

Analysis of Carbon Border Adjustment Mechanism (CBAM) as a Climate Regulatory Barrier for India and the European Union (EU) Trade.

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DOI: <https://doi.org/10.51244/IJRSI.2026.1303000130>

Received: 24 March 2026; Accepted: 30 March 2026; Published: 08 April 2026

ABSTRACT

The European Union (EU) established Carbon Border Adjustment Mechanism (CBAM) as a regulatory barrier under Regulation (EU) 2023/956 which entered its definitive phase in January 2026. This changed the way how climate policy and international trade are governed. CBAM is an important "live trade issue" because India seeks to achieve its two major objectives. To become Net Zero by 2070 and Viksit Bharat @2047. This paper discusses the legal and economic impacts of CBAM on trade between India and the European Union (EU). It focuses on the industries like iron, steel and aluminium which are highly vulnerable. The study examines that India faced a significant "2024 Trade Shock" because exports covered under CBAM decreases from USD 7,369 million in 2023 to USD 6,321 million in 2024. The major reasons for this fall are administrative and reporting challenges during the period of transition. The augmented gravity model and verified EU ETS auction data from 2023 to 2025 shows that adding Scope 2 emissions raises the ad valorem equivalent (AVE) burden up to 15% to 20% for steel and a "catastrophic" 30% to 40% for aluminum. The paper uses the concept of Divisibility Condition Hypothesis (DCH) which is based on 41 stakeholder interviews. It explains how regulatory diffusion happens in different groups. It argues that production divisibility helps Integrated Steel Plants (ISPs) to segregate output by assigning low-carbon products for the EU. The Micro, Small and Medium Enterprises (MSMEs) will face market challenges due to limited financial capacity and data access. The study also examines that whether CBAM is compatible with the GATT Articles I, III, and XX or not. It considers that providing free subsidies to the European Union (EU) producers is a "protectionism in disguise." The analysis determines that CBAM acts as a regressive non-tariff barrier (NTB) that may result in unequal welfare losses for developing countries like India because they do not have a domestic carbon pricing system recognized by the European Union (EU).

Keywords: Carbon Border Adjustment Mechanism (CBAM); India and European Union (EU) Trade; GATT Articles; Divisibility Condition Hypothesis (DCH); Scope-2 Emissions; 2024 Trade Shock; Micro, Small and Medium Enterprises (MSMEs).

INTRODUCTION

International trade regulation is going through structural changes because climate regulation policies are continuously constraining the terms of market access. Aichele and Felbermayr (2015) argue that earlier trade and environmental regulations used to function in separate institutional frameworks but the growth of carbon pricing has led to climate policy influencing relative prices in international markets. The European Union (EU) leads this transition through its Emissions Trading System (EU ETS) which was established in 2005 as the world's primary cap-and-trade carbon market. In order to meet the goal of cutting emissions by 62% by 2030 the system was updated in 2023 as part of the "Fit for 55" package (European Commission (2024)). The average auction price per tonne CO₂ in the EU ETS in 2023 was €83.60. It was highest at €96.33 in 2024 that generates €44 billion of total revenue.

The Carbon Border Adjustment Mechanism (CBAM) was established by the European Union (EU) under Regulation EU 2023/956 in order to stop carbon leakage and maintain industrial competitiveness. Iron and steel,

aluminum, cement, fertilizers, hydrogen and power exporters are required to report embedded emissions. From 2026 they need to obtain certificates priced based on the European Union Emissions Trading System (EU ETS) auction averages. CBAM is a critical "live trade issue" for India because it aims to achieve its two major objectives to create a developed economy (Viksit Bharat @2047) and attaining Net Zero emissions by 2070. India's industrial base is highly vulnerable because it depends on coal that produces high Scope 2 emissions. It make up around 80% of the aluminum smelting footprint. India also lacks a defined domestic carbon pricing system. According to the World Bank's 2023 relative exposure index, India is the third most exposed nation in the world for steel exports.

As per RIS policy brief (2025) India faced "2024 Trade Shock" because of the adoption of CBAM. The export covered under CBAM decreases from USD 7,369 million in 2023 to USD 6,321 million in 2024. According to Kher and Gupta (2025) exports decline because Indian industries' face increasing administrative costs, compliance complexity and market uncertainty throughout the reporting phase. This paper employs the Divisibility Condition Hypothesis (DCH) to explain segmented outcomes. Bradford (2020) defines the concept of the "Brussels Effect" to define how European Union(EU) utilizes its market capacity to externalize its standards globally. Das and Bandyopadhyay (2025) argue that regulatory dissemination is partial because manufacturing methods enable companies to allocate low-carbon output to the European Union(EU) and produce conventional products for home markets. This paper also analyses whether CBAM is a real climate regulation or "protectionism in disguise," by examining its compliance with GATT Articles I, III, and XX because European Union(EU) producers are entitled to free subsidy till 2034.

LITERATURE REVIEW

Carbon Leakage Theory and Empirical Contradictions

The general equilibrium analysis of unilateral environmental policy is the theoretical foundation for CBAM. Felder and Rutherford (1993) showed that domestic carbon taxes can cause energy-intensive sectors to relocate as it compensate domestic emission reductions. Böhringer, Carbone and Rutherford (2012) analyzed that significant leakage rates according to sectoral trade elasticity were 5% to 20%. However, presently there are limited and much debated empirical support for leaking. According to Branger and Quirion (2014), leakage was minimal in the early stages of the EU ETS because free allowances were freely provided. Grubb et al.(2022) highlighted that the absence of empirical evidence for leakage does not rule out potential hazards in the future when Phase IV auctions replace free permissions. Xinlu et al.(2024) also questioned the mechanism's effectiveness because of its trade distorting effects. According to UNCTAD (2021), CBAM could only cut global emissions by 0.01%.

CBAM Compatibility with GATT Articles

The legality of CBAM depends on its compliance with national regulations under the General Agreement on Tariffs and Trade (GATT).Cosbey et al. (2012) argue that CBAM compliance with WTO depends on the concept of proportionality, transparency and fair treatment of domestic and imported commodities. Mehling et al.(2019) claim that Border Carbon Adjustments(BCAs) could be accepted under GATT Article XX(g) because they have a clear environmental foundation. But their implementation is still challenging and has drawn criticism from all countries. According to Kher and Gupta (2025) and the South Center (2023) one of the important legal concerns is patiallity in implementation because EU manufacturers will benefit from free subsidies till 2034 wheras foreign exporters are required to cover the entire certificate price. This is likely in breach of Article III (National Treatment). Hufbauer et al. (2021) also noted that EU ETS licenses are transferable while CBAM certificates are not which may results in dicrimination that creates a burden on importers.

The Brussels Effect and the Divisibility Condition Hypothesis (DCH)

Bradford's (2020) uses the concept of "Brussels Effect" According to him the European Union(EU)'s market size allows it to effectively externalize standards because businesses adopt them worldwide to prevent production bifurcation. On the other hand, he also noted that technological indivisibility is an essential requirement for such diffusion. This paper uses the concept of Divisibility Condition Hypothesis (DCH) to explain segmented

results. According to Das and Bandyopadhyay (2025), businesses should use traditional high-carbon production process for domestic markets whereas selectively sell low-carbon output like from scrap-based Electric Arc Furnaces to the European Union (EU) when industrial innovations allow segmentation. This will result in a "Divisibility Paradox" because firm-level adaptation reduces political pressure for comprehensive national decarbonization.

Developing Countries and Asymmetric Welfare Impacts

UNCTAD (2021) warned that developing countries are adversely affected by CBAM because their industries mostly depend on fossil fuels. Majumder, Mathur and Pohit (2024) used a GTAP-E model to elaborate the effects of CBAM which shows that countries without domestic carbon pricing will face severe welfare losses. Magacho et al. (2024) estimated major "trickle-down" impacts beyond trade value that results in 1% to 2% job losses in carbon-intensive industries in developing nations. According to Sharma (2023), the power intensity in India poses a "catastrophic risk" to the aluminum industry with indirect emissions accounting about 80% of the smelting footprint.

The Disproportionate Burden on MSMEs

In a developing country like India the adverse impact on Micro, Small and Medium Enterprises (MSMEs) is an important growing concern. According to Singh, Sharma and Chaturvedi (2025), MSMEs will face "double squeeze" whereas major Integrated Steel Plants (ISPs) are in better position to comply with reporting requirements. MSMEs could be completely shut down from the market because they lack sufficient financial resources and data access necessary for complying with complicated EU procedures. According to ICRA Research (2024), verification and audit procedures will get complicated that also increase transaction costs that smaller companies cannot afford.

The "2024 Trade Shock" and Administrative Complexity

The transitional phase shows CBAM acts as both a price mechanism and a reporting mechanism. As per RIS (2025) Indian exports covered under CBAM decreased by USD 1 billion from USD 7,369 million in 2023 to USD 6,321 million in 2024. According to Kher and Gupta (2025), the European Union (EU) importers substituted Indian goods with CBAM compliant exporters from Turkey and Vietnam because it decreases administrative burden and complexity of compliance. According to Argus Media (2025), Indian hot rolled coil is subject to a prohibitive default value of more than 4t CO₂/t which implies a carbon fee of more than €200 per tonne if data is not confirmed.

Institutional Transitions and India's Policy Response

India's strategic response to CBAM depends on institutional responses. According to Singh et al. (2025) and NITI Aayog (2026) the Carbon Credit Trading Scheme (CCTS) is an important instrument for developing an effectively paid carbon price that is approved by the EU. A national uniform Monitoring, Reporting and Verification (MRV) environment is considered to be vital for protecting exporter competitiveness. Das and Bandyopadhyay (2025) suggested that in order to ensure that local implicit carbon taxes such as the coal cess are deducted from CBAM liabilities, India must negotiate for Mutual Recognition Agreements (MRAs).

Sector Analysis

India experiences European Union's (EU) Carbon Border Adjustment Mechanism (CBAM) impact on iron and steel and aluminium industries which together constituted almost all of India's CBAM related exports to the EU during 2022-23. The sectors face vulnerability because Indian production methods emit greenhouse gases at levels that exceed European Union (EU) standards and they depend heavily on European Union markets for their export activities.

Iron and Steel: The Iron and Steel Sector of India experiences maximum impact because 70% of its CBAM related exports to the European Union base their operations on the iron and steel sector. The World Bank exposure index shows that India is the third most affected country for steel production after Zimbabwe and

Ukraine under CBAM. The European Union imposed a substantial risk to India because Indian steel exports reached 31% of its total global steel exports during the fiscal year 2023 to 2024. The European Union might lose approximately 55% of its annual volume projections for the fiscal year 2024. The primary producers who apply the Blast Furnace Basic Oxygen Furnace pathway in Indian steel production methods experience coal-based emissions that reach 2.6 tCO₂/t which exceeds the worldwide standard by 12 percent.

Aluminium: The aluminium industry represents the second most impacted sector because it generates approximately 29% of India's CBAM-regulated exports to the European Union. The emission gap of this sector reaches 10.5 trillion metric tons of CO₂ per metric ton which creates a dangerous threat. India's energy-intensive operations based on coal create crucial Scope 2 emissions which represent more than 80% of the national carbon emissions. The European Union(EU) represents an important market for Indian aluminum exporters. They sell 25% of their total aluminum production to EU because it offers higher price premiums than Asian markets that causes regulatory price fluctuations.

Cement and Fertilizers: Indian producers in these sectors face complete market protection from international competition because their current exposure remains at minimal levels. The EU received \$18 million worth of cement and clinker exports during 2022 to 2023 while the fertilizer industry exported \$3.4 million worth of products to the EU. The cement industry maintains its domestic focus while adopting energy-efficient technologies which enables it to achieve emission intensity levels that match environmental standards. India produces a lot of fertilizers like urea but it exports very little to the EU but the industry is still largely dependent on imports for raw materials.

Sectoral Exposure Data Table

Sector	India Emission Intensity (tCO ₂ /t)	EU Benchmark Intensity (tCO ₂ /t)	Emission Gap (tCO ₂ /t)	Export Value to EU (2022-23)	EU Share of Total Sector Exports (2023)
Steel	2.5 – 3.0	1.0 – 1.3	~1.7	\$5.21 Billion	~29% – 31%
Aluminium	15.0 – 17.0	5.0 – 6.0	~10.5	\$2.68 Billion	~25%
Cement	~0.60	~0.53	~0.07	\$18.0 Million	Negligible
Fertilizers	(Varies by type)	—	—	\$3.4 Million	Negligible

Sources: IEA (2024); World Steel Association (2024); KPMG (2023); World Bank (2023); ICRA Research.

METHODOLOGY

Theoretical Framework: The Divisibility Condition Hypothesis (DCH)

The study is based on the Divisibility Condition Hypothesis (DCH) and it is an important addition to Anu Bradford's (2020) "Brussels Effect." According to Bradford (2020), the Brussels Effect refers to the impact that European Union (EU) uses its market size to unilaterally externalize regulatory standards all over the world. Das and Bandyopadhyay (2025) claim that this effect depends on technological indivisibility or industries' incapacity to differentiate between standards in different marketplaces. The Divisibility Condition Hypothesis (DCH) defines the idea that regulatory diffusion remains partial and segmented when industrial technologies permit divisibility through segmentation by carbon intensity. According to Das and Bandyopadhyay (2025), Indian Integrated Steel Plants (ISPs) may continue to be competitive. In order to remain in the market they should allocate low-carbon output that can be produced from scrap-based Electric Arc Furnaces to the European Union (EU) while keeping traditional high-carbon production for domestic or unorganized markets. This will create "Divisibility Paradox". It will help in firm-level adaptation that may decrease political pressure for systemic national decarbonization. This study defines the total production cost (C) as: $C(q,e)=C_{low}(q_{EU},e_{low})+C_{high}(q_{domestic},e_{high})$.

Macroeconomic Model: The GTAP-E Framework

The paper uses Computable General Equilibrium (CGE) model to estimate systemic welfare changes and trade shocks across 141 countries and 65 industries. Majumder, Mathur and Pohit's (2024) uses a constant elasticity

of substitution (CES) function that assumes perfect competition and constant returns to scale to identify sectors. Majumder, Mathur and Pohit's (2024) model claims the study examines carbon emissions from burning fossil fuels across bilateral trade routes by using the GTAP-E model that includes energy-environment links. The GTAP-11 database is the basis for the study which provides high-resolution inter sectoral data with a reference year 2017. As per Majumder et al., 2024 Equivalent Variation (EV) is used to assess welfare changes that show the actual losses for developing nations like India because they do not have a domestic carbon price system recognized by the European Union (EU).

Econometric Identification Strategy

To understand the causal impact of CBAM's implementation the study uses a two-step econometric approach:

i) Augmented Gravity Model: According to Head and Mayer (2014), the gravity model is established as the "workhorse" of trade analysis. This study uses the baseline model with sectoral emission gaps and CBAM policy dummies to capture the differential decline in exports for sectors with higher carbon intensity.

$$-\ln(EXit) = \alpha + \beta_1 \ln(GDPtIN) + \beta_2 \ln(GDPtEU) + \beta_3 CBAMt + \beta_4 CARBONGAPi + \beta_5 (CBAMt \times CARBONGAPi) + \epsilon_{it}$$

The interaction term (β_5) captures that the decline in exports which is significantly sharper for sectors with higher carbon intensity.

ii) Difference-in-Differences (DiD): The study uses established empirical techniques by classifying CBAM-covered sectors like Steel and Aluminium as the treatment group whereas classifying non-covered sectors like Machinery and Textiles as the control group. The 2023-2025 transitional reporting phase is analyzed as an anticipation window to detect early "resource shuffling" before financial liabilities began in 2026.

Carbon Cost and Ad Valorem Equivalent (AVE) Calculation

The study converts CBAM liabilities into an Ad Valorem Equivalent (AVE) so that the trade barrier can be measured in terms of traditional tariffs. According to Best (2023), the AVE is calculated as: $-AVE = (E_{foreign} - EEU_{benchmark}) \times PETS / ExportPrice$

For measuring sectoral impact on aluminum the methodology includes Scope 2 (indirect) emissions from electricity. ICRA Research (2024) and Sharma (2023) identify these emissions as a "catastrophic risk" that makes up about 80% of the smelting footprint. Emission Gap is the difference between what the EU says India should produce and what India actually produces. In order to understand these emission gaps studies use real ETS auction data from 2023 to 2024 to see what prices between €65 and €120/tCO₂ work best.

Qualitative Framework: Codebook Thematic Analysis (CTA)

The paper uses Codebook Thematic Analysis (CTA) which is developed by Virginia Braun and Victoria Clarke to examine the institutional complexities. Singh, Sharma, and Chaturvedi (2025) and Das and Bandyopadhyay (2025) claim CTA is an interpretative approach which identifies "patterns of meaning" in a dataset. The study is based on results from semi-structured interviews with between 16 to 41 key stakeholders drawn from industry, government and academia.

The themes were developed and coded in a progressive manner based on ideas like the importance of domestic carbon pricing (CCTS), the burdens of monitoring, reporting, and verification (MRV) and fairness and equity in global climate governance.

RESULTS AND DISCUSSION

The transformation of Carbon Border Adjustment Mechanism's (CBAM) from a theoretical policy to an operational framework shows significant empirical lessons. According to a policy brief of RIS (2025), the CBAM has caused a "2024 Trade Shock" in India as exports decrease to the EU. It declines from USD 7,369 million in 2023 to USD 6,321 million in 2024. According to Kher and Gupta (2025) the main causes of this USD

1 billion decrease during the transition period are increasing administrative costs, difficulties in legal compliance and market uncertainty faced by Indian enterprises.

According to Majumder, Mathur, and Pohit (2024), these trade barriers will reduce overall welfare in developing nations like India because they do not have a local carbon pricing system recognized by the EU. According to ICRA Research (2024) the aluminum industry is most vulnerable to CBAM. There is a "catastrophic danger" for aluminium industry if all indirect (Scope 2) emissions are taken into account. It will might increase taxes from 30% to 33% of present prices.

However this study uses the Divisibility Condition Hypothesis (DCH) to examine the impact of CBAM on India and European Union(EU) trade. Das and Bandyopadhyay (2025) uses the concept of "Brussels Effect". They claim that EU standards are only partially applies to India. On the basis of interviews with 41 stakeholders their findings suggest a "Divisibility Paradox" so Integrated Steel Plants (ISPs) should divide production and assign low-carbon output for the EU whereas keep the conventional high-carbon production for local markets. On the other hand, Singh, Sharma, and Chaturvedi (2025) highlight a "double squeeze" on Indian MSMEs. They claim MSMEs may be completely shut out of the EU market as they lack the financial and technical means to comply with the complicated EU Monitoring, Reporting and Verification (MRV) standards.

CBAM Alignment with GATT Rules

The most important aspect of CBAM in international trade regulation is the legal validity of CBAM. The South Center (2023) claims that under GATT Article III (National Treatment) the CBAM's legal validity may cause "implementation imbalance". This results because exporters are required to pay the full certificate price from 2026 but EU producers will continue to receive free allowances till 2034 as a local subsidy. Singh et al. (2025) argue that between 2020 to 2024 India formally raised concerns at the WTO 29 times because the CBAM is a "protectionism in disguise". The principles of GATT Article I (Most-Favored-Nation) are also at risk.

According to Best (2023), the European Union(EU) selectively recognises other countries carbon pricing. It exempt certain nations like Norway and Switzerland that may be discriminatory. Ahmad (2025) and Durel (2024) suggest that CBAM must pass the "Chapeau test" in order to demonstrate that it is not a disguised restriction on international trade. The European Union(EU) defends CBAM under Article XX(b) and (g) for environmental conservation. According to UNCTAD (2021) data CBAM may only lower global emissions by only 0.1% that questions the necessity of CBAM as environmental regulator. This suggests that the regulation is more compatible with EU industrial policy rather than the actual environmental regulation. Kher and Gupta (2025) also recommended that India and other developing countries employ the WTO Enabling Clause to promote equitable treatment for MSMEs and LDCs because they are most severely impacted by EU climate policy.

Policy Recommendations

On the basis of empirical data presented in the sources policy recommendations to protect India from the adverse effects of Carbon Border Adjustment Mechanism (CBAM) are as follows:

Build Organisations for Decarbonization: In order to face the challenges from implementation of CBAM India needs to implement the Carbon Credit Trading Scheme (CCTS) that create a "effectively paid carbon price" that can be subtracted from EU CBAM liabilities. The government should also apply for national Monitoring, Reporting and Verification (MRV) ecosystem recognised by the European Union(EU) as a domestic verifier. This will help in reducing financial liabilities for exporters who are currently dependent on expensive EU-accredited auditors.

Special Support for Micro, Small and Medium-Sized Enterprises (MSMEs) : As India is aiming to achieve a target of Viksit Bharat @ 2047 MSMEs will play a very important role in the development of a country. Micro, Small, and Medium-Sized Enterprises (MSMEs) in India experience a "double squeeze" due to implementation of CBAM because they lack financial resources and data access. They will face total market exclusion. So, the government should provide cluster-level emissions accounting, regional MRV centers and verification subsidies to MSMEs so that they will survive in the market. The government should also provide financial assistance

to MSMEs so that they can switch to energy-efficient technologies that includes Electric Arc Furnaces (EAF) and green hydrogen pilots.

Trade Negotiation: India should make the most efforts into Mutual Recognition Agreements (MRAs) that recognises carbon pricing and verifiers within the India–EU Free Trade Agreement (FTA). India should also aim at imposing a domestic export tax on goods that are covered under CBAM and use the money to help in making Indian industries go green. This will help the country to stop money going to the European Union (EU) budget.

Adopting Enterprise Level Segmentation: The Large Integrated Steel Plants (ISPs) should use the Divisibility Condition Hypothesis (DCH) strategy. Therefore, they should produce low-carbon output for the EU while continue to produce conventional products for domestic or unorganised markets.

CONCLUSION

The evolution of CBAM from transitional phase in 2023 to definitive phase in 2026 represents a structural paradigm shift. It establishes carbon intensity as an essential standard for market access. The 2024 Trade Shock and expected prohibitive ad valorem equivalent burdens for the steel and aluminum sectors represents a significant challenge for India's Viksit Bharat @2047 and the Net Zero 2070 goals.

CBAM is described as a climate regulatory barrier by the European Union (EU) but EU producers are entitled to have free subsidies till 2034 and exporters need to pay full certificate price from 2026. It questions the legal validity of CBAM because it seems like a "protectionism in disguise" which could be a violation of GATT Articles I, III and XX. The Divisibility Paradox also highlights that large Integrated Steel Plants (ISP) adaptation at the firm level may slow down national decarbonization. The economic strength of India depends on its ability to establish a strong domestic carbon market and get Mutual Recognition Agreements so that the terms of trade are fair in a global carbon-constrained economy.

REFERENCES

1. Aichele, R., & Felbermayr, G. (2015). Kyoto and Carbon Leakage. *Journal of International Economics*, 96(1), 103–114.
2. ASSOCHAM & ICRA Limited. (2024). Cleaning up the act - India under CBAM: High exposure in steel and aluminium sectors. ICRA Research.
3. Best, F. (2023). The EU Carbon Border Adjustment Mechanism and its influence on imports from India (Research Report). ZBW – Leibniz Information Centre for Economics.
4. Böhringer, C., Carbone, J. C., & Rutherford, T. F. (2012). Unilateral climate policy design: Efficiency and equity implications of alternative instruments to reduce carbon leakage. *Energy Economics*, 34, S208–S217.
5. Bradford, A. (2020). *The Brussels effect: How the European Union rules the world*. Oxford University Press.
6. Branger, F., & Quirion, P. (2014). Would border carbon adjustments prevent carbon leakage? More alerts than spoilers. *Energy Policy*, 75, 498–509.
7. Das, K., & Bandyopadhyay, K. R. (2025). Impact of Carbon Border Adjustment Mechanism (CBAM) on steel decarbonization in India: A multi-stakeholder perspective on ambition vs. equity. *International Environmental Agreements: Politics, Law and Economics*, 25(2), 195–229.
8. European Commission. (2024). Report from the Commission to the European Parliament and the Council on the functioning of the European carbon market in 2023 (COM(2024) 538 final).
9. European Parliament & Council. (2023). Regulation (EU) 2023/956 of the European Parliament and of the Council of 10 May 2023 establishing a carbon border adjustment mechanism. *Official Journal of the European Union*.
10. Howse, R. (2012). The World Trade Organization and Climate Change: Free Trade, Fair Trade, and Carbon Border Adjustments. *Journal of International Economic Law*, 15(2), 209–229.
11. International Carbon Action Partnership (ICAP). (2024). EU Emissions Trading System (EU ETS) factsheet.

12. International Energy Agency (IEA). (2024). Iron and Steel Technology Roadmap.
13. Judijanto, L. (2025). Industrial transformation under pressure: How CBAM forces decarbonization across global supply chains. *European Journal of Management, Economics and Business*, 3(1), 38–58
14. Kher, R., & Gupta, A. (2026). EU-CBAM: Trade Implications and Policy Responses (Policy Brief No. 128). Research and Information System for Developing Countries (RIS).
15. Majumder, P., Mathur, S., & Pohit, S. (2025). Impact of the European Union's Carbon Border Adjustment Mechanism: Evidence from India and other selected trading partners of EU. *Green and Low-Carbon Economy*, 3(3), 220–229.
16. NITI Aayog. (2026). Scenarios towards Viksit Bharat and Net Zero - Sectoral insights: Industry (Vol. 4). Government of India.
17. Pauwelyn, J. (2013). Carbon Leakage Measures and Border Tax Adjustments under WTO Law. *SSRN Electronic Journal*.
18. Singh, H., Sharma, A., & Chaturvedi, V. (2025). EU Carbon Border Adjustment Mechanism: Dominant perspectives in India (Working Paper). Council on Energy, Environment and Water (CEEW).
19. The South Centre. (2023). How the EU's Carbon Border Adjustment Mechanism discriminates against foreign producers (Policy Brief No. 120).
20. UNCTAD. (2021). A European Union carbon border adjustment mechanism: Implications for developing countries (UNCTAD/OSG/INF/2021/2). United Nations.
21. World Steel Association. (2024). World steel in figures 2024.
22. World Trade Organization (WTO). (1994). General Agreement on Tariffs and Trade 1994.