

CARBON PRICING BEYOND BORDERS: ASSESSING CLIMATE POLICY SPILLOVERS FROM THE EU CARBON BORDER ADJUSTMENT MECHANISM

The European Union has some of the world's most ambitious climate policies, yet it only accounts for a small share of global carbon emissions. Achieving meaningful global emissions reductions thus depends on other countries strengthening their own climate policies. The EU's carbon border adjustment mechanism (CBAM) incentivises EU trading partners to adopt domestic carbon pricing systems to retain carbon revenues at home. Whether this incentive is sufficient to encourage such policy diffusion is an important question for global climate governance.

This paper examines whether CBAM has increased the adoption of carbon pricing policies in third countries. Using data on trade exposure to CBAM-covered sectors and the evolution of carbon pricing mechanisms in 163 countries between 2014 and 2025, we estimate the effect of exposure to CBAM on the likelihood of non-EU countries adopting carbon pricing policies. We find that countries with greater trade exposure to CBAM have significantly increased announcements of carbon pricing policies since the European Commission previewed CBAM in 2019. On average, a one-percentage-point increase in a country's CBAM exposure raises the probability of adopting a carbon pricing policy by about 2 percent.

This result suggests that the EU's CBAM can generate positive international spillovers by encouraging the wider adoption of carbon pricing policies. However, these effects are concentrated among high- and upper middle-income countries, indicating that developing countries face technical and institutional constraints in adopting similar carbon pricing policies.

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1 CBAM's potential to spur global climate action

The European Union has some of the most ambitious climate policies and one of the highest carbon prices in the world, yet accounts for only 6 percent of global carbon emissions. Unless third countries also apply appropriate decarbonisation policies, stringent EU climate policies may be insufficient to substantially contribute to the reduction of global carbon emissions.

As its domestic carbon pricing regime became increasingly stringent, the EU introduced a first-of-its-kind policy tool: the carbon border adjustment mechanism (CBAM). Promised in July 2019 as part of the European Green Deal, formally proposed in July 2021 and finalised in mid-2023, CBAM (Regulation (EU) 2023/956) is designed to prevent 'carbon leakage' – the shift of emissions-intensive production out of the EU to jurisdictions with more lenient policies. Implicit in its design, CBAM features an important mechanism that counters free-riding by incentivising the EU's trading partners to strengthen their own climate policies and adopt carbon pricing policies similar to the EU.

CBAM requires importers to pay a carbon price equivalent to the EU carbon price on the embodied emissions of certain carbon-intensive products¹. Article 9 of the CBAM regulation permits importers to deduct carbon prices already paid in the country of origin from their CBAM obligations. This rebate mechanism incentivises third countries to establish carbon pricing schemes domestically, in order to retain carbon tax revenues within their fiscal space.

In this paper, we quantify whether EU trade partners have established domestic carbon pricing policies in response to the EU CBAM proposal. If this mechanism spurs global uptake of carbon pricing policies and limits free riding on climate mitigation, wider adoption of carbon border mechanisms may be an effective lever to accelerate global climate mitigation.

There is anecdotal evidence of such a response mechanism: Türkiye's national climate strategy aims to align its emissions trading system (ETS) with CBAM, indicating that Türkiye's carbon pricing scheme is explicitly designed as a reaction to CBAM (DCC, 2024). Based on a statistical analysis, we find that after the European Commission communicated plans for a carbon border tax in 2019², carbon pricing announcements in countries with high CBAM-related trade exposure increased significantly. On average, these countries started to develop and implement carbon pricing policies three years after announcing them.

CBAM's effect on third countries is substantial: a one percentage point increase in a third country's CBAM exposure – the share of CBAM-related exports to the EU in total exports – increases the probability that a carbon pricing policy will be adopted by two percent. In Türkiye's case, the probability of the introduction of a carbon pricing policy increased by about eight percent, compared to a no-CBAM scenario. Furthermore, we find that this effect is driven by high- and upper middle-income countries, suggesting that lower-income countries may lack the governance capacities needed to implement similar carbon pricing policies.

¹ CBAM covers imports of aluminium, iron and steel, cement, fertilisers, electricity and hydrogen. From 2028, it has been proposed to be extended to 'combined metal products'.

² See European Commission, 'The European Green Deal', https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en.

Our analysis is, to the best of our knowledge, the first to directly measure the effect of CBAM on the likelihood of the EU's trade partners adopting carbon pricing policies. Mehling *et al* (2025) provided an overview of anecdotal evidence of third countries' policy responses to CBAM. Clausing *et al* (2025) and Li *et al* (2026) modelled the introduction of stringent carbon pricing policies in China as a response to CBAM and found substantial economic benefits.

Closer to our work, Clausing *et al* (2024) found that media outlets in several EU partner countries mentioned carbon pricing policies more frequently after important CBAM events. Smith *et al* (2024) and Otto (2025) qualitatively analysed political responses to CBAM and found that countries shifted from opposition initially to cooperation, including through the adoption of carbon pricing policies. Another strand of the literature focuses on the characteristics of developing economies that might explain their slower adoption of carbon pricing policies. Boute (2024), Finon (2019) and Sandler and Schrag (2025) highlighted the lack of administrative capacity, while Abdou *et al* (2025) mentioned the importance of fiscal capacity.

2 How CBAM shapes the global adoption of carbon pricing

2.1 Measuring exposure to CBAM

Despite CBAM applying equally to all EU trade partners, countries may nevertheless be affected differently depending on factors including the depth of their trade relationship with the EU, their geographical diversification and their level of development. To measure the extent to which countries are exposed to CBAM, we estimate the shares of their total exports to the EU and European Free Trade Association (EFTA) countries that fall under CBAM³. We rely on trade data for 163 countries, covering 2014 to 2024, developed by Gaulier and Zignago (2010), to estimate the average CBAM exposure. To account for differences in countries' development levels, we use the World Bank income-level classification and divide countries into a higher-income group, comprising high and upper-middle income countries, and a lower-income group, composed of low and lower-middle income countries⁴.

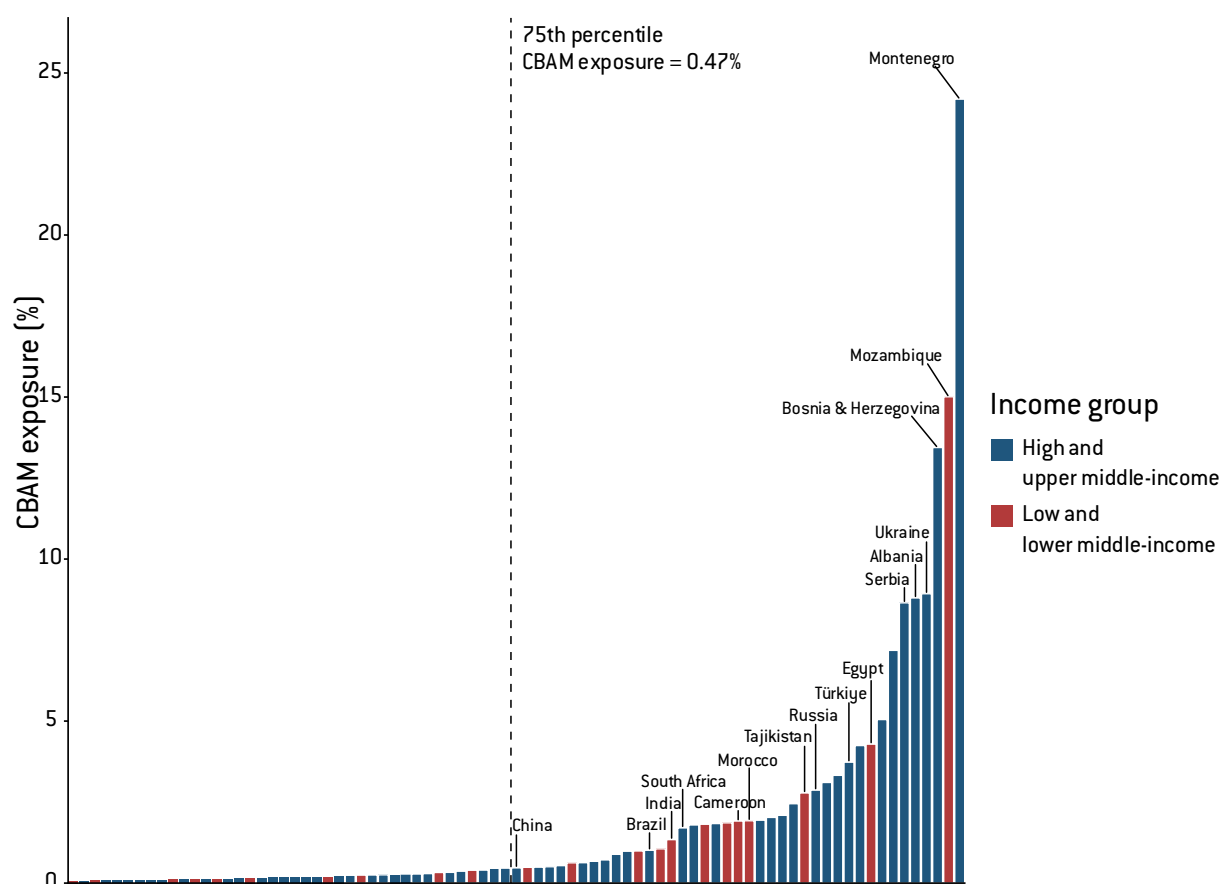
Exposure varies widely between countries, ranging from 0 to 24.2 percent, with the highest values concentrated among a small number of countries. The most exposed country is Montenegro, with an average CBAM exposure of 24.2 percent, followed by Mozambique (15 percent) and Bosnia and Herzegovina (13.4 percent). Within the higher-income group, Ukraine, Albania and Serbia also have close CBAM-related trade ties with the EU, partly explained by their geographical proximity. In the lower-income group, Mozambique, Egypt, Tajikistan, Morocco and Cameroon are the five most exposed countries. In addition, some of the world's largest greenhouse gas emitters – China, India, Russia, Brazil, South Africa and Türkiye – rank among the top 25 percent most-exposed countries (Figure 1)⁵.

³ Covered products are listed in the CBAM regulation (Regulation (EU) 2023/956). EFTA countries are generally exempt from CBAM obligations, since the European Economic Area EFTA countries – Norway, Liechtenstein and Iceland – participate in the EU ETS, and Switzerland has signed an ETS linking agreement with the EU.

⁴ We use the income classification in the latest year to avoid variation across time. Our results are robust to a changing income composition.

⁵ The 75th percentile exposure value is 0.5 percent, while the mean exposure is one percent.

Figure 1: Distribution of CBAM exposed countries (top 50 percent)



Source: Bruegel. Note: blue bars represent high- or upper middle-income countries while red bars represent low- or lower middle-income countries. CBAM exposure is the average ratio of CBAM exports to the EU plus EFTA countries to total exports between 2014 and 2024.

2.2 Measuring carbon pricing policies

To assess whether third countries respond to CBAM by establishing domestic carbon pricing mechanisms, we record the adoption of carbon pricing policies by country and year. Information on third countries' carbon pricing mechanisms comes from the World Bank's *State and Trends of Carbon Pricing* series between 2014 and 2025⁶. For each country and year, the dataset includes the development status and type of carbon pricing policies under consideration. The types of carbon pricing policies include carbon taxes and emissions trading systems.

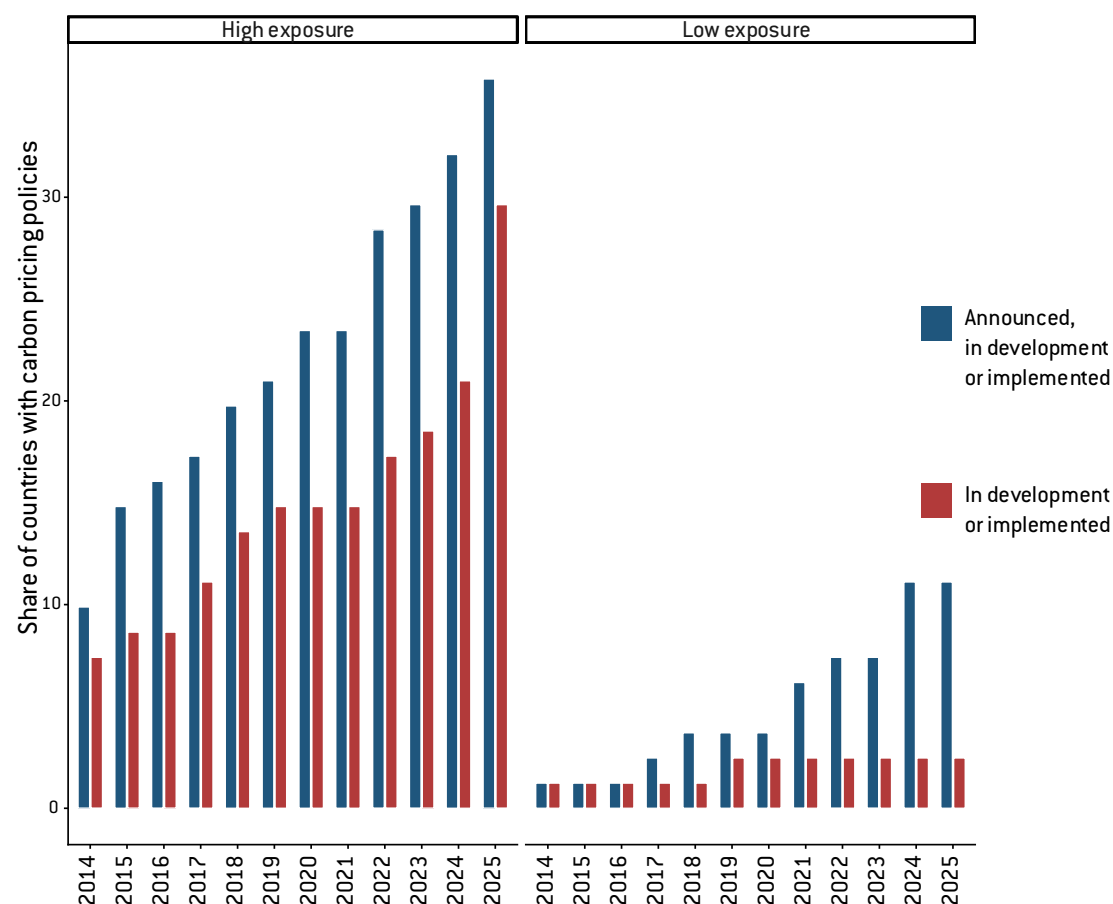
We consider carbon pricing mechanisms at two stages during their development process: mechanisms that have been announced but are not yet under development, and mechanisms that are either under development or already implemented⁷. As of 2025, 120 carbon pricing policies had been announced,

⁶ For a list of all reports in the series, see World Bank, 'State and Trends of Carbon Pricing', <https://hdl.handle.net/10986/13334>.

⁷ For some carbon pricing policies, the status directly switches from 'announced' to 'implemented'. For example, Albania announced a carbon tax in 2023 that was already implemented in 2024. Table A1 in the appendix lists the countries with a carbon pricing mechanism and the years of development stages.

were under development or were already implemented⁸. Excluding EEA EFTA members, 39 countries had at least announced a national carbon pricing mechanism as of 2025.

Figure 2: Share of countries with carbon pricing mechanisms by CBAM exposure



Source: Bruegel. Note: blue bars show the shares of countries with at least one policy either announced, under development or implemented; red bars show the shares of countries with a mechanism under development or implemented. The countries are split into two groups: those in the upper 50 percent of CBAM exposure (Figure 1) and those in the lower 50 percent.

Figure 2 shows the shares of countries with a carbon pricing policy by CBAM trade exposure. The 50 percent most exposed countries show higher rates of, and larger increases in, carbon price adoption than countries with lower exposure to CBAM. While after 2020, the rate of carbon price announcements increased for less-exposed countries, this appears to not translate into actual development and implementation of these policies. The changes in adoption rates might be driven by country characteristics other than CBAM exposure or events that affect all countries uniformly but are unrelated to CBAM announcements. To isolate the effect of CBAM on countries' adoption of carbon pricing policies, we control for such effects in the next section.

⁸ 65 percent of carbon pricing policies are implemented at national level, while the remainder are applied at subnational level – the California ETS, for example. However, in our analysis, we only include policies applied at national level (Appendix A1).

2.3 The effect of CBAM on carbon pricing policies

We measure whether the EU's introduction of CBAM has increased the likelihood of adoption of carbon pricing mechanisms by third countries. To assess this, we compare the rate of adoption by countries with different CBAM exposures but otherwise similar characteristics. Intuitively, if CBAM increases the likelihood of adoption of carbon pricing by third countries, countries with greater exposure to CBAM should exhibit relatively higher adoption rates after the introduction of the EU's cross-border carbon regulation. We implement this insight analytically in a difference-in-difference setup. More specifically, we quantify whether countries with larger shares of CBAM-affected exports have been significantly more likely to adopt carbon pricing policies since the announcement of CBAM in 2019.

We measure CBAM exposure at the country level as the average annual share of CBAM-affected exports in total exports between 2014 and 2024 to limit short-term fluctuations in countries' exposure levels. Additionally, we account for time-invariant country characteristics (ie geography and culture) and for time trends common across countries (ie the Paris Agreement) that may affect a country's probability of adopting a carbon pricing policy⁹.

Importantly, we record the adoption of carbon pricing policies both at the time they are announced and when their formal development and implementation start. There can be substantial time lags between announcements and the start of development of carbon pricing mechanisms. Separating out the development stages allows us to track the announcement of carbon pricing policies as a direct response to the EU's introduction of CBAM, and to follow up on the more costly development and implementation stages of such policies.

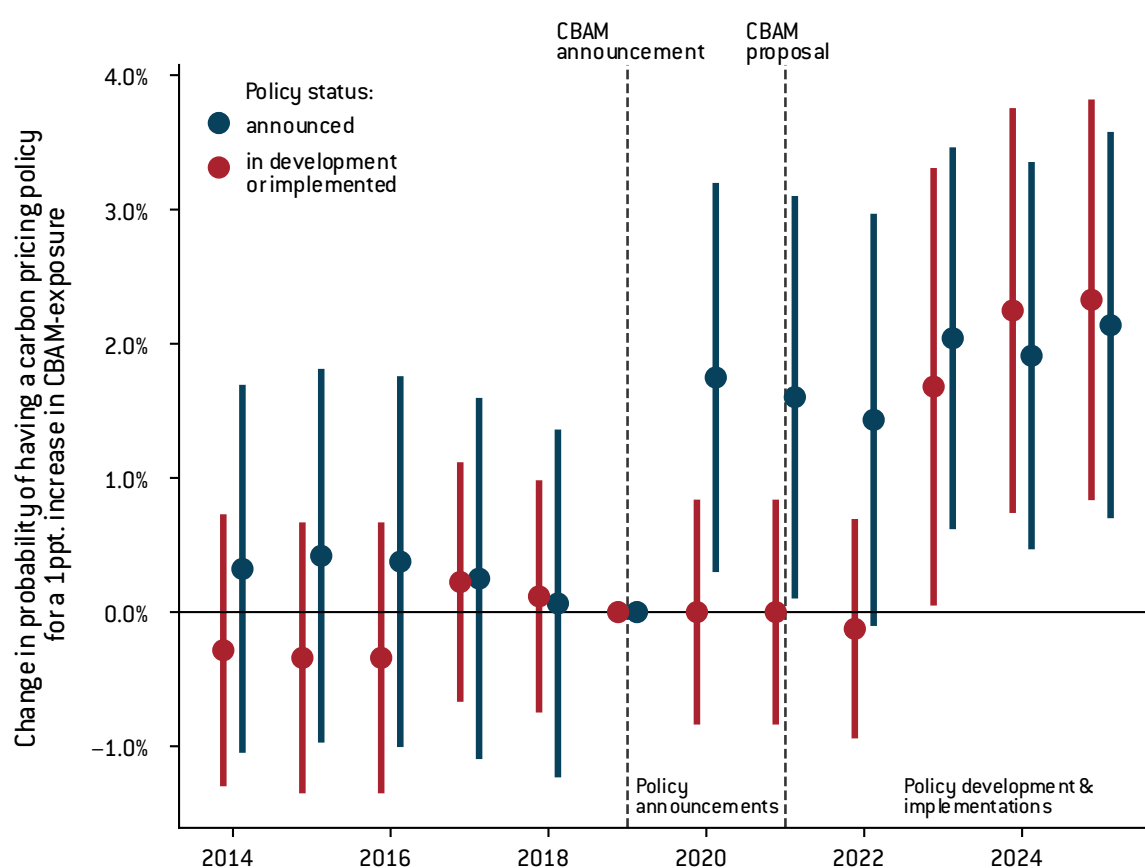
Figure 3 summarises the results. After the announcement of CBAM in 2019, countries with higher EU trade exposure in CBAM covered goods were significantly more likely to announce their own carbon pricing mechanisms. A one percentage point increase in a country's average CBAM exposure leads to a roughly two percent increase in the probability of a carbon pricing policy being announced. The magnitude of this effect is substantial. For example, Türkiye has a CBAM exposure of about 4 percent, so the probability of Türkiye (or a similarly exposed EU trade partner) introducing a carbon pricing policy increased by about 8 percent ($=2 \times (4\% - 0\%)$) compared to a no-CBAM scenario. Figure 3 also shows that, on average, countries announcing carbon pricing policies proceed with the development and implementation of such policies three years after their initial announcement, and about two years after the CBAM legislation was proposed.

Table A2 in the appendix shows that these effects are statistically significant and robust to various alternative analytical specifications, including time-varying and one-year lagged CBAM exposure measures. We also account for variables that might influence both the probability of having a carbon pricing mechanism and the level of CBAM exposure, ie GDP *per capita*, total level of exports, the level of corruption, and measures of government efficiency, regulatory quality and rule of law.

⁹ Appendix 2 provides details on the analytical setup.

As an additional robustness check, we account for the special status of EU candidate countries¹⁰. For these countries, the requirement to align with the EU *acquis* means they must join the EU ETS. This may explain a potential earlier adoption of similar policies by those countries. All EU candidate countries are among the 25 percent most exposed to CBAM. In Table A3 in the appendix, we include an additional dummy equal to one from the year a country attains candidate status, while we exclude these countries from other specifications. The results remain robust, both when controlling for candidate status and when excluding candidate countries. Lastly, our results are unchanged after transforming our exposure measure using the natural logarithm to control for potentially distorting effects of outliers.

Figure 3: The impact of CBAM exposure on the probability of having a carbon pricing policy



Source: Bruegel. Note: the figure shows the change in the probability of third countries having a carbon pricing mechanism given a one percentage point increase in CBAM exposure. Blue dots show the effect of CBAM exposure on countries' likelihood of having announced a carbon pricing mechanism. Red dots indicate the effect on the probability of having carbon pricing mechanisms at the development or implementation stages. CBAM-exposure is the average ratio of CBAM-related EU-export values to total exports over 2014-2024. The effects reported in this figure correspond to column (2) of Table A2. The vertical solid lines represent 90 percent confidence intervals.

¹⁰ EU candidate countries are Albania, Bosnia and Herzegovina, Georgia, Kosovo, Moldova, Montenegro, North Macedonia, Serbia, Türkiye and Ukraine. See European Commission, 'Candidate countries and potential candidates', undated, https://enlargement.ec.europa.eu/enlargement-policy/candidate-countries-and-potential-candidates_en.

Since the European Commission proposed CBAM in 2021, 12 countries have either started to develop or have implemented carbon pricing policies¹¹. Among these countries are large polluters, including India, Indonesia and Türkiye. About 60 percent of newly announced or developed carbon pricing mechanisms are carbon taxes, while the remainder are emissions trading schemes. The ETS mechanism can differ widely across countries. For example, India and Türkiye are developing baseline-and-credit systems based on emissions intensities instead of absolute emissions, while Brazil's cap-and-trade system regulates absolute emissions similarly to the EU (World Bank, 2025).

The increased rate of carbon-price adoption may also mitigate the risk of CBAM-induced resource shuffling – a rerouting of traded goods – with companies exporting cleaner products to the EU and redirecting dirtier products elsewhere, leading to lower net benefits for climate change mitigation. Countries with carbon pricing policies in place are less prone to such trade reshuffling, as carbon prices typically apply to the production of goods that serve both domestic and export markets, independent of their ultimate destination.

Carbon pricing mechanisms that are already implemented have become more stringent over time. The global average carbon price rose from €1.90 per tonne of CO₂ equivalents (tCO₂e) in 2020 to €5.40/tCO₂e in 2025. This was largely driven by the introduction of China's national ETS which increased the coverage of priced global carbon emissions by 15 percentage points to 28.5 percent (World Bank, 2025). Early evidence indicates that several countries are aligning their carbon pricing framework with sectors covered by CBAM. For instance, China has added steel, cement and aluminium to its national ETS, which previously covered the power sector (MEE, 2025). Similarly, Vietnam incorporated iron, steel and cement into its ETS policy in August 2025, while India's carbon credit trading scheme is expected to initially cover steel, cement, aluminium and fertilisers¹².

In principle, CBAM also incentivises via the same mechanism higher carbon prices for policies already in place. However, price levels of non-EU carbon pricing mechanisms remain relatively low, with moderate increases over the past years. Notable exceptions are South Africa's carbon tax and the California ETS, with price increases of 82 percent and 91 percent, respectively, since 2020¹³.

2.4 Variation in CBAM spillovers across income groups

To further explore potential variations across countries' development levels, we estimate the effect of CBAM exposure on the likelihood of countries with different income levels having a carbon pricing policy. This distinction is important because CBAM can have different impacts on countries with similar exposure levels but different income levels. Lower-income countries might lack the institutional,

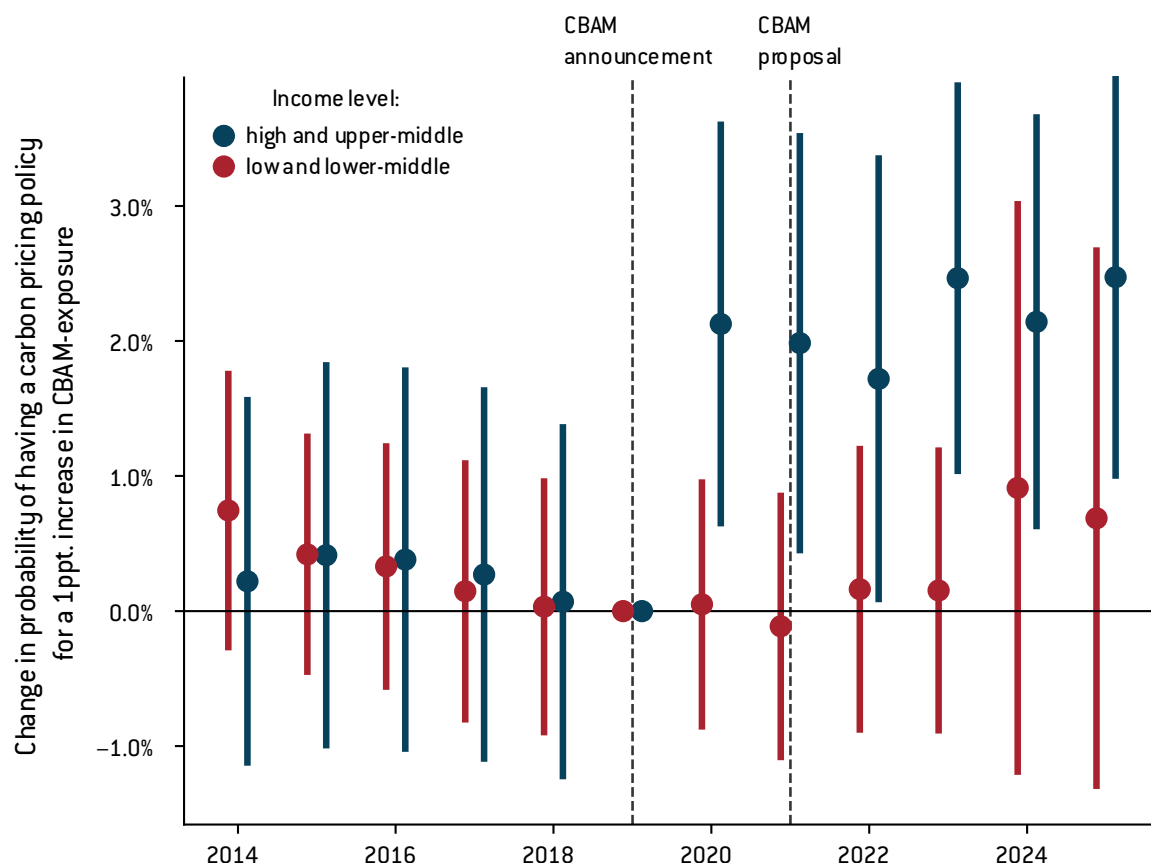
¹¹ Table A1 lists the countries with a carbon pricing policy, along with the starting year for each development stage.

¹² See Government of the Socialist Republic of Vietnam's decree of 9 June 2025, 119/2025/ND-CP on providing the mitigation of greenhouse gas emissions and protection of the ozone layer', <https://english.luatvietnam.vn/tai-nguyen/decree-119-2025-nd-cp-mitigation-of-greenhouse-gas-emissions-402540-d1.html>. The list of sectors was published by the Indian Bureau of Energy Efficiency and its Ministry of Power; see Indian Bureau of Energy Efficiency's website on carbon markets, <https://beeindia.gov.in/carbon-market.php>; and the Indian Ministry of Power's response on 13 March 2025 to a question on carbon credit trading schemes, https://powermin.gov.in/sites/default/files/uploads/LS13.03.2025_Eng.pdf.

¹³ Carbon prices in the year of implementation and as 2025 are listed in Table A1 in the appendix. As CBAM is phased in gradually with lower effective CBAM cost, third countries' future carbon price levels might increase accordingly.

administrative or tax capacity to implement a carbon pricing policy. Figure 4 shows that the effect of CBAM on the probability of carbon price adoption is driven by higher income countries.

Figure 4: The impact of CBAM exposure on the probability of having a carbon pricing policy by income group



Source: Bruegel. Note: the figure shows the change in third countries' probability of announcing, developing or implementing a carbon pricing mechanism based on a one percentage point increase in CBAM exposure. The blue dots show the change in probability for high- and upper middle-income countries, while the red dots show the change in probability for low- and lower middle-income countries. CBAM exposure is the average value of CBAM-affected exports from 2014-2024. The vertical solid lines represent 90-percent confidence intervals.

Following the Commission's announcement of the plan for CBAM in 2019, the probability of having a carbon price policy increased significantly for high- and upper middle-income countries, while we do not observe such effects for low- and lower middle-income countries (Figure 4)¹⁴. Importantly, an increase in CBAM exposure shows no effect before 2019 for any of the groups, highlighting the role played by the CBAM announcement in the uptake of carbon pricing policies. The size of the effect increased following the CBAM proposal in 2021 and again following the entry into force of the policy in 2023. Specifically, in 2020, a one percentage point increase in the CBAM exposure of high-income countries is associated with a 2.1 percent increase in the probability of having a carbon policy. Our finding that lower-income countries are less likely to adopt carbon pricing mechanisms supports the literature, which suggests that non-pricing instruments, such as efficiency standards, subsidies for

¹⁴ The results are robust to an alternative classification based on income *per capita* quartiles (Table A4).

clean technologies and public programmes involving low carbon infrastructure, might be more effective in developing countries (Stern, 2015; Finon, 2019; IPCC, 2022).

Compared to higher-income countries, lower-income countries face stronger political and institutional constraints, making the adoption of carbon pricing policies harder (Boute, 2024; Finon, 2019; Sandler and Schrag, 2025). Carbon pricing requires a monitoring, reporting and verification (MRV) system, tax administration and regulatory capacity. Lower-income countries tend to have weaker tax systems (Benitez *et al*, 2023; Carattini, 2022), less reliable emissions data and limited administrative and enforcement capacity (Ricciuti *et al*, 2019). This is particularly the case in economies where small, medium-sized and informal firms represent large shares of economic activity (in 2024, the informal employment rate reached 86.5 percent in low- and lower middle-income countries, while it was 31.05 percent in upper middle- and high-income countries)¹⁵. Carbon pricing might also constrain lower-income economies as they rely more on emission-intensive industries, decreasing their incentives to adopt such a policy (Bellon *et al*, 2021).

3 Fostering CBAM spillovers on global climate policies

To significantly reduce global emissions, EU climate mitigation policies alone are not sufficient. Other countries, particularly large emitters such as China, India and Indonesia, need to strengthen their climate policies. This paper highlights how CBAM may be able to shape climate policies abroad and thus help mitigate the free-rider problem of coordinated climate action.

Following the announcement of CBAM in 2019, there was a significant uptake among non-EU countries in the adoption of domestic carbon pricing mechanisms. Specifically, the share of higher-income countries announcing, developing or implementing a carbon pricing policy rose from 19.5 percent in 2019, to 33.3 percent in 2025. Over the same period, the share of lower-income countries with a similar policy increased from 4 percent to 12 percent.

Our results suggest that increased exposure to CBAM strengthens the spillover effects on global carbon pricing. Countries' CBAM exposure could be expanded further within the EU framework, or through broader adoption of carbon border mechanisms.

First, broadening the list of products covered by CBAM would increase third countries' CBAM exposure. In 2025, a list of downstream products was added to the CBAM regulation to close loopholes and prevent production from shifting to countries with weaker climate policies¹⁶. Accounting for the newly added downstream products, the global average CBAM exposure increases from 1 percent to 1.1 percent. The exposure of Bosnia and Herzegovina and Türkiye increases by 2 percentage points and 1.9 percentage points, respectively. This translates into a 4.2 percent and 4 percent higher probability of introducing a carbon pricing policy after 2019, compared to CBAM without the additional downstream products¹⁷.

¹⁵ See the ILOSTAT database 'Statistics on the informal economy', undated, <https://ilostat ilo.org/topics/informality/>.

¹⁶ See the European Commission press release of 17 December 2025 'Commission strengthens the Carbon Border Adjustment Mechanism', https://ec.europa.eu/commission/presscorner/detail/en/ip_25_3088.

¹⁷ While exposure to CBAM encourages countries to implement a carbon price, it might also have adverse effects on the ability of developing countries to address climate change. See Mahendra Shunmoogam, 'Feedback from the Republic of South Africa's Department of Trade, Industry and Competition', 26 August 2025, European Commission,

Second, we show that carbon border policies can be effective tools to incentivise the adoption of domestic carbon mitigation policies by third countries. Wider implementation of such measures would increase third countries' exposure to CBAM and would limit the risk of trade diversion by reducing opportunities for exports to be redirected to countries without carbon border policies. Early evidence indicates that several countries are willing to align their carbon pricing frameworks with the EU CBAM. For instance, the United Kingdom's carbon border policy, which will enter into force in January 2027, covers the same sectors as the EU CBAM, excluding the electricity sector. Canada and Australia are also considering adopting carbon border measures¹⁸. If the member countries of the Open Coalition on Compliance Carbon Markets were to each adopt a CBAM, a larger number of countries would be incentivised to start pricing carbon¹⁹. For example, India's exposure would increase by 3.04 percentage points, while Paraguay's exposure would increase by 15.6 percentage points, further increasing the probability of them adopting a carbon pricing policy by 6.4 percent and 32.8 percent, respectively.

We also show that higher-income countries are more likely to adopt carbon pricing mechanisms as a response to CBAM. Lower-income countries may face technical and financial constraints limiting their ability to set up effective carbon pricing policies. For example, if no data on actual emissions embodied in exported goods is available, emission levels default to relatively high values defined by the European Commission.

To prevent exports from being assessed at higher default levels, an accurate MRV system is essential. Lower-income countries may face constraints in accessing the technology required to directly monitor carbon emissions (ie sensors, metering systems) and to develop reliable, indirect measurement methods (eg production-based emission estimation, life-cycle analysis). A second requirement is a reliable reporting system. The prevalence in developing countries of micro, small and medium enterprises and informal firms, often operating outside the official tax system, makes reporting and enforcement difficult. Finally, accredited and independent third parties need to ensure the accuracy, consistency and transparency of emissions data. In many developing countries, lack of access to recognised auditing bodies is a significant challenge (CFRR, 2019).

Our analysis shows that carbon border adjustments can be an effective tool to promote the global adoption of climate policies. Following the principle of common but differentiated responsibilities, however, the needs and capacities of lower-income economies must be taken into account, to ensure a truly global and equitable low-carbon transition.

https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/14748-Carbon-Border-Adjustment-Mechanism-CBAM-downstream-extension-anti-circumvention-and-rules-on-electricity-emissions/F3593480_en.

¹⁸ In 2025, Canada held public consultations on CBAM; see Government of Canada, 'Exploring Border Carbon Adjustments for Canada', undated, <https://www.canada.ca/en/departement-finance/programs/consultations/2021/border-carbon-adjustments/exploring-border-carbon-adjustments-canada.html>. Australia considered a CBAM in its 2025 carbon leakage review report (DCCEEW, 2025).

¹⁹ The Open Coalition on Compliance Carbon Markets was created during the 2025 COP30 to improve the design and governance of compliance carbon markets, and to establish a global emissions cap. This coalition includes Brazil, China, the EU, the United Kingdom, Canada, Chile, Germany, Mexico, Armenia, Zambia, France, Rwanda, Andorra, Guinea, New Zealand, Monaco, Singapore and Norway.

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Appendix 1: Carbon pricing policy data construction

To construct the dataset on carbon pricing we draw on the World Bank's *State and Trends of Carbon Pricing* reports from 2014-2025. These reports are typically released in the second trimester of each year and cover policy developments over the previous 12 months. To identify the specific year in which a policy begins to be considered, developed or implemented we consult historical editions of the report available in the World Bank repository²⁰.

The reports define a policy as being under consideration if the country announced their intention to work towards the implementation of a carbon pricing initiative through official government sources. A policy is under development once a government is actively working towards the implementation of a carbon pricing instrument. This includes when a mandate has been established but regulated entities do not yet face compliance obligations. Finally, a policy is implemented when it requires compliance.

Reports published before 2021 do not distinguish between 'under development' and 'under implementation'. We thus consider the policies to be under development if the report does not include data on the price established by the policy²¹.

We collect information on both sub-national and national carbon pricing mechanisms. We only keep national policies to be able to match this information with trade information available at the country level.

Policies are classified as an ETS or a carbon tax according to their technical design. Prior to 2021, ETSs included both cap-and-trade systems and baseline-and-offset systems, as implemented by Australia in 2012. In line with the most recent definition of ETS used in the World Bank's report, we treat baseline-and-offset systems observations as not having an ETS in place. Table A1 highlights the countries with a carbon pricing mechanism and the years of the different development stages.

²⁰ See footnote 6.

²¹ In our empirical strategy we consider jointly policies under development and implemented, thus this approximation does not impact our results.

Table A1: List of carbon pricing mechanisms per country (2014-2025)

Country	Year of policy announcement	Year of policy development	Year of policy implementation	Price as of implementation (\$/tCO2e)	Price as of 2025 (\$/tCO2e)
Albania	2023		2024	13.1	13.7
Andorra			2025		
Argentina			2018	5.3	8.9
Bahrain	2025				
Botswana	2022				
Brazil	2015	2025			
Brunei	2021				
Canada	2016		2019	15.0	66.2
Chile		2015	2017	5.0	5.0
China	2014	2018	2021	9.2	11.8
Colombia			2017	6.5	5.2
Côte d'Ivoire	2018				
Dominican Rep.	2025				
India	2024	2025			
Indonesia	2020	2022	2024	0.6	0.7
Israel	2022	2024	2025	1.5	1.5
Japan			2012	1.1	1.9
Kazakhstan		2014	2020	0.9	1.1
Kenya	2024				
Malaysia	2022	2025			
Mauritania	2024				
Mexico			2014	3.1	3.9
Montenegro	2020	2023	2024	25.8	25.9
Morocco	2022				
New Zealand			2008	32.0	12.4
Pakistan	2021				
Paraguay	2024				
Philippines	2024				
Senegal	2019				
Singapore	2017	2019	2020	3.7	18.6
South Africa		2014	2020	12.8	7.1
South Korea		2012	2019	6.5	9.1
Thailand	2015	2025			
Türkiye	2015	2025			
Ukraine*	2014	2017	2020	0.4	0.7
Uruguay			2022	137.3	158.8
Vietnam	2018	2025			

Source: Bruegel based on World Bank. Note: price data is taken from the World Bank *State and Trends of Carbon Pricing* report. Years correspond to the first instrument (ETS or carbon tax) implemented. *Although a carbon tax was introduced in Ukraine in 2011, the World Bank reports it as announced/under development before 2020, as the measure was going under major revision.

Appendix 2: Econometric specification

To assess the effect of CBAM exposure on the likelihood of having a carbon pricing policy after the announcement of an EU carbon border tax, we estimate the following specification:

$$\text{Carbon Pricing Policy}_{c,t} = \beta_1 \text{Exposure}_c \times \text{Post CBAM}_t^{2019} + \gamma_c + \eta_t + \epsilon_{c,t}$$

Where *Carbon Pricing Policy*_{*c,t*} is equal to one when country *c* has at least one carbon pricing policy announced, under development or implemented in year *t*. *Exposure*_{*c*} is measured as the average share of CBAM exports to the EU and EFTA over total exports for the period 2014-2024. *Post CBAM*_{*t*}²⁰¹⁹ is equal to one if year *t* is larger than 2019. γ_c and η_t respectively control for time-invariant country characteristics (ie geography, culture) and year-fixed effects, accounting for time trends common across countries, such as the Paris Agreement.

Table A2: Estimation of the effect of CBAM Exposure on the probability of having a carbon pricing policy

Dependent Variable	Carbon Pricing Policy _{<i>c,t</i>}					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Exposure_c × post_CBAM_t¹⁹</i>	0.038*** (0.004)	0.016*** (0.004)	0.015*** (0.004)			
<i>Exposure_{c,t} × post_CBAM_t¹⁹</i>				0.010** (0.004)	0.009** (0.004)	
<i>Exposure_{c,t-1} × post_CBAM_t¹⁹</i>						0.010** (0.005)
<i>Exposure_{c,t}</i>				0.007 (0.006)	0.007 (0.007)	
<i>Exposure_{c,t-1}</i>						0.008 (0.007)
<i>Quantification Effect of CBAM Exposure:</i>						
with one 1 ppt ↗ in CBAM Exposure	+3.8%	+1.6%	+1.5%	+0.9%	+0.9%	+1.0%
Observations	1,956	1,956	1,593	1,793	1,593	1,433
Country FE	No	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes	Yes	Yes
Controls	No	No	Yes	No	Yes	Yes

Robust standard errors in parentheses

p* < 0.1, ** *p* < 0.05, * *p* < 0.01

Source: Bruegel. Note: across all specifications, the dependent variable is equal to one if country *c* has at least one carbon pricing policy announced, under development or implemented in year *t*. Columns (1) to (3) report the effect of the average CBAM exposure on the likelihood of having a carbon pricing policy (announced, under development, or implemented) after 2019, when the Commission announced CBAM. While the specification shown in Column (1) does not include fixed effects, Column (2) and (3) include both country and year fixed effects. Column (3) also includes control variables: GDP *per capita*, the total level of exports, the level of corruption, a measure of government efficiency, of regulatory quality and of rule of law. Columns (4) and (5) mimic Columns (2) and (3) but using a yearly value of CBAM exposure, while Column (6) uses a one-year lagged value of CBAM exposure. The results are robust across all specifications, with an effect varying from +0.9 percent to +3.8 percent.

Table A3: Estimation of the effect of CBAM exposure on the probability of having a carbon pricing policy – controlling for EU candidate status

Dependent Variable	Carbon Pricing Policy _{c,t}								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Exposure_c \times post_CBAM_t^{19}$	0.016*** (0.004)								
$\ln(Exposure_c) \times post_CBAM_t^{19}$		0.010*** (0.003)	0.005* (0.003)						
$Exposure_{c,t} \times post_CBAM_t^{19}$				0.010** (0.004)					
$\ln(Exposure_{c,t}) \times post_CBAM_t^{19}$					0.010*** (0.003)	0.007*** (0.002)			
$Exposure_{c,t-1} \times post_CBAM_t^{19}$							0.010** (0.005)		
$\ln(Exposure_{c,t-1}) \times post_CBAM_t^{19}$								0.008*** (0.003)	0.005** (0.002)
$Exposure_{c,t}$				0.006 (0.007)					
$\ln(Exposure_{c,t})$					-0.002 (0.002)	-0.001 (0.002)			
$Exposure_{c,t-1}$							0.008 (0.007)		
$\ln(Exposure_{c,t-1})$								-0.001 (0.002)	-0.001 (0.002)
$EU\ candidate_{c,t}$	-0.125** (0.057)	-0.105* (0.055)		-0.112** (0.056)	-0.107* (0.055)		-0.063** (0.028)	-0.049** (0.024)	
Observations	1,593	1,593	1,534	1,593	1,565	1,506	1,433	1,408	1,354
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EU Candidate Countries Included	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: Bruegel. Note: across all specifications, the dependent variable is equal to one if country c has at least one carbon pricing policy announced, under development or implemented in year t . Column (1) reports the effect of the average CBAM exposure on the likelihood of having a carbon pricing policy (announced, under development, or implemented), after 2019, the announcement of EU CBAM, while columns (2) and (3) introduces the $\ln$ transformed average CBAM exposure. Columns (4) to (6) mimic columns (1) to (3) but use a yearly value of CBAM exposure, while columns (7) to (9) use a one-year lagged value of CBAM exposure. All specifications include both country and year fixed effects, and control variables: GDP *per capita*, the total level of exports, the level of corruption, a measure of government efficiency, of regulatory quality and of rule of law. Columns (1), (2), (4), (5), (7) and (8) also control for the partner country's EU candidacy status, while Columns (3), (6), and (9) drop these observations. The results are robust across all specifications.

Table A4: Estimation of the effect of CBAM exposure on the probability of having a carbon pricing policy, by income level

Dependent Variable	Carbon Pricing Policy _{c,t}					
	(1)	(2)	(3)	(4)	(5)	(6)
$Exposure_c \times post_CBAM_t^{19Higher}$	0.019*** (0.004)	0.020*** (0.005)	0.021*** (0.004)			
$Exposure_c \times post_CBAM_t^{19Lower}$	0.000 (0.003)	-0.004 (0.003)	-0.004 (0.003)			
$Exposure_c \times post_CBAM_t^{19Q1+Q2}$				0.000 (0.003)	-0.002 (0.002)	-0.002 (0.003)
$Exposure_c \times post_CBAM_t^{19Q3}$				0.016*** (0.005)	0.020*** (0.005)	0.021*** (0.005)
$Exposure_c \times post_CBAM_t^{19Q4}$				0.025*** (0.005)	0.021*** (0.008)	0.020** (0.009)
EU candidate _{c,t}			-0.134** (0.058)			-0.126** (0.059)
Observations	1,956	1,593	1,593	1,758	1,593	1,593
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: Bruegel. Note: across all specifications, the dependent variable is equal to one if country c has at least one carbon pricing policy announced, under development or implemented in year t . Columns (1) to (3) report the effect of the average CBAM exposure on the likelihood of having a carbon pricing policy (announced, under development, or implemented), after 2019, the announcement of EU CBAM, for higher- and lower-income countries, while columns (4) to (6) use an alternative classification based on quartile of income per capita. All specifications include both country and year fixed effects, and control variables: GDP *per capita*, the total level of exports, the level of corruption, a measure of government efficiency, of regulatory quality and of rule of law. Columns (3) and (6) also control for the partner country's EU candidacy status, while Columns (3), (6), and (9) drop these observations. 'Higher' comprises high- and upper middle-income countries while 'lower' refers to low- and lower-middle-income countries. Q1, Q2, Q3 and Q4 refer to the income *per capita* quartile. Q1 is defined as below the 25th percentile, Q2 as between the 25th percentile and 50th percentile, Q3 between the 50th percentile and 75th percentile, while Q4 is defined as above the 75th percentile.



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