Rethinking the EU's Carbon Border Adjustment Mechanism: What it means for low-income countries

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The European Union's Carbon Border Adjustment Mechanism (CBAM) represents a major climate and trade policy shift. It levies carbon pricing on carbon-intensive imported goods and provides a credit for carbon prices paid in the home market. Concerns have been raised about the potentially negative effects of CBAM on low-income countries, but new research using detailed plant-level data and a quantitative trade model suggests these effects are not inevitable:

- **Emissions intensity of production is not systematically higher in low-income countries.** Many producers in low-income countries operate at a smaller scale and use cleaner electricity sources, increasing their competitiveness under CBAM. Clean foreign firms could benefit from higher prices in the European market, creating a new margin of comparative advantage.
- **CBAM creates a fiscal opportunity.** Governments can impose their own carbon taxes on export sectors, raising revenue without opposition as firms pay the carbon tax either way. A domestic carbon price means revenues stay home rather than flowing to the EU.

CBAM presents both risks and opportunities for low-income countries. The key is proactive engagement: By recognising the new margins of comparative advantage that emerge in an increasingly carbon-priced world and considering options for domestic carbon pricing, countries can turn a perceived threat into an opportunity to develop sustainably and increase fiscal resilience.

POLICY BRIEF MOZ-23122

APRIL 2025

This project was funded by IGC Mozambique

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Introduction

As the European Union and the United Kingdom begin implementing their Carbon Border Adjustment Mechanisms (CBAM), policymakers in low-income countries are watching closely—and often with concern. It has been argued that CBAM risks penalising developing economies for a problem they did not create; some even describe CBAMs as “green protectionism”[1] or “green colonialism."[2]

But is this fear justified? This research examines the global effects of CBAM using detailed plant-level data on aluminium and steel production — the two most emissions-intensive and heavily traded sectors targeted in the initial phase of the policy — and a global trade model that allows us to simulate the impact of carbon pricing, both with and without border adjustments. What the research finds is more nuanced — and in many cases, more hopeful — than much of the current debate.

What is CBAM, and why was it introduced?

The European Union was the first jurisdiction to enact a CBAM, triggering a significant climate and trade policy shift. The idea of a CBAM gained momentum in 2019 when European Commission President Ursula von der Leyen announced the European Green Deal, a comprehensive plan to make the EU climate-neutral by 2050.

Policymakers debated several alternatives before formally proposing the CBAM in July 2021. The logic behind CBAM is straightforward: Domestic carbon prices are useful for driving domestic emissions reductions, but are subject to leakage and free-riding concerns. Leakage arises because domestic producers can shift emissions-intensive production to unregulated foreign locations, and domestic consumers can choose to consume less expensive but dirtier imports. Thus, leakage both undermines the efficacy of the policy and generates domestic political opposition from firms that worry they will lose competitiveness. Free-riding arises because greenhouse gas emissions affect the entire world evenly. Thus, most jurisdictions do too little emissions mitigation, realising that they bear the full costs of their efforts but only receive a fraction of the benefits shared worldwide.

The CBAM seeks to address both concerns by imposing domestic carbon prices at the border based on the carbon content of imports to ensure that foreign producers face the same effective carbon price as domestic producers.

[1] https://www.ft.com/content/ca51ebf5-fbb8-4c88-a93d-ded3d6d3bcdd
[2] https://fpif.org/beware-europes-new-green-colonialism/

Importantly, the CBAM includes a credit for any carbon taxes already paid in the country of origin so that producers are not taxed twice.

The CBAM started with a phase-in period on 1 October 2023. Importers must report the emissions used to produce traded goods, but without financial obligation, until 1 January 2026. The policy initially covers six carbon-intensive industries -- iron and steel, aluminium, cement, electricity, fertiliser, and hydrogen – with the potential to expand to others over time. Producers in CBAM sectors are currently allocated free ETS allowances in proportion to historical production levels and the carbon intensity of a plant with tenth-percentile emission levels. Free allocations will be phased out gradually between 2026 and 2035, and the share of emissions covered by the CBAM will increase in parallel, creating a level playing field between European and non-European production. In December 2023, the UK government announced its intention to implement a CBAM by 2027. While the UK CBAM is not yet law, the government has issued position papers outlining its plans. The UK CBAM would cover the same sectors as the EU, except for electricity imports.

Other countries are also discussing CBAMs. Canadian Prime Minister Mark Carney has proposed a CBAM, arguing that it will level the playing field for industrial producers subject to Canada's federal carbon price backstop. The governments of both Australia and Taiwan are currently considering CBAMs. China has expanded its emissions trading system to cover CBAM-targeted industries, and other countries have cited the EU CBAM as motivation for considering and enacting carbon pricing.

Is CBAM unfair to low-income countries?

One of the most frequently voiced concerns is that CBAMs disproportionately hurt developing economies. The concern is that many low-income countries rely on the exports of primary materials, and their production may be especially emissions-intensive, resulting in disproportionate exposure to the CBAM.

The World Bank has developed an index of country-level exposure to the EU CBAM[3]. The index is constructed as the share of GDP from CBAM-targeted goods exported to the EU, multiplied by the carbon payment per dollar of exports relative to an average EU producer. By this measure, Zimbabwe, Ukraine, Georgia, Mozambique, and India are the most exposed countries. While tools like this provide a useful starting point for policy dialogue, they are based on aggregate data and strong assumptions. As such, they do not necessarily give an accurate insight into the economic consequences of CBAM for individual producers or countries.

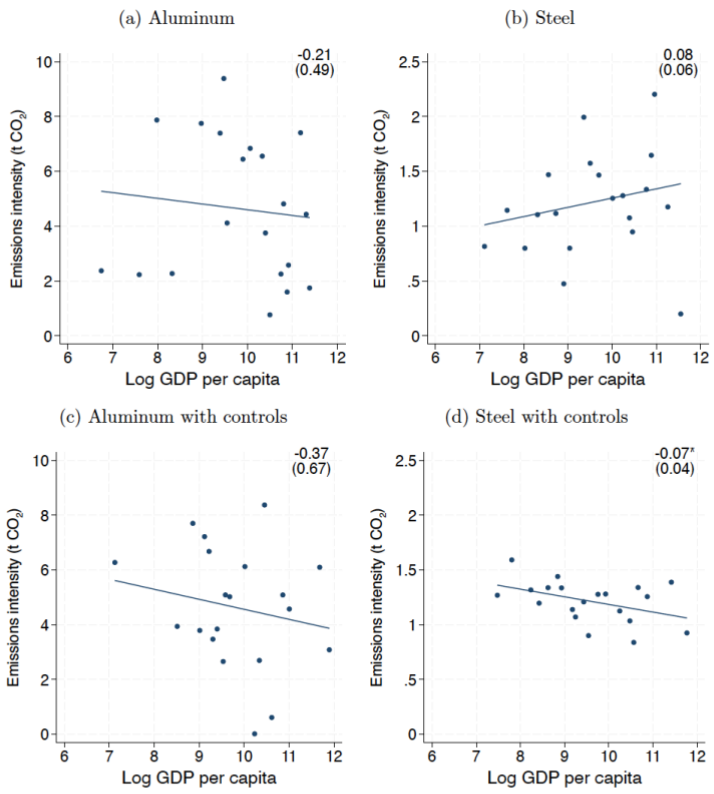
[3] https://www.worldbank.org/en/data/interactive/2023/06/15/relative-cbam-exposure-index

Using detailed production and emissions data on aluminium and steel production — two sectors targeted in the EU's initial phase — there is no systematic evidence that producers in low-income countries are more emissions-intensive than those in richer countries.

The top two figures in Figure 1 show a flat relationship between emissions intensity and GDP per capita that holds for both aluminium and steel. This key relationship determines the exposure of lower-income trading partners to CBAM policy. There is little evidence of a clear pattern. Production in lower-income countries is not systematically more emissions-intensive than in higher-income countries.

Instead, the emissions intensity of production is determined by compositional differences in technology, ownership, and production scale across countries. When controlling for differences along these dimensions, there is more of a negative relationship between the emissions intensity of production and GDP per capita; however, the relationships remain modest in magnitude.

FIGURE 1: Emissions intensity by GDP per capita

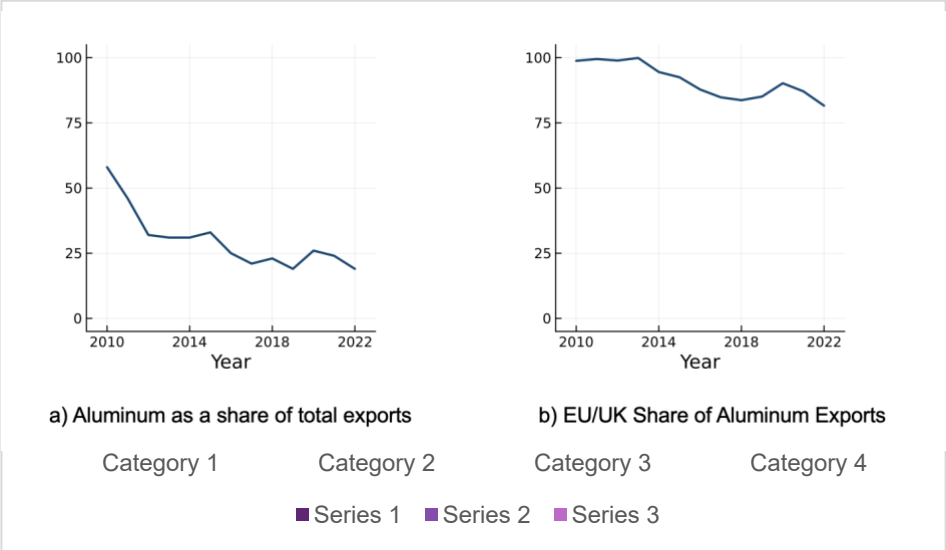


Each figure is a binned scatter plot. Each observation is a country. Emissions intensity is tons of CO_2 emitted per ton of production. Controls include primary production (%), average production (Mt), state ownership (%), and foreign ownership (%). Primary production refers to primary aluminum and BOF steel. State ownership is whether the majority-stakeholder parent company is a state-owned enterprise. Foreign is whether the majority-stakeholder parent company is headquartered in a different country from a given plant. We compute the production-weighted average across plants within each country. Average production is the average across plants within a country. We report the slope and standard error of the fitted line in the top-right corner of each figure. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

The case of Mozambique

Mozambique provides an interesting case study for this insight. Mozambique is a key player in the global aluminium industry due to the presence of Mozal, the second-largest aluminium smelter in Africa. Mozal significantly contributes to the country's export economy, with aluminium representing one of Mozambique's most important export products. In recent years, a large share of these exports has been directed to the EU.

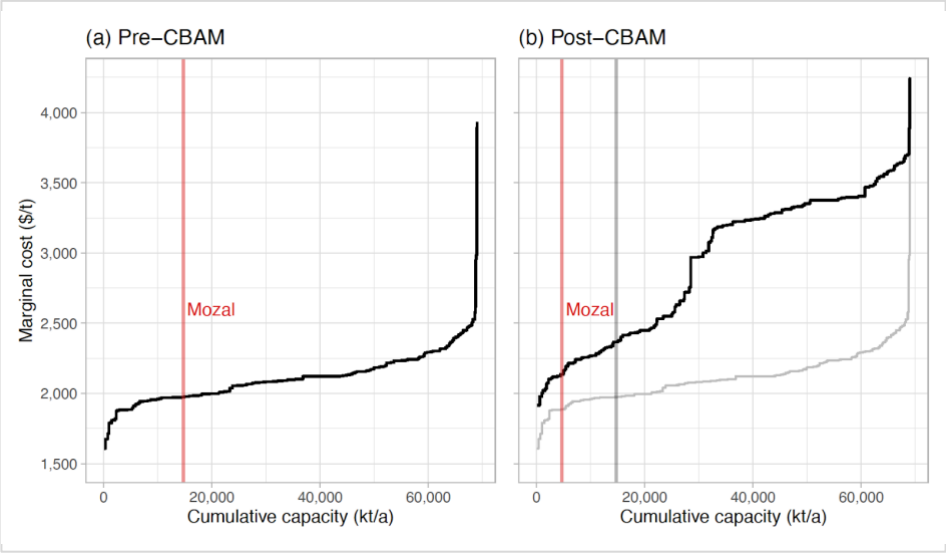
FIGURE 2: Aluminium exports from Mozambique



UN Comtrade data shows that aluminium was over 50% of Mozambique's total exports in 2011, then fell to about 17% by 2022. Exports to the EU and UK were more than 95% of Mozambique's total aluminium exports, then fell to about 75% in 2022. Even with these recent changes, aluminium exports to CBAM countries remain important to Mozambique's economy. In addition, the Mozal smelter uses approximately half of Mozambique's total electricity production, highlighting both the energy-intensive nature of aluminium production and the country's relatively low level of economic development.

Establishing the carbon content of Mozal's electricity consumption is complicated. While hydroelectric power accounts for a large share of electricity production in Mozambique, much of it is exported to South Africa. Meanwhile, Mozal imports electricity from South Africa, where a significant portion of power generation relies on greenhouse gas-intensive coal production. Our analysis finds that when Mozal is credited with clean energy input, its production is far less emissions-intensive than coal-powered smelters in countries like China or India. In this context, Mozambican aluminium becomes more cost-competitive under CBAM — not less.

FIGURE 3: Production costs and capacity



Note: Marginal costs are in nominal 2023 USD. Cumulative capacity is in metric megatons per annum. Marginal costs are operating costs, defined as cash costs plus depreciation. Costs and capacities are estimated at the asset level.

Further, as the European Union removes its "free allowances" system for emissions-intensive European firms alongside the CBAM imposition, European aluminium prices will rise, giving Mozambique's aluminium producers a more lucrative market destination.

In other words, CBAM does not automatically penalise developing countries; It penalises dirty production regardless of where it occurs and rewards clean production, even in low-income economies. Countries that can produce emissions-intensive goods cleanly—whether due to renewable energy sources, more efficient processes, or cleaner production technologies—may see gains in market share as more carbon-intensive producers face rising costs.

CBAM as a tool for climate-positive development

CBAM is not just a border tax policy – it creates opportunities for domestic climate policy in unregulated markets, with both environmental and fiscal benefits.

Under the CBAM, exporters to the EU will face a carbon price regardless of their country's policies. If no domestic carbon price exists, importers must purchase emissions certificates from the EU, but if a domestic carbon tax does exist, the CBAM credits that tax. The exporter pays the same amount, but the tax revenue remains in the exporting country.

Governments have a choice between paying the charge at the EU border or paying a domestic carbon tax and receiving credit for it under the CBAM. By

implementing their own domestic carbon price, even solely on emissions-intensive industries, countries can retain the revenue from carbon pricing — without any loss of competitiveness — since the overall tax payment on the firm remains the same regardless of whether they levy the tax at home.

This creates a low-hanging fiscal opportunity for governments in low-income countries. Carbon pricing under normal circumstances faces political and administrative challenges, but the CBAM creates an opportunity for governments to raise revenue (and reduce emissions) in a way that does not affect the competitiveness of their firms, which are paying the tax either way. The choice is between keeping the revenue within their country of origin or paying it to the EU.

New sources of tax revenue may be particularly attractive for low-income countries, where tax capacity and revenues are limited. A targeted carbon tax linked to CBAM compliance represents one of the lowest-cost and most efficient options to create revenue and aligns with broader development goals. Since emissions are concentrated in a small number of large exporters, the tax should be relatively simple to administer. A domestic carbon tax focused on a few large firms could generate substantial revenue with minimal administrative burden. By taking advantage of the CBAM's tax credit provisions, governments can turn a compliance requirement into a development strategy.

Policy implications for low-income countries

The key message for policymakers in low-income countries is clear: Do not assume that CBAM will hurt you. It can be a lever for climate-aligned development, increase competitiveness, and provide a new source of government revenue. Below are four priority areas for consideration.

1. Assess exposure and emissions intensity

- Map exposure: Identify which CBAM-covered goods are exported to the EU by facility.
- Measure emissions intensity: Collect facility-level data on production and emissions (scope 1 and scope 2).

Clean producers may have a cost advantage under CBAM – but this must be documented and certified. Without verification, facilities may be assigned aggregate emissions-intensity factors.

2. Invest in credible measurement, reporting, and verification (MRV)

- Prioritise MRV capacity-building in CBAM-exposed sectors.
- Partner with third-party verifiers and leverage international climate finance to build MRV systems.
- Explore regional cooperation to develop standardised MRV protocols.

Without credible emissions data, even low-carbon producers risk being assessed using EU default values.

3. Leverage endowments in clean energy

- Countries with access to low-carbon energy should actively promote their green production potential in CBAM-targeted sectors.
- Certify renewable energy use.
- Support industrial decarbonisation where low-cost improvements are available.

CBAM introduces a new form of comparative advantage based on the emissions intensity of production. Low-carbon production will become an important margin of competitiveness, even in traditional heavy industries like aluminium and steel.

4. Consider introducing a domestic carbon tax for exporting sectors

- A domestic tax will not raise costs for firms. It substitutes for EU border payments.
- A domestic tax keeps revenues at home rather than transferring payments to the EU.
- Carbon pricing signals climate credibility, which may unlock broader benefits related to climate finance and technology access.

The key is to engage proactively. CBAM is not going away — and ignoring it may be the costliest option. With smart, targeted action, low-income countries can minimise risk and, in some cases, turn a compliance response into a climate-aligned development strategy.

Conclusion: A cautiously optimistic view

CBAM is a landmark policy — the first major attempt to address carbon leakage at scale. While concerns about its distributional effects are understandable, this research shows that it is not inherently regressive. In fact, with the right

response, CBAM can be a catalyst for clean development and a new opportunity to build fiscal capacity for low-income countries.

To learn more about this model, data, and findings, see the full paper: *The Global Effects of Carbon Border Adjustment Mechanisms* (Clausing, Colmer, Hsiao, and Wolfram, 2025).