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Carbon Pricing at Export Markets

Trade-Related Implications in Trinidad and Tobago

Ilya A. Stepanov, Diego A. Gutiérrez, and Camilo E. Tovar

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Carbon Pricing at Export Markets: Trade-Related Implications in Trinidad and Tobago

Prepared by Ilya A. Stepanov, Diego A. Gutiérrez, and Camilo E. Tovar*

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ABSTRACT: This paper examines the potential impact of border carbon adjustments on Trinidad and Tobago's exports. Despite its marginal contribution to global greenhouse gas emissions, the country's high carbon intensity exposes the economy to global low-carbon transition risks. The paper aims to raise awareness and encourage discussions on critical actions needed to maintain export competitiveness, enhance diversification, support balance of payments stability, and finance a green transition. The analysis recommends building on existing policies to integrate transition risks into development strategies, promote carbon intensity reduction, accumulate relevant data, and explore innovative emissions reduction approaches, including carbon pricing.

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WORKING PAPERS

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Prepared by Ilya A. Stepanov, Diego A. Gutiérrez, and Camilo E. Tovar[1]

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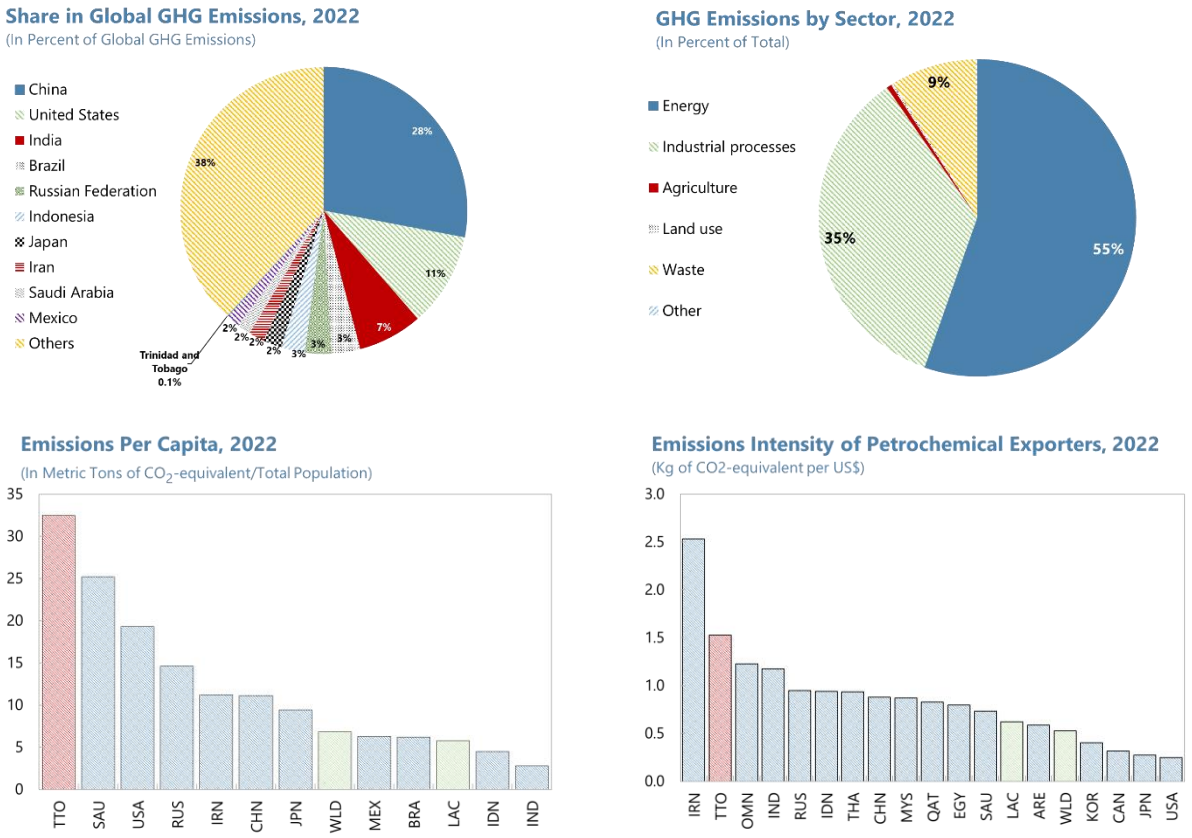
I. Background—Carbon Pricing and Border Carbon Adjustments

Trinidad and Tobago's contribution to global greenhouse gas (GHG) emissions is very small—0.075 percent in 2022—but the country is substantially exposed to global low-carbon transition risks. With a population of about 1.5 million and a large and globally competitive gas and petrochemical sector, the country is a large emitter in per capita terms and has a high emission intensity of GDP compared to other petrochemical countries (1.5 kg CO_2-equivalent per US$ in 2022).[1] Most of the country's emissions originate from the energy and industrial sectors (Figure 1). This exposes the country to global low-carbon transitional risks (here after, *transitional risks*), particularly those arising from carbon pricing introduced at the export markets, as they could reduce the demand for hydrocarbons and carbon-intensive products in these markets.

Figure 1. Greenhouse Gas Emissions in Trinidad and Tobago



Sources: IMF Climate Change Dashboard, World Economic Outlook Database, and authors' calculations.

[1] IMF Climate Change Indicators Dashboard, IMF staff calculations.

Advanced and emerging market economies are increasingly embracing carbon pricing as an instrument to strengthen the policy response to climate change. Carbon pricing, in the form of a carbon tax or an emissions trading system (ETS)[2] is one of the main policy tools to achieve decarbonization targets and support the energy transition.[3] It is considered a cost-efficient instrument for GHG emissions reduction (Parry, Black, and Zhunussova, 2022; Goulder and Parry, 2008). Currently, carbon pricing schemes have been introduced in 49 advanced and emerging market economies, and at least 23 additional countries plan to start pricing emissions soon. In recent years, countries have increased domestic prices for carbon and broadened its use across industries and activities (Figure 2). In some instances, authorities are seeking to link their ETS to create a larger and more liquid market for the trading of emission allowances across jurisdictions—e.g., the Swiss ETS linked with the European Union's (EU) ETS. Currently, the EU ETS is one the most developed systems. It covers 30 countries and has brought carbon prices up to as high as 100 euro per ton of CO_2-equivalent.

However, more stringent domestic climate policies and rising carbon prices can adversely affect the international competitiveness of national industries, thus justifying the introduction of trade-related measures to level the playing field.[4] Indeed, by promoting the shift away from fossil fuels and supporting low-carbon production processes, carbon prices may increase the domestic cost of electricity generation and manufacturing.[5] Divergences in carbon pricing across countries contribute to an uneven playing field for the affected industries (Parry et al., 2021). This has increased the interest in *border carbon adjustments* (BCAs)—i.e., charges on embodied carbon in imported products—as they can help safeguard the competitiveness of domestic producers and address carbon leakages.[6] Not surprisingly, BCAs are currently being considered in Canada[7] and have been suggested earlier in the United States.[8] They are already scheduled for the implementation in the United Kingdom,[9] and the European Union (EU) launched the world's first BCA in October 2023.[10]

[2] In an ETS, a regulator establishes limit for emissions per period within specific sectors of an economy. Emission allowances are then distributed or sold to entities participating in the ETS. By the end of the specified period, each participating entity is required to surrender allowances equivalent to their emissions during that period. Facilities emitting fewer emissions can sell the surplus of allowances to other participants in the system. Entities with lower abatement costs are motivated to decrease their emissions, whereas those with higher costs can opt to meet compliance by acquiring allowances from the market.

[3] See IMF, 2023a, Fiscal Monitor: Climate Crossroads: Fiscal Policies in a Warming World. Washington, DC: IMF, October.

[4] For an overview of these effects see Clausing and Wolfram (2023) and references therein.

[5] Almost all existing carbon pricing schemes covering the industrial sector are accompanied by measures to alleviate competitiveness impacts (e.g., free allowance allocations, partial exemptions from pricing). But their effectiveness declines with deeper industrial decarbonization and may blunt the domestic demand effects and forgo revenue from carbon pricing

[6] Carbon leakage refers to the situation that may occur if, for reasons of costs related to climate policies, businesses were to transfer production to other countries with laxer emission constraints. This could lead to an increase in their total emissions. The risk of carbon leakage may be higher in certain energy-intensive industries. See Böhringer et al. (2022), and Keen, Parry, and Roaf (2021).

[7] See https://www.canada.ca/en/department-finance/programs/consultations/2021/border-carbon-adjustments.html Consultation on border carbon adjustments.

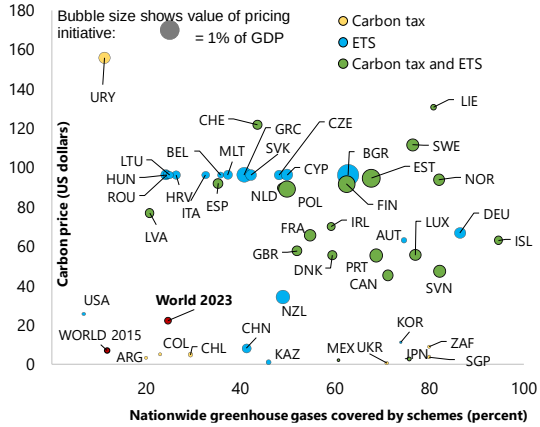
[8] See https://joebiden.com/climate-plan. Recent legislative proposals for carbon taxes in the United States have also contained BCAs (see www.carbontax.org/bills). But it its uncertain whether the new U.S. Administration will continue to pursue this policy.

[9] See Factsheet: UK Carbon Border Adjustment Mechanism - GOV.UK (www.gov.uk), UK Government, updated 18 December 2023.

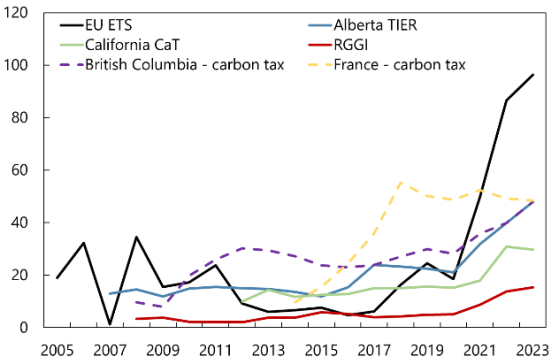
[10] There are alternative global proposals, such as Climate Clubs among countries undertaking ambitious and costly policies to reduce GHG. The rationale is that members of these clubs would set penalties against low ambition countries in the form of a broad tariff on all imports. It is argued that this is administratively easier to administer than BCAs as there is no need to measure the carbon content of imports and it also applies to all goods from nonclub countries. See Clausing and Wolfram (2023).

Figure 2. Carbon Pricing: Coverage and Price Levels

National, Subnational, and Regional Carbon-Pricing Schemes, 2022
(US$ per Ton of CO_2-equivalent)



Carbon Price Level in Selected Jurisdictions
(US$ per Ton of CO_2-equivalent)



Sources: IMF Fiscal Monitor 2023, and World Bank's Carbon Prices Dashboard 2023.

Note: EU ETS includes 27 EU members plus Iceland, Liechtenstein, and Norway. Prices are weighted averages across schemes in a country. Country-specific values are calculated using sold auctions and average prices. Mexico's subnational schemes and ETSs for Indonesia and Montenegro are not included in the figure owing to lack of data.

The EU's Carbon Border Adjustment Mechanism (CBAM) has entered a transitional phase[11] which will last until 2025 and become fully operational in 2026, when small fees will be introduced, increasing steeply around 2030 as free allowances are being phased out.[12] Under this mechanism, EU's importers of iron and steel, aluminum, cement, fertilizers, electricity, and hydrogen will have to buy CBAM certificates at the price set in the ETS market to cover the carbon footprint of the imported goods. The design allows for the CBAM payments to be reduced if the carbon price is paid in the country of origin for the declared embedded emissions of the product. The CBAM is designed to be compatible with WTO rules: it is aligned with the phase-out of the allocation of free allowances under the EU ETS ensuring the equal carbon price level for importers and domestic producers. After the transitional phase, the scope of products covered by the EU's CBAM will be reviewed to assess the feasibility of including other goods that are covered by the EU ETS.[13]

The EU's CBAM will apply to both direct and indirect emissions of main GHGs except for methane emissions, which in turn will be covered by other measures. The CBAM will cover carbon dioxide and where relevant, nitrous oxide and perfluorocarbons. It will apply to direct emissions—i.e., generated during the production

[11] During the transitional phase, the EU importers will have to start reporting emissions embedded in their imports with no payment obligations until 2026. The objective of the transitional period is to serve as a pilot and learning period for all stakeholders (importers, producers, and authorities) and collect useful information on embedded emissions to refine the methodology for the definitive period. See https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en#cbam-definitive-regime-from-2026.

[12] The CBAM certificates surrendered will be adjusted to reflect the extent to which EU allowances are allocated free of charge. The CBAM phase-in plan gradually ceases the free allocation of EU ETS allowances over a nine-year period (from 2026 to 2034) for sectors covered by CBAM.

[13] The EU ETS covers emissions from power and heat generation, a wide range of energy-intensive industry sectors including oil refineries, steel works and production of iron, aluminum, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids, and bulk organic chemicals.

process—of all the imports subject to the CBAM and as well as to indirect emissions—i.e., those arising from the generation of electricity used in the manufacturing process—for cement and fertilizers. CBAM's rules determine that special default values will apply to those goods for which emissions levels cannot be appropriately determined through the importers' declaration.[14] Methane emissions embodied in imports will be regulated by supplementary mechanisms. In this case, the new EU law will be imposing limits on fossil fuels imports and require companies importing oil and gas to demonstrate that their supply chain has emissions monitoring standards equivalent to those of the EU by 2027, eventually requiring oil and gas suppliers to limit methane emissions to stay below maximum methane intensity values by 2030.[15] The EU has expressed its commitment to supporting developing countries and least developed countries in implementing the CBAM, greening their industries, and transitioning to renewable energy sources. As well as their commitment to help those countries interested in introducing or enhancing their carbon pricing systems.[16]

[14] Embedded emissions will be verified based on the EU importers' declarations. Embedded emissions in goods will be calculated pursuant to the methods set out by the European Commission. Where the actual emissions cannot be adequately determined, as well as in the case of indirect emissions, the embedded emissions will be determined by reference to default values determined based on the best available data. See EUR-Lex - 32023R0956 - EN - EUR-Lex (europa.eu)

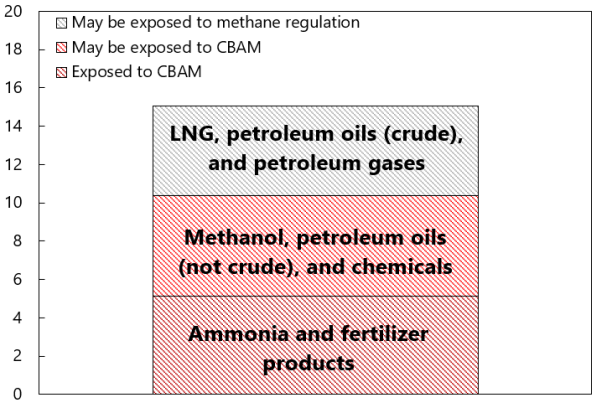
[15] See New EU Methane Regulation to reduce harmful emissions from fossil fuels in Europe and abroad, European Union, 27 May 2024.

[16] See Guidance and Technical Support for EU's CBAM. However, as of November 2024, none of the initiatives listed extended to Latin America and the Caribbean.

II. Trinidad and Tobago's Exposure to the EU's CBAM

Currently, about 5.1 percent (US$ 446 million) of Trinidad and Tobago's total exports of goods are exposed to the EU's CBAM (Figure 3, Table 1).[17] The most exposed items are fertilizers, including anhydrous ammonia and mixtures of urea and ammonium nitrate. However, the exports exposed to the EU's CBAM are likely to double, particularly if the CBAM's sectoral coverage is widened to include petroleum products and petrochemicals (including methanol).[18] Moreover, by the early 2030s, up to 15 percent of the Trinidad and Tobago's current total exports of goods could be subject to emissions regulation at the border (Figure 3). This would materialize once the EU introduces restrictions on the methane intensity embedded in hydrocarbon imports to the EU.

Figure 3. Exports at Risk to the EU Trade-related Emissions Regulation
(In Percent of Total Exports)



Sources: UN Comtrade, European Commission, IMF World Economic Outlook, and IMF staff calculations.

Trinidad and Tobago's fertilizer industry is particularly exposed to the EU's CBAM. Figure 4 shows that the carbon intensity of Trinidad and Tobago's production of anhydrous ammonia exceeds the EU's average level.[19] Also, that the carbon intensity of mixtures of urea and ammonium nitrate almost doubles that of the EU's level and one third higher than the weighted average level of carbon intensity of the EU's imports from numerous countries.

The EU's CBAM could erode Trinidad and Tobago's competitiveness in the EU's market due to the high carbon intensity of its exports.[20] Specifically, it is estimated that in a *worst-case scenario* with no global redirection of trade (i.e., *ceteris paribus*) the CBAM-related payments incurred by European importers of Trinidad and Tobago's fertilizers could exceed 40 percent of the total fertilizer annual exports to the EU, or about 0.8 percent of Trinidad and Tobago's GDP (Annex I). These costs would increase if CBAM's coverage is extended to

[17] Estimates based on 2018-2022 averages. Sixteen percent of Trinidad and Tobago's total exports of goods are destined to the EU, equivalent to 5.7 percent of GDP or US$ 1.4 billion.

[18] The expansion of the CBAM coverage is a subject to the tradeoff between enhanced protection against leakage and increased the regulatory complexity and reporting burden of the instrument. Although official decision is yet to be made, at the later stage, the CBAM may also cover coking coal, asphalt bitumen, petroleum products, chemicals, glass and ceramics, Non-ferrous metals. See presentation Exposure of Developing Countries to EU Carbon Border Adjustment Mechanism (EU CBAM) by Maliszewska M., at the Ninth IMF-WB-WTO Trade Conference, October 24-25, 2023

[19] The cross-country comparison is based on the emissions data from study by EU Joint Research Centre. These values are used to establish the default values for the transitional CBAM period.

[20] A comprehensive assessment of the CBAM impacts on the Trinidad and Tobago economy requires a more granular analysis with application of a global general equilibrium modelling framework. This would allow to analyze the trade implications of climate policies on global trade patterns of trade.

include other petroleum products and chemicals or methanol. In this scenario, and since the EU fertilizer market is competitive, the country could lose some of the EU's market share (Table 2).

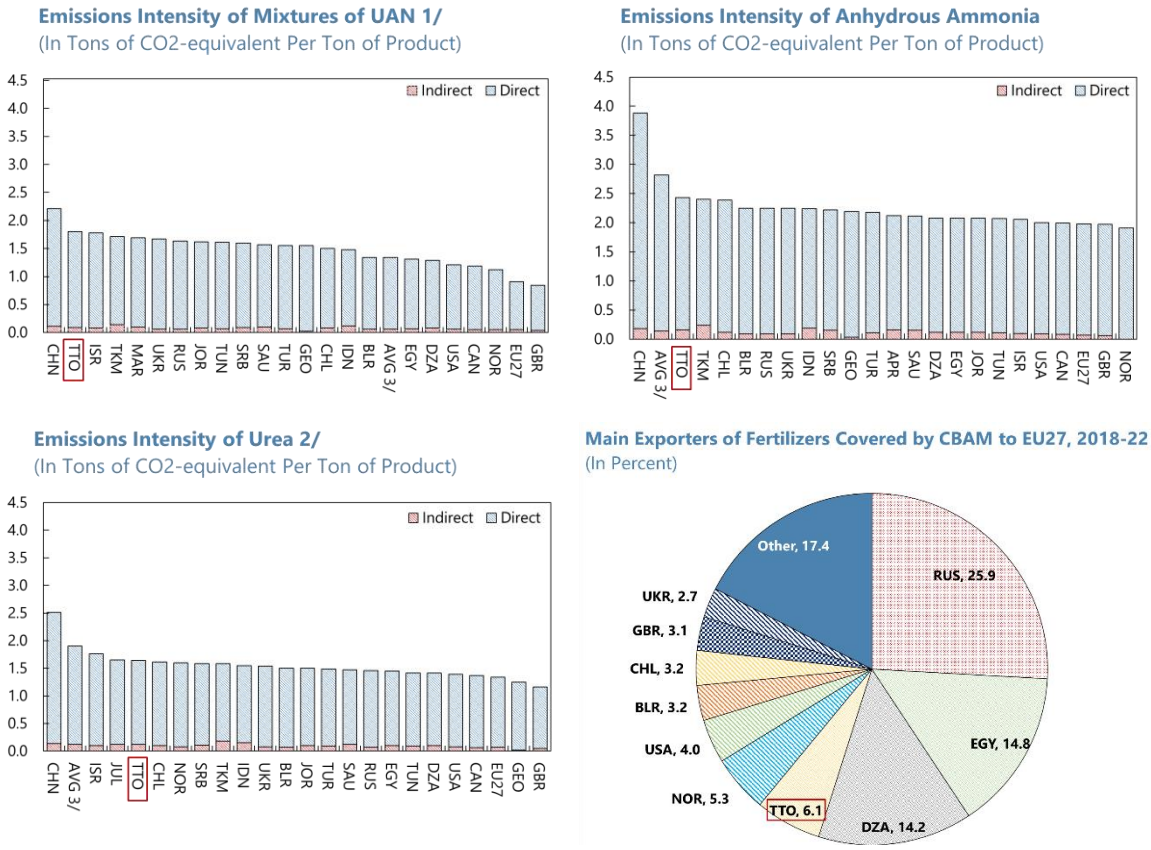
Table 1. Trinidad and Tobago: Exposure of Main Exports of Goods to the EU CBAM, Average 2018-22

HS Code	Product Name	Total exports to EU (US$ Mill.)	Percent share of exports to EU	Percent share of total exports	Covered by EU CBAM	May be covered by EU CBAM at the later stage
290511	Methanol (methyl alcohol)	399.5	29.0	4.6		√
281410	**Anhydrous ammonia**	**288.9**	**21.0**	**3.3**	**√**	
271111	Liquefied Natural gas	254.5	18.5	2.9		
310280	**Mixtures of urea and ammonium nitrate in aqueous or ammoniacal solution**	**152.5**	**11.1**	**1.8**	**√**	
270900	Petroleum oils and oils obtained from bituminous minerals, crude.	115.5	8.4	1.3		
271019	Other petroleum oils and oils obtained from bituminous minerals, other than crude.	28.1	2.0	0.3		√
293361	Melamine	21.0	1.5	0.2		√
271119	Other petroleum gases and other gaseous hydrocarbons in gaseous state	18.1	1.3	0.2		
890110	Cruise ships, excursion boats and similar vessels	16.1	1.2	0.2		
271121	Natural gas in gaseous state	12.2	0.9	0.1		
271113	Butanes	8.3	0.6	0.1		
890190	Other vessels for the transport of goods and other vessels	8.3	0.6	0.1		
271112	Propane	7.3	0.5	0.1		
261790	Other ores and concentrates	4.7	0.3	0.1		
281910	Chromium trioxide	4.7	0.3	0.1		√
310210	**Urea, whether or not in aqueous solution**	**4.6**	**0.3**	**0.1**	**√**	

Sources: UN Comtrade, European Commission and IMF Staff Calculations.

Note: Codes based on the HS 2002 Nomenclature. The row colors highlight export products already covered by the EU CBAM (dark grey) or that may be covered by EU CBAM (light gray).

Figure 4. Fertilizer Producers at the EU Market and Emissions Intensity of Selected Products

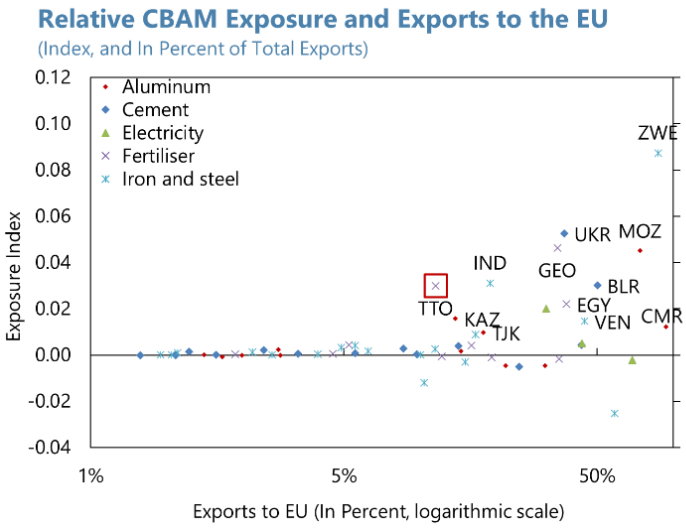


Sources: UN Comtrade, EU Joint Research Centre; and IMF Staff Calculations.

Note: "Direct" refers to direct emissions while "Indirect" refers to indirect emissions. See definitions in text.
1/ Mixtures of Urea and Ammonium Nitrates (UAN) in aqueous or ammoniacal solution.
2/ Whether or not in an aqueous solution.
3/ Weighted average of imports.

These estimates resemble those of the World Bank index, which shows that Trinidad and Tobago fertilizers' producers are substantially exposed to the EU's CBAM (Figure 5). The World Bank Index of the CBAM's relative exposure shows that Trinidad and Tobago falls within the group of the most CBAM-exposed countries even though the share of EU-destined exports is relatively small (Figure 5). Nevertheless, the WB's estimates should be interpreted with caution. This is because they rely on the Global Trade Analysis Project dataset, which uses bottom-up sectoral aggregation. As a result, the composition of related commodities may differ from just the CBAM-covered products, and the underlying emission intensities correspond to the aggregate. In this context, the fertilizer industry can be particularly vulnerable to this issue, as it is part of a subcategory within the chemicals sector.[21]

Figure 5. Countries' Exports to the EU and CBAM's Relative Exposure
(Index and in Percent of Total Exports)



Sources: World Bank's relative CBAM exposure Index; and IMF Staff Calculations.

Note: The legend shows each country's most exposed export product group. The index identifies countries with an excess of carbon emissions relative to the EU average. Negative index values indicate that relatively clean exporters may gain competitiveness in the EU market. The index is measured by multiplying the export share by the embodied carbon payment per dollar of export to the EU, and the difference between the exporter's emissions intensity and the EU average emissions intensity for the CBAM product, scaled by the assumed CBAM price ($100 per ton). The index combines 2019 exports data with emissions intensity dataset from Chepeliev and Corong (2022) and Chepeliev et al. (2022).

However, this extreme scenario is a ceiling as the adverse effect of the EU's CBAM on Trinidad and Tobago's exports is likely to be mitigated in the near-term by the strategic behavior of global petrochemical firms, which could help redirect some of the country's exports to non-EU markets. Indeed, some studies for other exposed countries suggest that the CBAM-related costs would most likely be partially offset in this manner.[22] Nonetheless, the potential for redirecting Trinidad and Tobago's exports will differ across products. This is more likely for commodities where the EU has a smaller share in global imports—e.g., urea and ammonia—and limited for products in which the EU holds a significant share of global consumption—e.g., mixtures of urea and ammonium nitrate (Table 2).

[21] Technical Note for the CBAM exposure index

[22] As an illustration, a joint World Bank–HSE university study, done prior to the war in Ukraine, indicates that the EU's CBAM will lead to decreased exports from Russia to the EU by about US$19 billion by 2035 relative to business-as-usual, while a part of this decrease will be compensated by the increased exports from Russia to the rest of the world by about US$11 billion. Furthermore, as the EU's CBAM targets carbon-intensive goods not covering crude oil, natural gas, and coal, CBAM may result in the EU importing more primary fossil fuels to use in the production of commodities covered under the CBAM, unless these are covered by supplementary mechanisms.

Table 2. Trinidad and Tobago's CBAM-exposed Exports at the EU Market, 2018-22

(In Percent)

HS Code	Product Name	Share of Trinidad and Tobago in total EU Imports	Share of EU in Global Imports
290511	Methanol (methyl alcohol)	12.9	25.4
281410	Anhydrous ammonia	14.2	23.0
310280	Mixtures of urea and ammonium nitrate in aqueous or ammoniacal solution	14.0	48.3
271019	Other petroleum oils and oils obtained from bituminous minerals, other than crude	0.0	33.1
293361	Melamine	3.5	45.6
281910	Chromium trioxide	5.8	36.8
310210	Urea, whether or not in aqueous solution	0.1	19.3

Sources: UN Comtrade, European Commission; and IMF Staff Calculations.

Note: Codes based on the HS 2002 Nomenclature. The row colors highlight Trinidad and Tobago's export products already covered by the EU CBAM (dark grey) or that may be covered by EU CBAM (light gray), see Table 1.

To mitigate the EU's CBAM impact, Trinidad and Tobago's could reduce the carbon intensity of its exported goods. While redirecting trade could help the country maintain its export levels in the short run, deeper reductions in emissions intensity would go further and help establish a permanent competitive advantage over other global suppliers in the EU market. However, in addressing the carbon intensity of Trinidad and Tobago's exports, it is important to consider that most emissions are *direct* (i.e., arising during manufacturing processes), while *indirect* emissions (i.e., originating from electricity generation used in manufacturing) only have a marginal share (Figure 3).

III. Policy Implications of BCAs and Global Decarbonization Action

While most trade partners of Trinidad and Tobago have not yet implemented BCAs, they emerge as a plausible component of the future economic global landscape, exerting pressure on carbon-intensive industries. This becomes more likely with an increasing number of countries declaring goals for carbon neutrality and adopting stringent domestic climate policies. These trends make carbon intensity of production a critical factor affecting the global competitiveness of industries.

Trinidad and Tobago's authorities have already started to act, addressing climate change and transitional risks**.** The country submitted its Nationally Determined Contribution (NDC) to the *United Nations Framework Convention on Climate Change* (UNFCCC) in 2018 committing to reduce emissions in industry power generation and transport sectors.[23] The authorities progressed in developing the vision for green energy transition issuing a number of forward-looking strategic documents, including the *Roadmap for a Green Hydrogen Economy*.[24] Also, renewable policy developments are taking place in two main fronts: (i) increasing the generation capacity with a project under construction to install a 92 MW solar power plant.; and (ii) developing a feed-in tariff policy to allow small scale residential and commercial customers co-generate electricity and sell it to the grid. Furthermore, the country has joined the *Global Methane Pledge* aiming to reduce anthropogenic methane emissions, representing 21 percent of the country's total emissions.[25]

However, to address the exposure to the EU's CBAM, Trinidad and Tobago could benefit from further integrating transition risks into energy and industrial policies. Based on the progress so far,[26] continued support and incentives to upgrade and increase the efficiency of its world class petrochemical infrastructure are important to mitigate transitional risks. To maintain access and competitiveness in the EU market, Trinidad and Tobago could further reduce the carbon intensity of its most exposed industries, particularly the fertilizer industry. The transitioning to renewable energy electricity will help reduce *indirect* emissions. But since these are low in the fertilizer industry, it will only help in the margin. Therefore, efforts should continue to focus on reducing and managing *direct* emissions. This will require to continue embracing greener and more efficient manufacturing technologies, developing Carbon Capture, Utilization, and Storage (CCUS) technology and advancing the respective legislation framework for its development.[27] Finally, it is important to assess and

[23] The submission included two targets: (i) an overall reduction of emissions from the industrial, power generation and transport sectors by 15 percent of cumulative emissions by 2030 relative to a BAU baseline, equivalent to 103 million tons of CO2 equivalent (MtCO2eq), conditional on external financial support; and (ii) an unconditional 30 percent reduction of cumulative emissions from the public transportation sector or 1.7 MtCO2eq compared to 2013 levels by 2030.

[24] See Trinidad and Tobago, 2023 Article IV Consultation, IMF Country Report No. 23/147; The Roadmap for a Green Hydrogen Economy in Trinidad and Tobago, 2022 and Setting the path for Wind Energy Generation in Trinidad and Tobago, 2023.

[25] Trinidad and Tobago along with 120 countries joining the Pledge agreed to take voluntary actions to collectively reduce global methane emissions at least 30 percent from 2020 levels by 2030. See https://www.globalmethanepledge.org/.

[26] Ongoing efforts to reduce GHG emissions also include efficiency programs (e.g., the Green Manufacturing Initiative), and exploring solutions for decarbonization of transport (e.g., solar PV carport at Grand Stand of Queens Park Savannah).

[27] The authorities with the private sector are considering a pilot project in carbon capture utilization and storage (CCUS) coordinated by newly established Carbon Capture & CO_2 EOR Steering Committee. In July 2024, Trinidad and Tobago secured support from the Green Climate Fund (GFC) for a carbon capture and storage project and the country has also launched a research hub focusing on CCUS.

manage the transitional risks to the iron and steel industry given its importance to overall exports—it accounts for 9 percent of overall exports—and its important role for the economy's diversification towards non-energy.

Stepping up the measurement and collection of emissions data would also help prepare better for the introduction of the EU trade-related carbon regulations and support its national exports. Emissions data transparency and business accountability is critical for mitigating transitional risks and for providing well-grounded support to the country's manufactured goods. They will also be critical in dealing with the EU's new requirements on imports' carbon footprint, which will rely on its own methods and approaches for emissions accounting in the absence of adequate data. In this respect, Trinidad and Tobago's authorities could continue scaling up its efforts on gathering data on GHG emissions and emissions intensities of production processes, including through its *National Climate Mitigation Monitoring, Reporting, and Verification* (MRV) system set in 2021.[28]

Securing stable and ample supply of natural gas to existing petrochemical facilities should also increase the efficiency of production and help stimulate investment in low-carbon technology. Recent challenges in gas supply have led to certain petrochemical facilities operating near their minimum capacity, compromising the efficiency of production processes.[29] To reduce carbon intensity scores and encourage future investments in energy efficiency and emissions reduction, Trinidad and Tobago's energy sector needs to explore strategies to ensure the longevity and predictability of natural gas supply. In this respect, recent developments in terms of securing the supply of gas from bordering projects with Venezuela along with other deep water gas projects that will materialize in the medium term should contribute to secure the necessary investment to increase the efficiency of petrochemical plants and reduce the carbon footprint (see IMF, 2024a,b). More broadly, stable revenues coming from the energy sector will remain a key prerequisite for successful energy transition, including financing renewable energy development.

To advance the decarbonization agenda, the authorities could consider re-evaluating the emissions reduction pathway. The Trinidad and Tobago Nationally Determined Contribution (NDC) set the target of emissions reduction in key emitting sectors (power generation, transportation, and industry) by 15 percent relative to business-as-usual (BAU, or forecasted emissions in the absence of climate policies) by 2030 conditional on international financing.[30] Over the past decade, Trinidad and Tobago has observed a decline in GHG emissions (Figure 6). Emissions peaked in 2010, coinciding with record-high production rates of natural gas, liquefied natural gas (LNG), and petrochemicals. Since that peak, emissions have steadily decreased, reaching a level one-third lower than the 2010 peak in 2021. However, despite the progress, the IMF Climate Change Dashboard suggests that the BAU emissions by 2030 are unlikely to differ significantly from those recorded in 2022. Furthermore, the emission reduction pathways aligned with the NDCs of the main petrochemical exports may be insufficient to allow the country bridge the emissions gap relative to its primary competitors (Figure 6). Transition risks stemming from the climate actions taken by advanced and emerging economies, along with

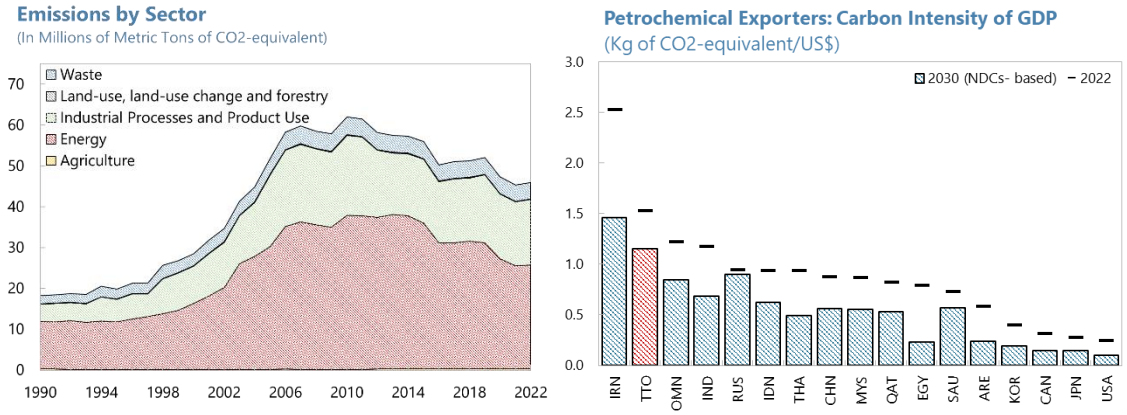
[28] See https://www.planning.gov.tt/content/tt%E2%80%99s-carbon-emissions-tracker-takes.

[29] Evidence from the corporate sector suggests that for certain petrochemical products, the reduction from full capacity to a minimum operational threshold can lead to an increase of more than 10 percent in emissions per unit of product.

[30] Unconditionally, Trinidad and Tobago aims to reduce emissions by 30 percent relative to 2013 emissions only in the sector of public transportation.

increasing market competition, requires revision of emissions reduction pathway. This could be formalized in an updated NDC submission to the UNFCCC.[31]

Figure 6. GHG Emissions and Emissions Intensity of Trinidad and Tobago and Other Petrochemical Exporters



Sources: IMF Climate Change Indicators Dashboard, World Economic Outlook; and IMF Staff Calculations.

Trinidad and Tobago could also consider introducing a carbon pricing mechanism to stimulate economic diversification and help reduce the exposure to the EU's CBAM. ETS or carbon taxes have gained popularity as energy and climate policy tools used by many petrochemical producers (Box 1). Carbon pricing could help consolidate and elevate the progress of the government and other green initiatives. For example, by boosting the investment in renewable energy generation, accelerating the implementation of the roadmap for a green hydrogen economy, setting the economic incentives to increase the efficiency of the energy sector, and scaling up the use of the CCUS and other low-carbon technologies. A carbon price can help reduce exposure to the EU's CBAM, although its coverage may have to extend beyond EU-oriented exports to be compliant with the WTO rules.[32] The design of a carbon price mechanism needs to carefully account for possible adverse domestic macroeconomic effects, including potential negative impacts on the global competitiveness of carbon intensive industries. A well-designed carbon price introduced in a timely manner and complemented by other policies to offset possible side-effects can help increase the economic resilience and sustainability of Trinidad and Tobago's economy and help develop new comparative advantages to successfully compete in a new greener global economy (Box 1).

[31] NDCs are submitted every five years to the UNFCCC secretariat. To enhance the ambition over time, the Paris Agreement provide that successive NDCs will represent a progression compared to the previous NDC and reflect its highest possible ambition. Parties of the UNFCCC are requested to submit the next round of NDCs (new NDCs or updated NDCs) by 2020 and every five years thereafter (e.g., by 2020, 2025, 2030), regardless of their respective implementation time frames. See Nationally Determined Contributions (NDCs) | UNFCCC.

[32] With the CBAM the EU will impose taxes on emissions generated in Trinidad and Tobago, unless these emissions are already subject to domestic carbon pricing. Trinidad and Tobago could consider implementing a domestic carbon tax to capture a portion of these revenues. However, for compliance with WTO rules, such a tax would need to be applied universally to all exports (as well as domestic consumption) of CBAM-covered products having wider macroeconomic, fiscal and trade implications.

Box 1. Considerations in Designing a Carbon Pricing Mechanism

Most petrochemical exporting countries usually support their emission targets with carbon pricing mechanisms (see text table). Carbon taxes and ETSs contribute effectively to the emissions reduction and incentivize the use of low-carbon technologies. At the same time, pricing carbon can have negative impacts on growth, industrial competitiveness, and household consumption (Grainger and Kolstad, 2010; Arlinghaus, 2015; Grigoriev et al., 2020). Therefore, design of a carbon pricing mechanism varies from one country to another accounting for differences in climate ambition, national peculiarities, being aligned with the development agenda (World Bank, 2023).

For instance, the potential adverse effects of carbon pricing on industries and households can be offset by effective revenue recycling or simultaneous reduction in existing taxes. The revenue-neutral carbon tax implemented in the Canadian province of British Columbia in 2008 was paired with concurrent reductions in both corporate and personal income taxes. To alleviate the impact on the economy's growth, a cap on emissions at the Chinese national ETS launched in 2021 is intensity-based; it adjusts depending on the actual output level.

Country (Share of global petrochemical market 1/)	Status of implementation	Emissions coverage	Level of carbon price, USD per tCO2e.
United States (11.6)	5 Subnational ETSs implemented, 2 ETSs and 1 CT under consideration. 3/		
South Korea (8.75)	National ETS implemented (2015).	74.0	11.2
Saudi Arabia (8.16)	…	…	…
Netherlands (5.67)	EU ETS (2005), and CT implemented (2021).	48.8	89.8
Germany (5.31)	EU ETS (2005) and National ETS (2021).	86.6	66.9
China (4.75)	National ETS implemented (2015) and 8 subnational ETSs implemented. 4/	41.3	8.2
Singapore (4.41)	CT implemented (2019)	80.0	3.8
Belgium (3.58)	EU ETS implemented (2005).	35.8	96.3
Japan (3.32)	National ETS under consideration, and CT (Tokyo) implemented (2021).	75.8	2.7
Canada (2.91)	National ETS, and 8 subnational ETSs implemented; National and 5 subnational CT implemented; 1 ETS and 1 CT under consideration. 5/	71.2	45.3
Iran (2.81)	…	…	…
Thailand (2.64)	1 ETS under consideration.	…	…
Russia (2.60)	…	…	…
France (2.54)	EU ETS implemented (2005), and CT implemented (2014).	54.8	65.8
Malaysia (2.29)	ETS under consideration.	…	…
Qatar (2.19)	…	…	…
India (2.17)	…	…	…
Spain (1.76)	EU ETS implemented (2005), and CT implemented (2014).	35.2	92.0
United Arab Emirates (1.58)	…	…	…
Italy (1.45)	EU ETS implemented (2005).	32.6	96.3
Trinidad and Tobago (1.34)	…	…	…
Egypt (1.05)	…	…	…
United Kingdom (1.04)	National ETS (2021).	52.0	57.7
Indonesia (1.03)	National ETS implemented (2023), and national CT under consideration.	26.0	…
Oman (1.01)	…	…	…

Sources: UN Comtrade, World Bank's Carbon Pricing Dashboard, IMF Climate Change Indicators Dashboard, World Economic Outlook, and IMF Staff Calculations.
1/ Refers to average in the period 2018-2022.
2/ Refers to both conditional and unconditional NDCs when applicable, excluding land-use, land-use change, and forestry (LULUCF).
3/ Implemented: RGGI (2009), California (2012), Massachussets (2018), Oregon (2021), and Washington (2023). Pennsylvania and New York ETS, and Hawaii CT under consideration.
4/ Beijing pilot (2013), Tianjin pilot (2013), Shanghai pilot (2013), Guangdong pilot (2013), Shenzhen pilot (2013), Chongqing pilot (2014), Hubei pilot (2014), and Fujian pilot (2016).
5/ ETS National level: Federal OBPS (2019). ETS Subnational level: Alberta (2007), Quebec (2013), GGIRCA (2016), Newfoundland and Labrador (2019), Nova Scotia (2019),
Saskatchewan (2019), New Brunswick (2021), Ontario (2022). CT National level: Canada federal fuel charge (2019). CT subnational level: British Columbia (2008), Northwest territories (2019), Newfoundland and Labrador (2019), Prince Edward (2019), and New Brunswick (2020). Manitoba ETS and CT under consideration.

Given its heavy dependence on the energy sector, Trinidad and Tobago requires a thorough examination of the potential for implementing a carbon pricing mechanism, along with an exploration of potential design options. A number of studies indicate that putting a price on carbon requires special attention to the regulatory design (level and the rate of price increase, emissions coverage, revenue recycling, point of regulation – upstream vs. midstream/downstream, use of offsets, etc.) to smooth out possible adverse macroeconomic effects (Parry, 2012; Stepanov and Makarov, 2021). In Trinidad and Tobago, the authorities could consider exploring a fiscally neutral carbon tax accompanied by a partial reduction in existing taxes (for e.g., royalty or other production-based taxes like Green Fund Levy), but this and other possible options should be investigated further.

Annex I. Quantification of CBAM-related Payments Incurred by European Importers of Goods from Trinidad and Tobago

To quantify the CBAM-related payments, this paper relies on UN Comtrade data on Trinidad and Tobago's export quantities to the EU-27 of products in the fertilizers industry.[33] This information is merged with the greenhouse gas emission intensities for each product estimated by Vidovic, Zore & Moya (2023).

We calculate the CBAM-related payments as follows:

$$Payment_i = \bar{p} \sum_{j=1}^{N} q_{ij} x_{ij}$$

Where q_{ij} represents the average quantity exports of product *j* recorded by country *i* and x_{ij} represents the total carbon intensity associated to product j in country i. $\bar{p}$ refers to the average carbon price at the EU ETS for 2023[34]. Results suggest that CBAM-related payments for Trinidad and Tobago would account for $US189 million which represent about 0.8 percent of GDP, 1.3 percent of the country's total exports, and 46.3 percent of the total fertilizer annual exports to the European Union.

It is important to note that these estimates represent an upper bound and should be read cautiously, as a comprehensive assessment of the CBAM impacts on the economy requires a more detailed analysis with application of a global general equilibrium modelling framework. A lower impact could be expected as the adverse effect of the EU's CBAM on Trinidad and Tobago's exports is likely to be mitigated in the near-term by the induced changes on global trade patterns, such as the strategic behavior of global petrochemical firms which could help redirect some of the country's exports to non-EU markets. Additionally, given Trinidad and Tobago's production exhibits high carbon intensity relative to most of its competitors, the estimates assume the full pass-through of costs from EU importers, who will need to purchase CBAM certificates, to exporting firms. However, the pass-through will depend on commodities' price elasticities and may vary across products. Finally, the immediate CBAM-related costs will also depend on the speed of the mechanism's roll-out, which is planned to align with the gradual elimination of EU ETS free allowances between 2026 and 2034.

[33] We rely on granular information using the HS 2002 nomenclature at the six-digit code level.
[34] 93.03 $US/tCO2e.

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