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Executive summary:

In response to this call for evidence on Net Zero and Trade by the Energy Security and Net Zero Committee we provide evidence and policy recommendations in relation to the following question:

How can the UK's trade policy further help with its goals for net zero? (question 3 in terms of reference)

The UK Government announced in 2023 it's intention to introduce a Carbon Border Adjustment Mechanism (CBAM) by 2027 covering the most emissions intensive industrial goods imported to the UK from the aluminium, cement, ceramics, fertiliser, glass, hydrogen, iron and steel sectors.

The CBAM is intended to address the risk of carbon leakage as the UK seeks to tighten controls on green house gas emissions domestically. It will require the importer of imported products within scope of the UK CBAM to pay a carbon price on the basis of emissions embodied in imported goods.

Our research focuses on the *potential improvements* of the border adjustment mechanism that should support decarbonisation policies and mitigate the risk of carbon leakage. Our analysis suggests that the following policy recommendations to maximise the role of trade policy in enabling the UK's Net Zero ambitions:

A. *To be effective, border adjustment should be implemented in all sectors.*
B. *Implementing UK CBAM in all sectors is likely too challenging. Therefore, the UK government should adopt a border adjustment that does not require information about emissions embodied in imports but instead compensates UK producers for cost disadvantages compared to foreign competitors associated with domestic carbon pricing. We propose the* ***Leakage Border Adjustment Mechanism*** *that sterilises import (and potentially export) leakage associated with domestic carbon pricing as a viable alternative border adjustment design.*
C. *To support decarbonisation, the UK government should implement policies that also address export leakage.*

Project name """Designing Effective Carbon Border Adjustment with Minimal Information Requirements. Theory and Empirics" See the VOX.EU column here for a summary.

Research Group

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Our research identifies two major problems of the UK CBAM design

UK CBAM implicitly has two objectives. First, to prevent carbon leakage (the displacement of low-carbon UK production with more carbon-intensive imports associated with cost disadvantages of UK firms that result from UK carbon pricing). Second, to induce foreign producers to produce in a cleaner fashion by taxing imports according to their carbon content.

As the UK carbon price increases, energy costs and production-related abatement costs rise, and this increases prices of UK producers *in all sectors*. Incomplete sector coverage provides perverse incentives for offshoring the production of unregulated final products that contain CBAM-regulated intermediates. E.g. a car produced outside of the UK can be imported without a CBAM charge, while importing steel to the UK to produce the car domestically is subject to CBAM levies. This creates incentives to produce cars outside the UK and import them.

The practical implementation of CBAM poses significant challenges as it requires data on direct and indirect carbon emissions for each exporter, which are exceedingly difficult to obtain. Furthermore, foreign firms have clear incentives to underreport the true carbon content of their production, necessitating extensive monitoring and verification processes. These processes could prove prohibitively costly and would need to be scaled up as sectoral coverage expands.

We propose the leakage border adjustment mechanism as an alternative

In *Campolmi et al (2023)*, we develop an alternative policy instrument that prevents leakage without requiring carbon content data of foreign production. The basic idea is to implement product-specific import tariffs (and export subsidies) that exactly offset the changes in UK imports (and exports) that would otherwise result from an increase in the carbon prices between the UK and its trading partners. We call this the Leakage Border Adjustment Mechanism (LBAM). The key advantage of LBAM compared to UK CBAM is that it just requires information on the carbon intensity of UK(!) production as well as readily available trade data to estimate import demand and export supply elasticitities. Using a structural model of international trade in differentiated products with many sectors and countries we simulate what would happen to imports and exports in response to rising domestic carbon prices and then obtain simple expressions for LBAM tariffs and export subsidies that only depend on observable information which undo those changes. In contrast, without border adjustment that sterilizes the effects on imports and exports, imports and exports from countries without an equivalent carbon tax would rise and this constitutes a market-access favour that was never meant to be given. At a fundamental level, LBAM tariffs and export subsidies are designed to just preserve the level of market access that foreign countries had before the introduction of the domestic carbon pricing scheme. That is why LBAM tariffs (and potentially LBAM export subsidies) can be considered compatible with the WTO's non-violation principle (Staiger (2022)).

What is the impact of decarbonisation policies on global emissions?

Our analysis[1] allows us to quantify the effect of decarbonisation policies on global emissions and to compare how this is affected by across different border adjustments. All our results below are obtained under the assumption that the carbon price paid by domestic EU and UK producers rises from $15 to $105 per ton. This increase roughly mirrors the change from the initial average carbon price in 2018 in the EU to its all-time high in 2023, also capturing well the dynamics of the UK carbon price during the same period. In what follows, we assume that the border adjustment adopted in the EU entails a tax on the carbon content of imports applied only to aluminium, iron and steel, fertilizers, and cement. In contrast, for the UK we consider the following alternatives:

- **No-BAM:** Absence of any border adjustment. Besides the carbon tax change, there are no other unilateral tax changes in the UK.
- **CBAM-UK**: Current implementation of CBAM applied only to aluminium, iron and steel, fertilizers and cement as in the EU.
- **LBAM**: Tariffs on imports that eliminate bilateral import-related leakage in all sectors.
- **LBAM-X**: In addition to import tariffs as in LBAM, the UK grants export subsidies that sterilize export-related leakage.
- **CBAM-ID**: 'Ideal' implementation of the CBAM. The UK unilaterally changes their import tariffs so as to tax the carbon content of imports in all sectors.

Figure 1 compares the extra reduction in global emissions resulting from the increase in carbon pricing in the UK[2] across different border adjustment mechanisms. The findings are striking. The current CBAM is only marginally more effective in reducing global emissions compared to the absence of any border adjustment (No-BAM). Conversely, in all other scenarios, the additional reduction in global emissions is substantially higher than that achieved under CBAM-UK.

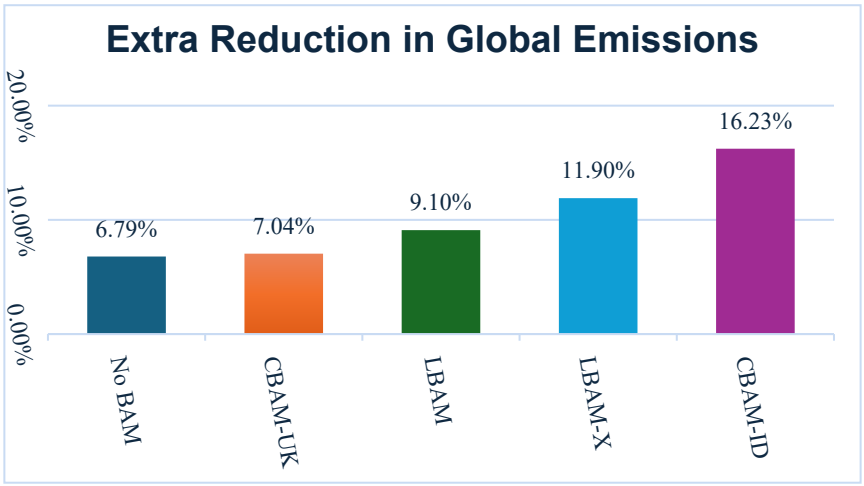

Figure 1: Own representation based on Campolmi *et al* (2023).

Figure 2 clarifies why CBAM's effectiveness is limited when applied only to a handful of sectors by decomposing the total reduction in global emission under CBAM UK (and EU) into four components:

[1] See Campolmi et al (2023). In the paper, we calibrate a granular structural trade model with 57 countries and 131 sectors to quantify the welfare and emissions under different policy scenarios. In our simulations the EU27 is regarded as a single country.

[2] More precisely this represents the *percent improvement* in global emissions reduction from the baseline scenario where the EU27 increases the carbon price and applies CBAM-EU to all countries while the UK does nothing.

(i) a 1.22% emission reduction due to decreased production of domestically consumed and produced goods; (ii) a 0.42% emission reduction due to decreased exports; (iii) a 0.19% emission increase due to increased imports; and (iv) an emission rise attributable to increased production of goods consumed and produced in the rest of the world. The latter two terms quantify import and export leakage. They make evident that under the UK's current CBAM proposal, a substantial part of the import leakage is not eliminated since most sectors -many of which are quite energy-intensive—are not covered, despite being affected by the rise in carbon pricing. In contrast, all the other border adjustments neutralise this leakage: CBAM-ID entails a notable decrease in emissions embodied in EU and UK imports, while LBAM and LBAM-X reduce them to zero. It is not surprising then that under the current CBAM proposal global emissions are hardly reduced compared to the baseline without border adjustment. Furthermore, Figure 2 provides additional insight. The current CBAM (as well as the CBAM applied to all sectors or the LBAM that sterilises tariff) fails to address the considerable export leakage stemming from the displacement of UK and EU exports in third countries. This leads almost to half the reduction of global emissions, indicating that the current focus on import leakage overlooks a crucial aspect. Among the considered border adjustment mechanisms, LBAM-X stands out as the only one that provides export subsidies to UK and EU producers, thus neutralizing their cost disadvantages from carbon pricing.

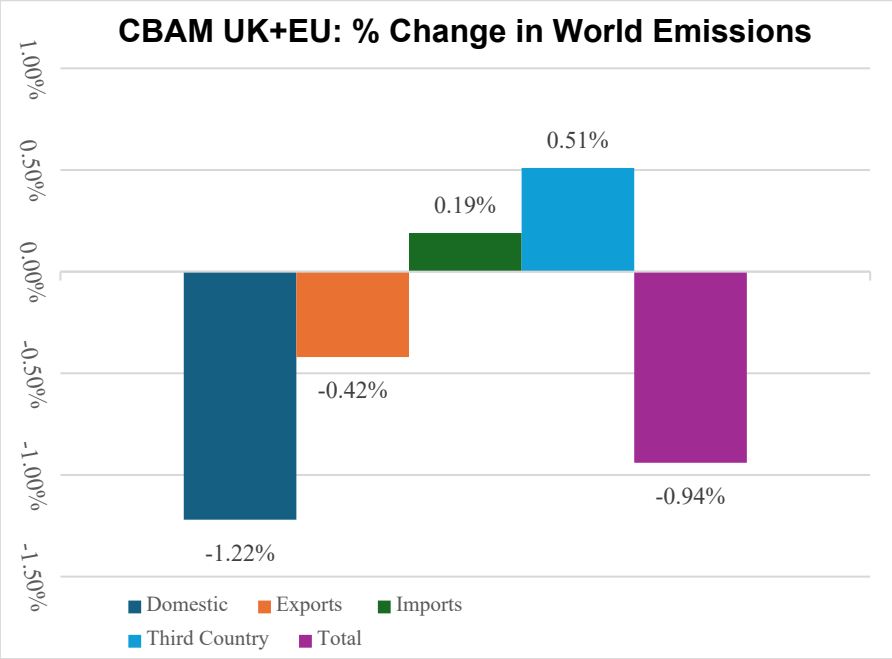

Figure 2: Own representation based on Campolmi *et al* (2023)

Our policy recommendations

A. According to our estimation in Figure 1, CBAM should be implemented in all sectors to be most effective. Otherwise, it fails to mitigate import leakage risk. While the current CBAM constitutes an important step forward from current anti-leakage policies, this should just be seen as the initial step. If the CBAM is not implemented in all sectors, the costs of its adoption are likely to outweigh its benefits. As far as we know, currently a clear plan from either the EU Commission or the UK government to expand CBAM coverage to all sectors is still missing.

B. Because it can be easily applied to all sectors, the Leakage Border Adjustment Mechanism is a promising alternative. As made clear by Figure 1, LBAM and LBAM-X demonstrate significantly greater effectiveness than CBAM-UK in reducing global emissions. Importantly, the implementation of LBAM and LBAM-X does not require detailed information about import carbon content or extensive monitoring and verification processes. Consequently, these border adjustments minimize administrative burdens and costs for the UK's trading partners.
C. Finally, addressing export leakage is key for the effectiveness of any border adjustment mechanism. Figure 2 casts a spotlight on the opportunity costs of an asymmetric policy focus on import leakage. Our estimates reveal a significant impact of export leakage on the efficacy of the current CBAM and provide evidence for policy intervention. However, addressing this type of leakage primarily relies on export subsidies, which are likely to be prohibited by current WTO regulations (Cosbey et al. 2019). This raises the question of whether export subsidies, akin to LBAM, should be deemed permissible.[3] Then, one can use Staiger (2022)'s argument in favour of their legality, particularly when applied to markets lacking equivalent carbon pricing. In such cases, these subsidies merely serve to maintain existing market access by offsetting the cost disadvantage faced by domestic producers, without causing harm to foreign producers.

Citations

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Campolmi, A, H Fadinger, C Forlati, S Stillger and U Wagner (2023), "Designing Effective Carbon Border Adjustment with Minimal Information Requirements. Theory and Empirics", CEPR Discussion Paper 18645. F See the VOX.EU column here.

Cosbey, A, S Droege, C Fischer and C Munnings (2019), "Developing Guidance for Implementing Border Carbon Adjustments: Lessons, Cautions, and Research Needs from The Literature", *Review of Environmental Economics and Policy* 13(1): 3–22.

Staiger, R (2022), *A World Trading System for the Twenty-First Century,* The MIT Press.

April 2024

[3]Interestingly, until recently, it has been widely held that border carbon adjustments like CBAM would likely violate WTO rules. Discriminating between imports with different carbon intensities is a key element of this policy yet it violates the Most-Favored-Nation (MFN) clause which requires that the same tariff rate must be applied to all trading partners. This suggests a modification to the CBAM design whereby equal carbon intensities are assumed across sources (benchmarking).