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Analysis

Border Carbon Adjustments Based on Avoided Emissions: Addressing the Challenge of Its Design

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ABSTRACT

Carbon pricing is an essential instrument to address climate change. However international differences in carbon control policies may cause not only carbon leakage but also competitiveness disadvantages. In this context, border carbon adjustments are a promising tool for discouraging these problems. But designing a real-world border carbon adjustment instrument implies to consider significant issues: technical feasibility, data availability, the risk of retaliation from developing countries, and its compatibility within the World Trade Organization legal framework. There are still no conclusive answers about a proper design. This paper is an attempt to address the above-mentioned challenges proposing a carbon border tax (CBT) based on avoided emissions. Such a CBT is applied at a product level and not at a sector level, and all international prices are deflated to guarantee that import 'like' goods received a treatment similar to 'like' domestic products. Using the WIOD, we simulate a CBT based on avoided emissions applied by the European Union, and we compare the results with a CBT based on embodied emissions.

1. Introduction

Climate change is a global problem that urgently requires global solutions. The concentration of greenhouse gases (GHGs) in the atmosphere is the product of several sources of emissions from all countries. Consequently, the climate —which affects everyone— depends on everyone's behavior.

The global nature of the problem makes the fight against climate change a global public good: the costs of abatement are national, while the benefits are global and independent of where the emission reduction is obtained. In this context, countries have the incentive to neglect environmental policies aimed at reducing domestic emissions and to rely on the reduction achieved by other countries. This is known as the free-rider problem.

Traditional solutions for public goods applied at national level cannot be effective when these goods are global. Governments have the legal authority to establish laws and institutions within their territories but there is no legal mechanism to coerce reluctant free-riding countries into international treaties or agreements that would guarantee the provision of global public goods.

Although the ideal system would be a cooperative regime in which countries negotiate a binding agreement to ensure efficient provisions of the global public good, the Westphalian nature of the current system of nations makes this cooperation unlikely, though not impossible.[1]

Theory and observation show the difficulties to design and approve effective and stable international climate agreements. In the past, the 1997 Kyoto Protocol set internationally binding emission reduction targets to signatory countries. Nevertheless, the United States (US) did not ratify the agreement and some of the signatory countries did not comply with their commitments. More recently, in December 2015, the Paris Conference of the Parties revealed again the political difficulties to adopt and implement a solution at a global level. Once again, without a system of penalties on non-participants and non-fulfillers, stable coalitions are difficult and emissions reductions are expected to

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[1] The 1987 Montreal Protocol on Substances that Deplete the Ozone Layer is an example of a successful global agreement. However, in the fight against climate change the experience so far has been much more disappointing. The different characteristics of ozone-depleting substances and greenhouse substances mostly explain the different difficulties to act against the ozone layer problem and against global warming. In the first case, the problem was associated with particular industrial processes and substances for which there were cheap substitutes. In contrast, global warming is associated with production processes that generally characterize industrial societies, such as the use of fossil fuels, intensive agrarian and cattle sectors, or a massive generation of waste.

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be small (Nordhaus, 2015).

In short, on the one hand the global character of climate change would require a global binding agreement inherently difficult to be achieved. On the other hand the problem needs an urgent solution and cannot wait for such an agreement. Accounting for this contradiction, and considering the difficulties of collective action to face global "public bad", Elinor Ostrom (2009) defended the idea of adopting "a polycentric approach for coping with climate change". Citizens as well as local and national authorities should voluntarily change their behavior in order to contribute to reduce the problem, while waiting for such a global agreement. Ostrom's idea reflects what is happening in practice. In 2016, about 60 jurisdictions —national and subnational— had a carbon pricing instrument covering about 13% of global GHG emissions (World Bank Group, ECOFYS, 2016).

In a globalized world, however, these unilateral actions might cause two related problems: carbon leakage —i.e. an increase of emissions in countries with less stringent or no abatement policies— and a loss of competitiveness for the country implementing the environmental policy (Lockwood and Whalley, 2010; Horn and Sapir, 2013). In this context, the key issue is the need of some measures to 'level the carbon playing field' (Houser et al., 2008; Krugman, 2009). One economically well-founded measure is the so-called border carbon-motivated adjustment (BCA). With this instrument, the region that already has a carbon pricing mechanism —the abating region— imposes a 'border adjustment' or tariff on certain products imported from countries that do not limit their global warming emissions —the non-abating regions—.[2]

The carbon leakage and competitiveness are issues of concern and the debate on the viability of a BCA is in the political agenda of regions like the US (American House of Representatives, 2009) and the European Union (EU) (Mattoo et al., 2009; Kuik and Hofkes, 2010). Also international trade institutions such as World Trade Organization (WTO) have already considered the relevance of this measure (UNEP and WTO, 2009; Hillman, 2013; Mattoo and Subramanian, 2013a). However, a BCA has not been implemented thus far, partly because it gives rise to some unsolved issues. One of them is its compatibility with the international legal framework, which has become a crucial point in the debate of BCA design. In short, the general WTO philosophy refers to the so-called non-discrimination principle. Using the WTO words "the products […] imported into the territory of any […] contracting party shall not be subject […] to internal taxes […] in excess of those applied […] to like domestic products".[3]

This issue is closely related with the subject of this paper: the technical problem of computing the tax base of the tariff, which entails to define how to calculate the emissions of different products imported from different countries and, thus, how to design a BCA.

There are two general approaches to define the tax base of a BCA. The first option takes as a reference the non-abating regions —the origin or place of production of the imported good— and it is based on the total emissions embodied in the good produced in the foreign country (Mattoo et al., 2009; Mattoo and Subramanian, 2013b; Atkinson et al., 2011; Dissou and Eyland, 2011; Böhringer et al., 2012; Ghosh et al., 2012; Elliott et al., 2013; Schenker et al., 2013). In the second option, conversely, the reference is the abating region —the place of destination or consumption of the imported good— and it is based on the total emissions embodied in the good if it were produced in the importing country (Mattoo et al., 2009; Mattoo and Subramanian, 2013b; Böhringer et al., 2012; Elliott et al., 2013).

The option of a BCA based on emissions embodied in imports has been considered by many authors and it would have a positive impact in environmental terms because it introduces different taxes discriminating according the carbon emissions of different exporters. In any case, we should emphasize that the role of BCA is not to discriminate imports according their emission; its role in environmental terms is to make national carbon pricing more feasible and improve it avoiding competiveness and leakage problems.

Even more importantly, its implementation would be almost unfeasible because it is very data demanding, especially if we want to apply different taxes to different producers and not based on countries' average emissions. It would require a large amount of data about technologies and sectorial emissions in different countries, which are not available for all countries and all economic activities. Moreover, it would be very difficult to control the deviation of exports from more polluting countries using third countries (see Monjon and Quirion, 2010).

Even in the case of solving the practical problems of estimating embodied emissions, this measure could find a great opposition arguing that it infringes the two aforementioned WTO principles. Besides, even in the case of a BCA WTO-compatible design, some developing countries could manifest their reticence for its potential as a protectionism measure (Holmes et al., 2011) and they could apply trade retaliations (Fouré et al., 2016). In this context, Sakai and Barrett (2016) propose the 'best available technology' principle as an equalization measure that would avoid being challenged under WTO law. This proposal, however, is not exempted from implementation problems linked to the definition of the best technology of reference.

On the other hand, a BCA based on emissions embodied in the domestically produced good might be considered as more clearly compatible with WTO principles and it would also be less data demanding. However, in this case the problem would be the definition of the domestic technology due to the complexity of global supply chains that characterizes production processes nowadays.

In this paper we propose an innovative alternative to design a BCA based on the total —direct and indirect— emissions that the abating region would have generated if it had produced completely —i.e. in all the phases of production— all the imports from non-abating regions in its own territory. We called it a BCA based on avoided emissions and it reproduces a hypothetical autarky situation. We assume that all inputs —domestic and imported— have been produced in the abating region by applying the so-called 'domestic technology assumption' corrected for international price differences (Arto et al., 2014), i.e. we introduce the deflation of imports as an equalization measure.[4]

[2] The application of a BCA in the form of tariff could also be applied not only when the policy of the abating region is a carbon tax but also in the case of the existence of an emissions trading system (Gros and Egenhofer, 2011). However, the volatility of allowances price makes it difficult to determine which would be the proper border carbon price or tax. In this case "the requirement for importers to surrender carbon allowances is more likely to be compatible with international law than an import tax" (Kuik and Hofkes, 2010: 1742). Anyway, also in this scenario there would be a problem similar to the one related to carbon border taxes analysed in this paper: what number of allowances should the importer buy? In principle —as in the case we analyse in the paper— we could use as a reference the effective emissions generated to produce the imported good or the avoided emissions (see later). In this respect, it is the same to pay 20 euros for any ton of CO_2 in terms of taxes or in terms of buying allowances. An important difference, however, is that the carbon price to pay is not fixed in the second case but it depends of the moment in which the allowance is bought. In any case our conclusions when comparing relative economic impact and viability in the context of World Trade Organization rules of different designs of tax base could be applied for defining different amounts of required allowances. On the different problems of implementing a border adjustment with emissions trading systems, see Monjon and Quirion (2010).

[3] See articles I and III in the General Agreement on Tariffs and Trade (WTO, 1947, 1994). However, there is an important debate and a legal discussion about the interpretation of these articles. In fact the non-discrimination principle might be overcame through article XX of the same WTO text that contemplates exceptions to the non-discrimination principle (see Hillman, 2013 for a detailed discussion).

[4] Our proposal is somehow in line with the approach of Mattoo et al. (2009), Böhringer et al. (2012) and Elliott et al. (2013) who propose as a possible metric to take into account the emissions generated producing the goods within the importing country. Anyway, the previous studies do not explicitly consider that the goods produced by the importing countries use some inputs that are imported. So it is not clear how they propose to take into account the emissions generated to produce those inputs, that is the novelty of our proposal. Simply referring to the carbon content embodied in the domestically produced goods might refer to the domestic production, excluding the imported inputs, or to the emissions embodied in the imported inputs too, taking into account foreign technologies. Moreover, we take into account international prices differences. Considering all these issues we think that none of the previous solutions would guarantee the same final treatment to domestic and imported products.