

CEPR/EAERE Webinar on Climate Policy: The Carbon Border Adjustment Mechanism (CBAM)

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The EU Parliament has recently proposed a framework for a Carbon Border Adjustment Mechanism (CBAM), which would be an extension of the European Trading System (ETS), requiring importers to purchase allowances for the volume of carbon emissions incorporated in their products.

For this first episode of the CEPR/EAERE Webinar on Climate Policy, [Carolyn Fischer](#) (Vrije Universiteit Amsterdam), [Samuel Kortum](#) (Yale University) and [Luis Garicano](#) (EU Parliament & CEPR) explored the economic and political issues associated with this proposal aimed at levelling the playing field and fighting the carbon leakage inherent to the renewed EU ambition on climate change. Their presentations were followed by a discussion moderated by [Christian Gollier](#) (Toulouse School of Economics, EAERE, CEPR & Climate Change RPN Leader) and a Q&A with the audience.

Panellists:



Carolyn Fischer
Vrije Universiteit
Amsterdam



Samuel Kortum
Yale University



Luis Garicano
EU Parliament & CEPR



Christian Gollier
Toulouse School of
Economics, EAERE, CEPR &
Climate Change RPN
Leader

Moderator:

Key Points of the Webinar

- **The need for a new paradigm to reach EU climate goals**

The main climate tool used in the past 30 years - voluntary multilateral agreements - has been hampered by its non-binding nature and lack of mechanisms to avoid free riding. 70% of global carbon emissions are still not subject to any pricing mechanism, resulting in an unsustainable equilibrium: global greenhouse gas (GHGs) emissions have increased by more than 40% since 1990.

In parallel, the EU has been increasing its ambition by defining emissions targets for key sectors in the economy. The first European package of climate and energy measures was agreed in 2008 and set objectives, which were met ahead of time, for 2020, notably including a 20% cut of GHGs emissions (compared to 1990). EU leaders endorsed the objective of achieving climate neutrality by 2050 and on a net domestic binding reduction of at least 55% in GHGs emissions between 1990 and 2030.

- **ETS and carbon leakages**

To achieve these climate goals, the EU has developed the **EU ETS**, the cornerstone of its climate change policy. Created in 2005, it is the world's first major carbon market and remains today the largest carbon-pricing system. It aims to cut down GHGs emissions from energy-intensive industries and electricity power plants and limit emissions from more than 11,00 heavy energy-using installations and airlines. Overall, it covers around 40% of the EU's GHGs emissions. It works following a market-based approach to price carbon emissions. A cap, reduced over time, is set on the total amount of certain GHGs that can be emitted by installations covered by the system. The number of permits sold by the EU to the market players (or distributed for free) are equal to the cap. They can trade these permits with one another, so that a market price for carbon emerges. As the cap decreases over time, it leads to an increase in carbon prices, thus promoting investment in decarbonization technologies, which become relatively cheaper.

However, in the absence of a global price on carbon emission, unilateral efforts to accelerate **carbon leakage dynamics** are doomed. Regions with laxer climate policies gain a comparative advantage and attract production. While the EU has managed to reduce its carbon emissions by 21% between 1990 and 2018, it has been offset by the increase in net imports from third countries by 28% in the same period.

- **Introduction of the CBAM to level the playing field**

On February 15th, the European Parliament approved its proposal for the implementation of a WTO-compatible EU CBAM. This mechanism takes the form of a tax on carbon footprints of imports, ensuring that the price of imports reflects their carbon content. A key element of the design of CBAM will

be that it mirrors the price being charged to EU producers and covers the same sectors to ensure **fairness and non-discrimination between domestic producers and foreign importers**, while introducing elements that will incentivise others to be making investments and putting in place carbon price schemes. It would avoid importers paying twice for the carbon content embedded in their products, by taking into consideration **existing carbon pricing measures in third countries**. In terms of an **assessment method**, the approximation proposed to obtain the actual level of carbon emissions is to measure the carbon content of imports using the weight of the raw material embedded in the products, multiplied by a default carbon intensity value (differentiated by country). In parallel, importers should be allowed to demonstrate if their specific production process is more carbon efficient.

In terms of **policy instruments**, several options are on the table. First, an excise duty/tax on consumption would not fully address the risk of carbon leakage and would be technically challenging given the complexity to trace carbon in global value chains (if designed in a similar way as the VAT). It also lacks public and political support. On the other hand, a customer's duty/tax on imports would fail to ensure WTO compatibility, given its fixed nature in relation to the evolving price of the EU ETS, and could be perceived as a protectionist measure by trade partners. On the other hand, an instrument based on the EU ETS would benefit from stronger support.

Furthermore, although it might prove challenging from a technical and administrative perspective, the CBAM shall be implemented at a **broad scope** and cover the same products as the EU ETS. It might otherwise trigger significant substitution effects and competition distortions between sectors. Furthermore, distortions between raw materials and intermediate/end products might exacerbate the risk of carbon leakage in the production of raw materials.

Free allocation of allowances represents the main mechanism to protect sectors at the highest risk of carbon leakage. They are based on a production benchmark on the top 10% of performers. The implementation of the CBAM offers - from an environmental and fiscal perspective - the opportunity to abandon them (current EU subsidy to EU resource and energy intensive industries). To avoid affecting European producers' competitiveness, a transition period should be considered for their progressive removal. CBAM and free allowances could coexist without representing double compensation if allowances allocated for free are also deducted from the CBAM. The right way to do it would be to eliminate the free allowances and allow for partial export rebates simultaneously introduced.

- **Review of Border Carbon Adjustments (BCA) literature: Developing Guidance for Implementing BCA**
 - **Guiding principles for BCA design**

BCA must be **transparent and coherent with internationally agreed-upon principles both in a multilateral trade system and a multilateral climate change regime**. In that regard, the key WTO obligations include principles of non-discrimination (article III) and the most-favoured national (article I).

These prohibit discrimination among goods based on their country of origin. Furthermore, an enabling clause allows some discrimination in favour of least developed countries, if the main aim is aid development. The *general exceptions* in article X, stating various environmental and health related exceptions also allows some otherwise illegal measures. Importantly, article X does not apply to subsidies, which may pose problems to including export rebates. Finally, the overall *Chapeau* requires that means meet the desired ends and are not aimed at protecting domestic producers. In other words, the motivation must be to combat leakage, not to protect competitiveness.

The other multilateral agreement that needs to be considered is the United Nations Framework Convention on Climate Change (UNFCCC), article 3 of common but differentiated responsibilities (CBDR). Not all countries have the same capacity to adopt climate policies. It may raise potential conflict if the BCA is aimed at creating leverage and bringing about equivalent national policies or unfair burdens on Least Developed Countries (LDCs). Furthermore, these international agreements do not confer legal rights on the practices of individual producers.

- **BCA design considerations**

Sectors that should be eligible for adjustments should be, with priority, on emissions pricing with high enough prices to induce leakage. Two components shall be considered: direct abatement costs and embodied emissions costs, which only emissions pricing policies have, and which shall be adjusted and net of free allocations, what the proposal does.

There are several issues to balance when considering products that shall be eligible for adjustments: the **leakage avoided (green component) versus risk of unfair application (trade compatibility) and the administrative costs (administrative feasibility)**. In that regard, two criteria need to be used simultaneously to identify the sectors at risk of leakage: the high cost of climate regulations (high GGHS intensity of production or value added) and the inability to pass through costs of regulations (trade sensitivity). The EU already has a carbon leakage list identifying the energy intensive trade exposed sectors. Seven sectors on this list - cement, ceramics, coke glass, refineries, basic iron, and steel & aluminium - represent 2/3 of the non-electricity emissions in the EU-ETS. Recommendations aim to focus on trade of homogeneous commodities - the more differentiated they are, the more difficult it is to assign benchmarks and administer. This is further informed by research showing that comprehensive BAM, aiming for full economy-wide adjustments, shift more welfare from developing countries than they do lower costs. However, the issue of downstream diversion is still very much under researched. According to the proposal, the CBAM should apply to any import embedding basic materials covered by the EU ETS going beyond just being covered by your own emissions pricing systems.

In terms of the **scope of emissions**, one shall consider both all direct emissions and energy-related emissions - such as those arising from purchased electricity, steam, or heat. The implementation of a third scope considering all other indirect emissions is generally not recommended because of its complexity while less leakages are involved. In that regard, the EU proposal includes indirect emissions from basic material inputs by weight.

Regarding **benchmarks** used for the embodied emissions, those must be specific while respecting some trade-offs between administrative feasibility - a feasible approximation to assess the carbon content of imported products - and green feasibility - assessing the "real carbon content" as close to reality as possible. One option is to have a single default for each product, which may underestimate the true carbon content but would avoid reshuffling and better respect the WTO non-discrimination clause. On the other hand, country specific benchmarks are more accurate but may rise WTO issues. Finally, the most accurate option, however administratively onerous, is to distinguish which process and firm specific benchmarks. In this regard, product-specific benchmarks and, where appropriate, adapted to different production processes are recommended, while producers should be given the option to provide their verified firm level data. Finally, financial, and technical assistance in accounting, reporting, and verification to assist foreign firms covered exported in submitting verified individual data is a way to demonstrate good faith. The proposal highlights a lot of this, such as material-specific default, for instance, and conventional emissions intensity in importing countries, while some discussions are ongoing regarding indirect emissions, and option to producers.

In terms of **credits against adjustments**, any free allocations offered to domestic producers must be afforded to imports, and the proposal offers to justify to importers that they have already paid on their products.

Country based exemptions raise various issues including trade law and administrative burden issues. Justifiable exemptions could be considered for countries that have an effective emissions cap, for instance, without price-control mechanisms, and LDCs. The EU proposal does foresee bilateral agreements.

Exports rebates would theoretically be useful for full destination-based carbon pricing by levelling the playing field in the rest of the world but raises WTO issues. It may indeed be permissible in conjunction with carbon tax but be viewed as illegal subsidies if used with ETS. The proposal is to phase out free allocation and add export rebates based on a 10% benchmark. It is important to note that economics modelling finds import adjustments responsible for most reductions in leakage.

Missing aspects in the proposal include the **use of revenues**. Earmarking revenues can indeed help respect CBDR by refunding exporting countries (directly or via a clean fund), contributing to internationally administered adaption funds, or disbursing collections to governments in ways that help developing countries cope with climate change. Finally, various issues in terms of **governance** have not been raised. An important aspect in this regard is to coordinate with trade partners in advance (e.g., notification, meaningful opportunity to comment, adequate lead time, contact point established), and make sure to review that processes are transparent and adherent to international norms.

- **Carbon Border Adjustments from Optimal to Practical**

- **The optimisation problem**

The question of identifying how to best reduce global emissions at a minimum cost without being out to hurt the rest of the world (ROW), which retains sovereignty, leads to the **optimization problem**. It considers various quantities - including the amount of fossil fuels extracted, energy use in production, quantities of imports, exports, and consumption of goods embodying energy - while anticipating ROW reactions.

The **qualitative answer** to this problem includes taking action to reduce fossil fuel extraction, the energy intensity of all goods produced (exports) and/or consumed, the consumption of goods that embody energy - that may be considered as an intensive margin - including imports and of exports of goods with a strong comparative advantage (intensive margin of exports), while expanding the range of exports on goods with a weak comparative advantage (expansion of margin of exports). On the other hand, no change shall be seen on set of imports, as their extensive margin should be invariant to an optimal policy. These different actions shall be conducted without terms of trade manipulation and can translate into an **economic rationale**. Quantitatively, one of the most important aspects is to balance lower supply along with lower demand for energy and to moderate the equilibrium effect of the world energy price, which is partly what the ROW is responding to. Part of that is to reduce fossil fuel supply by extracting less, which - all things equal - will push up global energy prices. This can be balanced by reducing demand through hitting all possible margins, which include producing with energy saving techniques; dictating energy saving techniques for imports from foreign producers; consuming less energy intensive goods and exporting less energy goods ROW would never produce for themselves.

- **Policy implementation**

Regarding **carbon taxes**, the bills currently being discussed in the US Congress display a feature of starting with a tax way upstream on extraction. This would correspond to a Pigouvian perspective where the tax rate equals the marginal harm from global emissions. It shall also consider a partial carbon boarder adjustment on energy that would be at a lower rate than the tax on extraction itself. This will push part of the tax downstream from extractors to producers. A same partial CBA would apply on the carbon content of imported goods, which leave the import margin unchanged relative to no policy. Furthermore, there is no CBA for the export of goods, but subsidies per unit of marginal exports possibly on exporters needing it exports, as otherwise one would rather reduce exports to consume less energy intensive goods. It has the effect of expanding the margins of exports relative to no policy. However, the Bills in Congress put full CBAs on energy, imports, exports, goods, etc. and pushes it all downstream as a pure consumption tax, which removes effective tax on extractors and good exporters

If **CBAM** is not part of the maximisation problem, it emerges when thinking about implementing the policy. Features of optimal mechanism notably include CBA on imported goods, which impose green incentives on importers and encourage producers of those goods in ROW to produce less carbon in order to pay less tax. Furthermore, no CBA for exported goods retain green incentivises for exporters and captures

the idea of an allowance. Finally, the features of optimal CBA that cannot be found in CBAM is the energy extraction that should face an effective tax, added via taxes or regulation.

- **Equation solving: the importance of a big coalition to lower world emissions**

Modelling this problem, carbon is pulled from the earth by energy extractors, embodied in energy trade and released into the atmosphere in the process of production through combustion by producers, or utilities generating electricity. Carbon is then embodied in goods, which are traded prior to being consumed. If policy coordination is put in place, with all countries on board, it could then lead to various leeway in how to tax (upstream, midstream, downstream, etc.).

The optimisation has to do with the social planner who is solving a problem aiming to maximise home's welfare without reducing welfare of ROW. The solution includes various wedges: the first one is a demand side wedge, stating that the marginal product of energy used at home shall be higher than the price of energy, which is the marginal product of energy and ROW. In other words, one does not want to use energy domestically unless it delivers a payoff. A second wedge is on the extraction side. The return that the extractors get in the home country shall be lower than the price of energy. Solving the equation, the Lagrange multiplier and foreign energy price must satisfy the equations of having market clearing in the energy market for the world and balancing the different wedges where the balancing weights are the amount by which the foreign world behaviour is undercutting home behaviours with respect to extraction, use of energy and production or consuming more of the energy or the goods that home is implicitly subsidising to crowd out the foreign world's production of those goods in a dirtier manner.

As a result, one observes that the extraction tax goes up in proportion to the harm, and the border adjustment is some fraction of that. The difference is the amount that stays as an effective tax on extraction of energy in the home country. It achieves to lower world emissions, especially in the context of a big coalition. One actor alone, like the EU, would lead to significantly lower results and would not generate a major reduction at the global emissions level. Production taxes, like the current ETS, appear as a way for improvement, as turning it into a consumption tax, like the direction taken with the CBAM. Finally, mixing demand side policy, whether it be a production or a consumption tax, and supply side policy could lead to greater results.