leadership Council 2020). Mexico has mentioned BCA in its NDC, and others are likely to follow in considering BCA – or responding to one. Therefore, the EU bears some responsibility if it acts first, and it should proceed with an eye towards the global evolution of carbon pricing, consulting with trade partners all along the way.

WHY USE BCA?

The primary objective of BCA must be to reduce carbon emissions. Indeed, the protection of a global resource is the only objective fully consistent with WTO exceptions in cases where BCA design does not meet basic WTO principles (Horn and Mavroidis 2011). Economic modeling finds that BCA can reduce carbon leakage rates by one-third to one-half (Böhringer, Balistreri, and Rutherford 2012; Balistreri and Rutherford 2012; Branger and Quirion 2014). By passing carbon costs through to consumers, BCA tends to be more cost-effective than other unilateral options, such as targeting vulnerable energy-intensive trade-exposed (EITE) sectors with exemptions (Böhringer, Carbone, and Rutherford 2012) or output-based allocations (Fischer and Fox 2012a). This advantage tends to get stronger as climate ambition increases (Böhringer, Fischer, and Rosendahl 2014). BCA may also encourage some exporting countries to tighten their climate policies to improve their market access (Böhringer, Carbone, and Rutherford 2016; Irfanoglu et al. 2015; Lessman et al. 2009); however, the tariff levels in WTO-compatible BCA are unlikely to be sufficient to bring many pollution-intensive countries into a carbon-pricing coalition (Nordhaus 2015; Bednar-Friedl et al. 2012; Weitzel et al. 2012).

By addressing competitiveness-related leakage, BCA can improve the political acceptability of pricing carbon emissions from domestic producers. However, BCA is not a panacea for EITE industries because they could use carbon-intensive intermediate inputs from unregulated regions or face weaker domestic demand from rising prices (Böhringer, Carbone, and Rutherford 2012; Burniaux et al. 2013).

WHEN CAN BCA BE APPLIED?

To adhere to WTO principles of non-discrimination, countries cannot ask for more or different compliance from importers than they ask of their own firms producing comparable products. That means that only price-based climate policies can be associated with a price at the border. A domestic carbon tax can be complemented by a border tax. For an emissions trading system, the border adjustment would likely entail compliance with the purchase of emissions allowances, with similar options for acquisition and time horizons for compliance as those enjoyed by domestic producers.

Economically, this principle makes sense as well. As Cosbey et al. (2019) explain, fundamentally, BCA requires importers to pay for the carbon embodied in their products – that is, the emissions associated with their production – and thus incentivize abatement. Non-price-based policies like performance standards may also encourage abatement, but they do not require that producers pay for the remaining embodied carbon. Price-based policies also have a transparent cost of carbon that forms the basis for the border charge. Implicit cost estimates are not valid for adjustment, not only because they can be manipulated (and nonmarket policies are likely to lead to inefficiently high marginal abatement costs) but primarily, again, because of the lack of pricing of embodied carbon.

WHAT GOODS WOULD BE ELIGIBLE FOR BCA?

BCA should be applied when there is significant risk of carbon leakage. Sector eligibility should rest on a combination of two criteria: carbon cost exposure and trade exposure (Fowlie and Reguant 2018; Sato et al. 2015). The EU has established a process to identify its at-risk sectors in the carbon leakage list, which it uses for free allocation. Whether the specific thresholds the EU used for a sector's direct and indirect carbon costs and its trade intensity with non-EU countries are ideal can be debated, but the two criteria are good indicators of which sectors need consideration. The EU 2020 proposal for BCA suggests beginning with one or two sectors (e.g., cement or steel) as a way to prove the concept before expanding to other sectors.

Several factors suggest that restricting coverage to imported goods from core EITE sectors is best. Legally, export rebates are difficult to defend because they could fall under WTO restrictions on so-called prohibited subsidies. Moreover, subsidies do not qualify for the environmental exceptions available to justify tariffs and import regulations under Article XX of the General Agreement on Tariffs and Trade (GATT) (Cosbey et al. 2019). The economics literature is also mixed on the effectiveness of export adjustments. Economically, most of the leakage mitigation benefits are obtained when BCA is applied only to imports of major EITE sectors (Böhringer, Carbone and Rutherford 2012). Broad application of BCA to all products and all embodied emissions does little to improve (and may even reduce) cost-effectiveness (Böhringer, Carbone, and Rutherford 2018).

HOW WOULD BCA BE CALCULATED?

Calculating emissions content requires first determining a system boundary – that is, what emissions

to include – and then calculating a benchmark. The system boundary can be drawn narrowly, for direct emissions only, or broadly, with all emissions along the supply chain or life cycle. An intermediate option would capture direct emissions and primary indirect emissions from power production, the main sources of carbon costs for the at-risk sectors. Importantly, the system boundaries cannot include more emissions than are subject to carbon pricing for implementing country producers, and the EU ETS covers only direct emissions and primary indirect emissions.

If the BCA covers both direct and primary indirect emissions, a default carbon intensity for each must be determined. In the EU ETS, a benchmarking exercise has already been conducted for domestic sources for the free allocation of emissions allowances. However, BCA requires a determination for foreign sources. The decision whether to use actual emissions data or a sector-wide benchmark involves trade-offs amongst firm incentives, industry incentives, data collection, compliance costs, and WTO obligations. Basing the calculation on actual emissions (or providing the option to certify them) is the only way to confer incentives for foreign exporters, on the margin, to reduce their emissions. However, such firm-specific calculations are administratively onerous and subject to reshuffling of emissions. For example, the market could simply reallocate the lowest-carbon production for sales to the EU, while higher-carbon production remains for unregulated consumption. Alternatively, the calculations could be based on more readily accessible data. For example, using the domestic average emissions intensity of a sector would arguably avoid discriminating by country, which could seem more in the spirit of WTO rules, as would a best-available-technology measure, although that would offer weaker leakage protection. A related question is whether to differentiate by production process (e.g., steel made using emissions-intensive coke or steel made from scrap steel using an electric arc furnace powered by renewables).

A hybrid approach could use a common sectoral emissions intensity for direct emissions and a country-specific measure for indirect emissions, for which data is available from national reporting. This option would potentially give foreign countries some incentive to improve their performance and thereby lower the burden on their exporters, but it would differentiate by country of export and require strong transshipment provisions. Overall, little economics research has been done to quantify the importance of reshuffling or the magnitude of incentives for foreign producers or regulators. In any case, allowing producers to provide third-party-verified firm-level data on emissions intensity would improve the odds that a BCA scheme is found legal (Cosbey et al. 2019).

WHERE MIGHT WE MODIFY OR EXEMPT THE ADJUSTMENT?

Ideally, and to comply with GATT exception provisions, the BCA would also offset the differential between foreign and domestic price-based climate policies.[3] Of course, if the foreign system has a different compliance mechanism or system boundary than the domestic system, this adjustment may require more than simply calculating the difference in carbon tax rates or certificate prices.

A BCA system must also recognize any free allowances or other compensatory mechanisms enjoyed by domestic firms and offer comparable benefits to imports covered by the BCA. In some cases, the BCA level may need to be adjusted down to zero. Generally, BCA should not be combined with other cost compensation behind the border (i.e., applied to domestic products) because such compensation would undermine the case for a GATT exception and would increase the likelihood of illegal subsidization. For symmetry, adjustment for foreign carbon prices must account for free allocation abroad.

An alternative to adjusting the BCA based on country-specific factors is the provision of a wholesale exemption, which is equivalent to modifying the emissions benchmark to zero. Indeed, case law suggests that it may be illegal to demand specific policies as a basis for exemption from BCA, rather than requiring that the exporter achieve some given level of climate performance.[4] Country-based exemptions also have the potential to unfairly discriminate amongst exporters and may thus be incompatible with GATT's requirements, but they might be justified under GATT's exception provisions if they contribute to protecting the environment. The use of such country-based exceptions is included in the EU proposal.

There are five possible exemptions on a country basis:

1. *Exempting countries that implement a national emissions cap.* Because an effective national cap theoretically precludes leakage, it would be allowed under GATT (Cosbey et al. 2019). However, many emissions caps are not as strict as the EU's, thus allowing for leakage.
2. *Exempting countries that take "adequate" national actions other than national caps.* As indicated above, non-price-based mechanisms should not be eligible for border adjustment, so the case for exempting them is unclear. Importantly, any national climate regime other than a hard cap

[3] For the same reasons that BCA should not be allowed for sectors or products that are regulated with non-price-based policies, such policies in the foreign country should not generate adjustments to the BCA.

[4] The Appellate Body in *US – Shrimp* ruled against a US law for demanding that foreign shrimp fishers use exactly the same equipment as US fishers to avoid the incidental capture of turtles.

is susceptible to leakage. Defining ex ante what constitutes adequate action is also difficult. On the other hand, not using this exemption may violate GATT's exception provisions concerning arbitrary treatment of exporting countries, if the exporting country is party to the Paris Agreement. The latter could be interpreted as international recognition of adequate national actions, but the diverse NDCs indicate a lack of clear consensus on adequacy.

3. *Exempting sectors from countries that implement a sectoral cap.* If a country effectively caps a given sector's emissions, no sector-level leakage will occur. Adjustments for sectoral carbon pricing (or export taxes) could also be included in the BCA calculations.
4. *Exempting least-developed countries and low-income countries.* This may help the measure align with the UNFCCC principle of common but differentiated responsibilities (CBDR) and the WTO principle of special and differential treatment. The exemption would not hurt the effectiveness of BCA in preventing leakage, since very few of these countries export EITE goods.
5. *Exempting countries by means of administrative flexibility.* Public policy objectives might motivate exemptions, but they must lead to predictable criteria. Administrative simplification, for example, can be more useful than BCA modifications for avoiding double charging or for aligning with CBDR goals.

Given those considerations, exemptions should be incorporated into a BCA regime with caution. Any differentiation based on the country of origin raises transshipment and reshuffling problems. Transshipment provisions work best when the goods in question are wholly obtained in a single country or at least have a very simple supply chain. Thus, if exemptions are sought, they seem more compatible with a narrow BCA that covers only a small number of commodity-oriented EITE goods.

HOW SHOULD THE REVENUES BE SPENT?

Revenues collected from import charges raise opportunities but also create an obligation to demonstrate that the primary goal of the policy is to reduce emissions, not to protect domestic industry. Earmarking to support low-carbon investments in domestic sectors is one idea, but even though it supports the environmental goal, it also can be seen to serve as additional protection. The fact that BCA tends to shift the burden of climate policy towards developing countries (Böhringer, Fischer, and Rosendahl 2010) runs counter to the principles of CBDR. Alternatively, dedicating the revenues to benefit the exporting countries can avoid this shift or even make exporting countries better off (Böhringer, Balistreri, and Rutherford 2012; Fischer and Fox 2012b). Not retaining the revenues also removes domestic incentives to use the BCA to manipulate the terms of trade. Thus, dedicating the revenues to objectives that assist developing countries can improve a BCA regime's chance of success in meeting GATT's exception requirements by helping to demonstrate good faith.

CONCLUSION

The EU is considering whether to prevent carbon leakage by adjusting the carbon price at the border. Amongst the unilateral options to address leakage, BCA may be the most efficient, but it is also the most controversial and legally challenging. Setting up such a tool will require EU policymakers to determine the coverage of traded goods and their emissions, develop a transparent calculation of the BCA, recognize carbon pricing in the countries of origin, consider the overall climate ambition of trade partners' NDCs, and comply with WTO rules. The central aim has to be effective performance in preventing emissions leakage.

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