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# **Sustainable Development and Green Economy: New Frontier for International Taxation?**

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*A bright mind  
sees opportunity  
where no one else does*

Enrico Mattei

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## **Abstract**

### **Sustainable Development and Green Economy: New Frontier for International Taxation?**

This work explores the role played by the European Union's Green Deal and the Carbon Border Adjustment Mechanism (CBAM) in reshaping global trade dynamics and the connected international taxation paradigms.

First, it intends to provide an in-depth analysis of the EU Green Deal and CBAM, shedding light on their implications for environmental sustainability and economic competitiveness.

Secondly, it investigates the CBAM spillover effect on EU trade partners, offering insights into the challenges to be faced and the possible opportunities for the affected countries.

Finally, the focus shifts to the interaction between CBAM, sustainability, and global development, with an emphasis on the United Nations Sustainable Development Goals.

The survey aims at fostering a comprehensive understanding of CBAM's transformative potential, its implications for sustainable development, and its booster in shaping the future of international taxation policies, where the focus on indirect taxation is set to take center stage in the future.

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## INTRODUCTION

In the global pursuit of addressing climate change and fostering sustainable economies, international carbon taxation has emerged as a pivotal topic of discussion. This focus is further amplified by recent fiscal initiatives announced in the context of the European Green Deal (EGD), which aims to make the European Union (EU) a trailblazer in environmental sustainability and economic development.

The conversation surrounding international carbon taxation has been significantly enriched by substantial fiscal initiatives outlined within the European Green Deal framework, as explored in the following chapters.

Chapter 1 delves into the creation of a “Carbon Border Adjustment’ Mechanism” (here in after CBAM) under the European Green Deal. CBAM imposes obligations on EU importers to purchase carbon allowances, potentially impacting the competitiveness of imported goods. Its central objective is to prevent the relocation of carbon emissions to countries with less demanding climate regulations, thereby ensuring a level playing field. However, CBAM’s successful implementation may encounter challenges in adhering to World Trade Organization (WTO) rules, which stipulate equal treatment of similar products and non-discrimination between domestic and foreign producers.

Chapter 2 examines the potential consequences of the CBAM on EU trade partners, particularly developing and emerging economies. This analysis explores two extreme scenarios to assess potential outcomes. The first scenario examines maximum carbon revenue generated for the EU if countries’ exports to the EU remain unaffected, while the second scenario assumes that all exports and input suppliers for industries producing these export goods are impacted.

The overview highlights countries that would generate the most carbon revenues and those more exposed to CBAM's effects, particularly in East Europe and Africa. Equitability concerns for non-EU economies arise, with suggestions such as returning revenue from carbon import adjustments to paying countries or utilizing it for technology transfer and international climate finance. The principle of common but differentiated responsibility is also advocated, emphasizing the role of developed countries in technology diffusion for low-carbon transitions in energy-intensive industries.

Chapter 3 explores the concept of Carbon Border Adjustment (CBA) within the broader context of international taxation. CBAs, including CBAM, involve charging the carbon content of imported products to ensure they face equivalent treatment to domestic carbon pricing.

The chapter outlines three primary reasons for implementing CBAs: safeguarding the competitiveness of domestic industries, reducing emissions leakage, and strengthening international incentives for carbon pricing. Designing CBAs requires careful consideration of sectoral coverage, measurement of embodied carbon in traded goods, treatment of exports, and adherence to the World Trade Organization (WTO) rules.

Along with the technical aspects of CBAs, Chapter 3 emphasizes their potential importance in the context of aggressive climate mitigation policies and their impact on global efforts to combat climate change. The analysis underscores the importance of considering the joint impacts of carbon pricing and CBAs.

In conclusion, the analysis was intended to explore the intricacies of international carbon taxation and its role within the European Green Deal framework. They delve into the challenges and opportunities presented by the Carbon Border Adjustment Mechanism (CBAM) and its implications for EU trade partners.

Additionally, they shed light on the broader context of Border Carbon Adjustments (BCAs) and their significance in the realm of international taxation, sustainability, and development.

In short, the scope is to stimulate reflections regarding the intricate interplay among three pivotal aspects in the discourse on forthcoming international taxation: environmental policy, global trade, and equitable economic growth.

# CHAPTER 1: THE EU GREEN DEAL AND THE CBAM

## 1.1 The European Green Deal in a nutshell.

### 1.1.1. The Green Deal Context.

On December 11, 2019, the 14<sup>th</sup> President of the European Commission, Ursula von der Leyen, formally introduced the European Green Deal (European Commission, 2019)<sup>1</sup>, a significant milestone in the European Union's commitment to addressing climate change and promoting environmental sustainability. The Green Deal is based on the Commission proposal to strengthen the efforts to cut greenhouse gas (GHG) emissions 55% of 1990 levels by 2030 (European Council, 2020)<sup>2</sup>, the European Union should then reach net-zero carbon emissions by 2050 (European Commission, 2020)<sup>3</sup>.

Following the official announcement, the European Commission began developing a vast array of legislative proposals and policy instruments to translate the goals of the European Green Deal into concrete action (Bianchi et al, 2020; Colli, 2020)<sup>4</sup>. These initiatives encompassed efforts to decrease greenhouse gas emissions, encourage renewable energy use and energy efficiency, propel the circular economy forward, safeguard biodiversity, and ensure a just transition for communities disproportionately impacted (Fetting, 2020; Siddi, 2020)<sup>5</sup>.

In its essence, the Green Deal will serve as a strategic blueprint for a series of measures that will impact the economic structure of the EU and will inevitably have relevant international significance. The comprehensive plan envisions using the modern climate crisis as an opportunity to create a carbon-neutral future by reshaping the European economy.

The ambitions of the plan are already clear in its terminology, specifically the use of the term “deal” suggests an aspiration for a legacy reminiscent of that of the 32nd president of the United States of America, Franklin Delano Roosevelt, promising a new social contract for Europe.

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<sup>1</sup> EUROPEAN COMMISSION, *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of The Regions, The European Green Deal*. Brussels, 2019, 1-24.

<sup>2</sup> EUROPEAN COUNCIL, *General Secretariat of the Council, European Council meeting conclusions*, Brussels, 2020, 1-14.

<sup>3</sup> EUROPEAN COMMISSION, *Communication from the commission: Proposal for a regulation of the European Parliament and of the Council establishing the framework for achieving climate neutrality and amending regulation 2018/1999 (european climate law. proposal for a regulation of the European Parliament and of the Council*. Brussels, 2020, 1-46.

<sup>4</sup> BIANCHI M., COLANTONI L., FRANZAL., ANTONUCCI R., FAVAZZA A., - *Green Deal Watch: A green recovery from the COVID-19 crisis?* Istituto Affari Internazionali (IAI), Issue no. 1, 2020, 1-31. See also COLLI F., *The end of 'business as usual'? COVID-19 and the European Green Deal*, Egmont Institute European Policy Brief no. 60, 2020, 1-5.

<sup>5</sup> FETTING C., - *The European Green Deal*, Vienna, 2020, ESDN Office, Report, 1-22. See also: SIDDI M., *The European Green Deal: Assessing its current state and future implementation*. FIIA Working Paper, no. 114, 2020, 1-46.

Differently from previous EU industry policies, which faced limitations due to the absence of adequate fiscal powers (European Commission, 2016)<sup>6</sup> and a mandate for industrial restructuring akin to those held by national governments, the European Green Deal carries the political weight and the resources necessary to overcome these constraints on Brussels' authority.

The EU's ambitions bring forth two distinct responsibilities. Internally, as the EU pursues a process of restructuring its internal market, it is essential to thoroughly evaluate all potential domestic consequences. In this regard, it should be underlined that the European Commission presented a detailed plan comprising 47 action points (European Commission, 2019)<sup>7</sup>, including a new EU-wide industrial strategy, poised to reshape the internal market landscape significantly (Lee-Makiyama, 2021. Gómez, 2021)<sup>8</sup>.

Up to date, EU has implemented strategies to tackle carbon leakage primarily through shielding-based methods. These approaches involve compensating eligible businesses for the carbon costs they incur because of the Emissions Trading System (ETS); eligibility for such compensation is typically limited to sectors of the economy that exhibit high levels of emissions intensity and are heavily involved in international trade (Gatzen et al., 2023)<sup>9</sup>.

The rationale behind this targeting is the recognition that these sectors are particularly vulnerable to competitive challenges and carbon leakage risks, especially in a global context where the stringency of climate policies varies significantly.

Currently, eligible industries within the EU can avail themselves of shielding through two primary mechanisms:

- firstly, they may receive compensation for direct costs triggered by the ETS, wherein eligible firms are granted a limited number of EU Allowances (EUAs) at no cost to cover a portion of their direct emissions, in accordance with EU-wide regulations;

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<sup>6</sup> EUROPEAN COMMISSION - *Study on the potential and limitations of reforming the financing of the EU budget*. 2016, 1- 197.

<sup>7</sup> EUROPEAN COMMISSION - *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of The Regions, The European Green Deal*. Brussels, 2019, 1-24. Annex to the Communication on the European Green Deal Roadmap - Key actions. Among the key actions: Proposal for a carbon border adjustment mechanism for selected sectors; EU Industrial strategy; Propose legislative waste reforms; Review of the Alternative Fuels Infrastructure Directive and the Trans European Network – Transport Regulation; Measures to support deforestation-free value chains; Revision of measures to address pollution from large industrial installations.

<sup>8</sup> LEE-MAKIYAMA H., - *The EU Green Deal and Its Industrial and Political Significance*. ECIPE, European Centre for International Political Economy. 2021, 1 – 10. On the topic of industrial relevance of the Green Deal, see also GÓMEZ J. F., - *The European Green Deal and the Energy transition: challenges and opportunities for industrial companies*. Boletín de Estudios Económicos, Issue 76, 2021, 191-211. The article presents the relevance of the innovation policies envisioned by the Green Deal and notes that “*new strategic approach by the eu to innovation policies must be coupled with new, innovative ways to finance sustainable projects facing technological, market and regulatory uncertainty*” (see p. 205).

<sup>9</sup> GATZEN C., PEICHERT P., BALACHANDAR V., BREKENRIDGE A., *Carbon Border Taxes: help or harm to European industry?* in *Frontier Economics*, 10 September 2023, Figure 1.

- secondly, Member States have the option to provide financial compensation to eligible firms for indirect costs incurred through electricity prices influenced by carbon costs, subject to compliance with state aid rules.

In both cases, the compensation provided is tied to benchmarks based on the “*best available technology*”. If the current scheme offers certain advantages, such as simplified administration due to its exclusive focus on domestic producers reporting emissions, it also presents notable drawbacks. These include the sacrifice of potential auction revenues by Member States, limiting opportunities for tax reduction, and diminishing effectiveness over time<sup>10</sup>.

Moreover, to effectively limit GHG emissions, focusing exclusively on domestic production would be insufficient, trade practices also require extensive reform. A purely continental strategy could pose the threat of merely displacing polluting industries abroad, or increasing imports of goods with high environmental footprints; therefore, the ambition of the European Green Deal has been extended beyond the Union’s borders (Leonard et al, 2021)<sup>11</sup>.

To address these challenges and to ensure equitable treatment between foreign and domestic industries, the European Commission has introduced the Carbon Border Adjustment Mechanism (CBAM). This innovative approach aims to establish parity for products produced within the EU market and imported from abroad, by imposing a tax on imports equivalent to the carbon emissions penalty faced by domestic producers.

Additionally, exporters of EU goods would receive tax refunds, thereby preventing them from facing a competitive disadvantage in foreign markets where local producers are not subject to similar emissions penalties<sup>12</sup>. In essence, the CBAM is envisaged as a comprehensive solution to combat carbon leakage and unfair competition, striving to uphold a level playing field both domestically and internationally while incentivizing global emissions reductions.

Recognizing the international influence of the proposal, the European Green Deal openly poses the goal of positioning Europe as a “geopolitical force through sustainability” (Lee-Makiyama, 2021; Leonard et al, 2021)<sup>13</sup>. The relevance of the proposal sparked a powerful international debate over

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<sup>10</sup> As the ETS cap decreases in the future, resulting in higher EU Allowance (EUA) prices, the impact of the scheme’s “cross-sectoral correction factor” (CSCF) is expected to intensify. This factor, designed to ensure that the allocation of free certificates to shield relevant industries from carbon leakage risks remains within the 43% limit mandated by law, may leave a significant “cost gap” for industries directly emitting carbon, thereby weakening the intended shielding effect and undermining the objective of maintaining a level playing field.

<sup>11</sup> LEONARD M., PISANI-FERRY J., SHAPIRO J., TAGLIAPIETRA S., WOLFF G. B., *The geopolitics of the European green deal*. Policy contribution no. 04, European Council on Foreign Relations, 2021, 1 – 23, noted that “*The EU produces less than 10 percent of global greenhouse-gas emissions. This implies that to have an impact on global warming, the EU needs to push the green transition beyond its borders.*” (see p. 20).

<sup>12</sup> See Figure 4 in the Appendix for a simplified understanding of the functioning of the system.

<sup>13</sup> LEE-MAKIYAMA H., *The EU Green Deal and Its Industrial and Political Significance*. ECIPE, European Centre for International Political Economy. 2021, p. 3. See also: LEONARD M., PISANI-FERRY J., SHAPIRO J.,



its legitimacy and effects, specifically “The plan has produced howls of protest from EU trade partners [...] This includes public criticism from major economies such as China, India, Japan, and the United States” (Overland, Sabyrbekov, 2022)<sup>14</sup>.

In order to comprehend the potential motivations behind major economies’ criticism of the Green Deal, a recent multifaceted analysis (Overland, Sabyrbekov, 2022)<sup>15</sup> highlighted the following parameters: trade dynamics with the EU, carbon intensity of exporting countries’ economies<sup>16</sup>, track record of opened confrontations in the WTO, public sentiment on climate change, and innovation capacity.

The trade dynamics variable considered both the foreign countries’ exports to the EU, predicting nations heavily reliant on exporting CBAM-covered products to the EU market to oppose the project, and the proportion of EU exports to each foreign country relative to total EU exports, factoring the likelihood of trade retaliation against the EU.

Furthermore, the model considered the track record of confrontation in WTO disputes of each country to reflect the likelihood of legal challenges moved against CBAM; the higher the number of past WTO disputes initiated by a country, the higher the probability of new legal procedures opened against the CBAM.

According to the model, the stance of a country towards CBAM is also influenced by public opinion on climate change, with governments in nations where skepticism against climate change is prevalent predicted to show greater resistance to CBAM; conversely, countries with widespread concern about climate change may consider CBAM as a legitimate and necessary measure.

Lastly, the model regards the innovation capacity of each country as crucial, considering that it could facilitate adjustment to global decarbonization trends. Taking all variables into account, the authors anticipate the strongest opposition from the Islamic Republic of Iran, Ukraine, the United States of America, the United Arab Emirates, and the Arab Republic of Egypt<sup>17</sup>.

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TAGLIAPIETRA S., WOLFF G. B., *The geopolitics of the European green deal*. Policy contribution no. 04, European Council on Foreign Relations, 2021, 1 – 23.

<sup>14</sup> OVERLAND I., SABYRBEKOV R., *Know your opponent: Which countries might fight the European carbon border adjustment mechanism?* in Energy Policy, n° 2022, 169, p. 1.

<sup>15</sup> *Ibidem*

<sup>16</sup> The carbon intensity of a country’s economy plays a crucial role, with higher carbon content goods subject to elevated CBAM-related fees. While specific sectoral carbon intensity data may be unavailable, a country’s overall carbon intensity is used as a reasonable approximation.

<sup>17</sup> See figures 9 and 10 in the Appendix, which present the predicted strongest opponents of the project. The 15 countries predicted to be the most vocal opponents include: the Islamic Republic of Iran, Ukraine, the United States of America, the United Arab Emirates, the Arab Republic of Egypt, the Republic of India, the People's Republic of China, the Republic of Kazakhstan, the Russian Federation, the Republic of Belarus, Libya, the Kingdom of Saudi Arabia, the Republic of Indonesia, Bosnia and Herzegovina, and the State of Kuwait.

Relevantly, not all countries are affected uniformly by the same variables. Without considering technological capabilities, the model expects the United States of America as the foremost vocal critic of the plan, exceeding Ukraine, and Iran<sup>18</sup>.

These findings suggest that the United States's opposition to the mechanism might be mitigated by its robust technological infrastructure and greater adaptability. This consideration might be generalized understanding the importance of technological development in meeting the stricter requirement imposed by CBAM legislation: the higher the level of technological development in the field of decarbonization for a given country, the higher the possibility of mitigating the influence of the European CBAM by imposing domestic environmental regulations without excessively limiting production and growth. This connection holds particular significance when considering the potential impact of CBAM on developing countries, which may lack the economic resources and the technical capabilities to impose effective forms of domestic carbon taxation without limiting their growth prospects.

Considering only the importance of trade with the EU, the carbon intensity of national production and the likelihood of confrontation, the model predicts as main opposers of the plan the United States of America, Ukraine, the Islamic Republic of Iran, Bosnia and Herzegovina and the Republic of Belarus<sup>19</sup>.

Maintaining the same variables but removing the variable of confrontation likelihood, the main opposers of the mechanism would be Ukraine, the Islamic Republic of Iran, Bosnia and Herzegovina, the Republic of Belarus, and the Republic of Serbia<sup>20</sup>.

It can be noted that the United States emerges as a probably more vocal opponent when considering likelihood of confrontation. While its absence among the five main opposers in the second scenario may seem surprising at a first glance, it highlights the influential role that the likelihood of confrontation plays in shaping opposition predictions.

In other words, the observation that the United States emerges as a more likely opponent upon consideration of the probability of confrontation reinforces the expectation of substantial resistance from the US.

Lastly, the article presents the model if based only on the variables of trade and likelihood of confrontation<sup>21</sup>.

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<sup>18</sup> See figure 5 in the Appendix which omits the criterion of innovation capacity, a variable with significant implications for the United States of America, emphasizing its theoretical prowess in adapting through the utilization of technology. The Islamic Republic of Iran, Ukraine, the United Arab Emirates, and the People's Republic of China would complete the list of the five strongest opponents of the EU proposal.

<sup>19</sup> See figure 6 in the Appendix.

<sup>20</sup> See figure 7 in the Appendix.

<sup>21</sup> See figure 8 in the Appendix. In this case, the main opponents would be the Republic of Bosnia and Herzegovina, the Islamic Republic of Iran, the Republic of Belarus, the United Arab Emirates, and the Russian Federation.

The multiple possible conclusions underscore the complex interplay of variables involved in assessing opposition to the plan and emphasize the need for a comprehensive approach in analyzing potential challenges. To thoroughly understand the motivations underlying potential international criticism directed at the CBAM, it is necessary to deepen the significance of carbon-intensive sectors to foreign economies<sup>22</sup>.

It is to be expected that economies more reliant on carbon intensive sectors for their exports will more likely obstacle any trade limitation imposed on carbon intensive products, considering that such restrictions would strongly limit their export capabilities. For instance, China and India would face greater repercussions compared to the EU or the United States if subjected to the same hypothetical tariffs on identical products by their trading partners, due to their heavier dependence on energy-intensive sectors to drive exports<sup>23</sup>. Consequently, it is also implied that in the event of exactly reciprocal trade retaliation, the Asian economic giants would suffer more significant economic harm than their Western counterparts.

Strengthening the profound influence that the European Green Deal is poised to have on foreign policy dynamics, the proposal plans to reconsider EU energy security (Kirkegaard, 2023)<sup>24</sup>.

In connection with the energetic dependence of the EU, the Commission itself noted in 2023: “*Russia’s weaponization of energy was a major wake-up call for security of supply and tackling dependencies*” (European Commission, 2023)<sup>25</sup>.

In the political discourse within the Union leading to the approval of the Green Deal, the aspect of energy independence hastily gained critical prominence.

Notably, maintaining the Green Deal’s prominence in both EU and national policy agendas throughout its lengthy implementation period presents a significant overarching challenge (Colli, 2020)<sup>26</sup> and past geopolitical crises have diverted European policymakers’ attention towards energy supply security, often resulting in prioritizing domestically produced fossil fuels, notably coal, over cleaner imports (Siddi, 2020)<sup>27</sup>.

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<sup>22</sup> See figure 11 in Appendix. Emission intensive industries generally account for 10 to 20 percent of GDP. The countries with a higher dependence on emission intensive industries than the European Union are: People’s Republic of China, Kingdom of Thailand, Socialist Republic of Vietnam, Malaysia, Argentine Republic, Republic of Indonesia, Japan, United Mexican States, Republic of Turkey, and the Republic of India.

<sup>23</sup> See figure 12 in Appendix.

<sup>24</sup> KIRKEGAARD J. F., *Russia’s invasion of Ukraine has cemented the European Union’s commitment to carbon pricing*. Policy Brief, Peterson Institute for International Economics, 2023, 1-20.

<sup>25</sup> EUROPEAN COMMISSION, *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of The Regions, A Green Deal Industrial Plan for the Net-Zero Age*. Brussels, 2023, p. 6.

<sup>26</sup> COLLI F., *The end of ‘business as usual’? COVID-19 and the European Green Deal*, Egmont Institute European Policy Brief no. 60, 2020, 1-5.

<sup>27</sup> SIDDI M., *The European Green Deal: Assessing its current state and future implementation*. FIIA Working Paper, no. 114, 2020, p. 8.

While climate change represents a widespread concern and a point of support for the Green Deal, energetic crises may revive political discourse favoring supposedly secure domestic fossil fuels over renewable energy, therefore harming the full implementation of the Green Deal, particularly amidst rising geopolitical tensions and concerns about importing rare earth materials needed for renewable energy production. Exemplarily, leaders in member states skeptical of climate action decided, immediately after the Covid-19 crises, to prioritize economic recovery over environmental concerns.

This sentiment was reflected in calls to discard the Green Deal and discontinue programs like the EU Emissions Trading System (ETS) respectively from the Polish Deputy Minister for State Assets, Janusz Kowalski, and from Czech Prime Minister, Andrej Babis (Siddi, 2020)<sup>28</sup>. Notwithstanding, the Green Deal planned (and funded) shift towards renewables could lead to decentralized and less conflict-prone energy systems, fundamentally altering the current fossil fuel centric geopolitics.

In a more immediate sense, addressing climate change requires effective coordination across regions and nations to shift production systems, a role which Brussels is aptly positioned to fulfill. Furthermore, the EU possesses significant experience in redistributing wealth among regions and providing direct assistance to areas reliant on carbon-intensive industries, such as coal, limiting the possible negative consequences for countries such as the Czech Republic and Poland (Lee-Makiyama, 2021)<sup>29</sup>. As the green transition intensifies, the coal industry faces a substantial reduction in output, potentially resulting in significant job losses. While the exact consequences remain uncertain, data suggests that up to two-thirds of all coal sector jobs could vanish by 2030 (Lee-Makiyama, 2021)<sup>30</sup>.

### *1.1.2. Economic growth decoupled from resource use.*

Focused on growing concerns over the impacts of climate change and the need for a sustainable economic model, the European Green Deal represents more than a comprehensive policy framework; the European Commission defined the project as “*a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient, and*

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<sup>28</sup> *Ibidem*, p. 8.

<sup>29</sup> LEE-MAKIYAMA H., *The EU Green Deal and Its Industrial and Political Significance*. ECIPE, European Centre for International Political Economy. 2021, 1 – 10.

<sup>30</sup> *Ibidem*, p. 4.

*competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use*” (European Commission, 2019)<sup>31</sup>.

Particularly relevant for its practical implications is the concept, presented in the last line, of *“economic growth decoupled from resource use”*. Bearing in mind the previously mentioned political uncertainty over the reliance on renewable sources of energy, the first challenge posed to this ambitious claim is certainly represented by the industrial and civil energetic needs of the European Union.

The dynamics of energy prices and supply conditions wield a profound influence on the growth trajectory of the European Union (Li, 2021)<sup>32</sup>, in this sense escalations in energy prices can precipitate significant inflationary pressures and structural disruptions to economic activities. Therefore, the imperatives of navigating energy price volatility and mitigating supply disruptions emerge as a central point for policymakers and stakeholders, as they try to devise a new course towards sustainable and resource-independent economic growth within the EU. It should be underlined that in 2021, the EU still produced only around 44% of its own energy (Eurostat, 2023)<sup>33</sup>. While the current shift towards sustainable energy sources may be a unique feature of modern times, energy readjustments strategies are not. The oil crisis of the 1970s highlighted the precarious reliance on Middle Eastern oil and exposed the vulnerability of Western Europe and other resource-deficient economies. While some nations thrived by adopting natural gas, others turned to domestic coal as a substitute for imported oil.

These adaptation responses continue to shape the energy landscape of modern Europe and of the European Union, as different European economies remain reliant on coal (Eurostat, 2022)<sup>34</sup>. Germany, the largest European economy, holds the distinction of being Europe’s highest overall coal-fired emitter, discharging just over 180 million tons of carbon dioxide and equivalent gases from coal, which produced 31% of its electricity in 2022. The Republic of Poland was the second-largest coal polluter in 2022, with 125 million tons of CO<sub>2</sub> emitted in the atmosphere.

Among the countries that are most reliant on coal, Bulgaria relied on coal for 42% of its electricity and emitted 23.8 million tons of CO<sub>2</sub>, while Czechia, formerly known as the Czech Republic, emitted a total of 34 million tons of CO<sub>2</sub>, with coal accounting for 43% of its electricity generation<sup>35</sup>.

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<sup>31</sup> EUROPEAN COMMISSION, *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of The Regions, The European Green Deal*. Brussels, 2019, p. 1.

<sup>32</sup> LI R., LEUNG G. C., *The relationship between energy prices, economic growth and renewable energy consumption: Evidence from Europe*. Energy Reports no. 7/2021, 1712-1719.

<sup>33</sup> EUROSTAT, *Shedding light on energy*, Interactive Publications, 2023.

<sup>34</sup> EUROSTAT, *Complete energy balances of the European Union*, Interactive energy visualization tools, 2022.

<sup>35</sup> See, for further details, Figure 1 “Coal use, electricity production and cumulative percentage of EU GDP” in the Appendix of this work.

Given the significant role of energy production in driving economic growth, coupled with the fact that a third of the EU's GDP originates from economies still moderately dependent on coal, an inadequately managed phase-out of coal could adversely impact both the growth prospects of these countries and those of the EU.

In 2022, wind and solar power collectively contributed a historic fifth of the EU's electricity supply, standing at 17% of the energy mix<sup>36</sup> for the first time and maintaining a lead over coal-fired generation (16%) (Jones, 2023)<sup>37</sup>.

However, the transition away from fossil fuels faced challenges due to dual crises in Europe's electricity system. Limited energy production in Germany due to the closure of nuclear powerplants and from hydro powerplants across the continent led to a significant 185 TWh gap in generation, equivalent to 7% of Europe's total electricity demand in 2022.

While most of the gap was compensated for by increased wind and solar generation and a decrease in electricity demand, approximately one-sixth was met by heightened fossil fuel generation. With coal being more economical than gas, it accounted for the most increase, rising by 7% (+28 TWh) compared to 2021.

Even a net energy exporter as the French Republic was forced to revive the production of coal to produce 0.6% of its energy (Jones, 2023)<sup>38</sup>. Consequently, EU power sector emissions experienced a 3.9% increase (+26 MtCO<sub>2</sub>) in 2022 compared to the previous year. Gas generation remained almost unchanged (+0.8%), with no significant shift from gas to coal due to the higher cost of gas compared to coal (Jones, 2023)<sup>39</sup>.

The second fundamental aspect of the promise of future economic growth decoupled from resource use, relates to the importance of traditionally resource intensive industries.

To understand how important natural resources are today for the EU one should first look at the composition of the Union's gross domestic product. The European Union represents the world's second-largest economy (IMF, 2024)<sup>40</sup>, however, the EU comprises a diverse array of Member States, each with unique characteristics and profound differences.

Therefore, an examination of GDP composition provides valuable insights into the varied economic landscapes across the Union's constituent nations.

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<sup>36</sup> See, for further details, Figure 2 "Energy mix of the European Union in 2022", in the Appendix.

<sup>37</sup> JONES D., *European Electricity Review*, Ember climate, 2023, 1-79.

<sup>38</sup> Ibidem

<sup>39</sup> Ibidem

<sup>40</sup> INTERNATIONAL MONETARY FUND (IMF) - *Dataset European Union*. 2024. Available at: <https://www.imf.org/external/datamapper/profile/EU> (accessed 7 February 2024). However, it should be noted that the World Bank considers the EU as the third largest world economy, after the United States of America and the People's Republic of China. See WORLD BANK - *World Development Indicators*, 2024, In <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2022&locations=EU-CN-US&start=2015> (accessed 7 February 2024).

In 2022, 84.8 % of the EU's GDP was produced in the Eurozone (Eurostat, 2022)<sup>41</sup>, the group of 20 countries that adopts the Euro as its official currency, including all the ten largest economies, with the sole exception of Poland. The comparative analysis of key demographic and economic indicators across the Euro area, the United States of America, and the People's Republic of China reveals distinct patterns in population size, GDP per capita, and more importantly sectorial composition<sup>42</sup>. The Euro area comprises a population of 348.5 million and a GDP per capita of €38.7k, it predominantly relies on services, which constitute 72.6% of its GDP; industry and agriculture accounted for the remaining 27.4%. It should also be noted how construction, an industrial activity that can hardly be delocalized or replace through imports, constantly represented 5 to 6% of the EU GDP between 2010 to 2021.

In contrast, the United States of America, with a population of 333.6 million and a higher GDP per capita of €52.0k, exhibits a greater emphasis on services, accounting for 80.5% of its GDP, while also maintaining significant industrial activity at 18.5% of GDP.

Meanwhile, the People's Republic of China, with a population of 1,411.8 million but a lower GDP per capita of €14.5k, displays a robust industrial sector comprising 40.1% of GDP, alongside a substantial services sector at 52.3%.

Traditionally resource-intensive sectors, such as construction and manufacturing, continue to play a crucial role in driving economic growth within the European Union and the global economy, accounting for a fifth of the European GDP and an even more considerable portion of the global economy.

In this context, the constraints placed on these sectors must account for the risk of merely replacing domestic production with imports.

In clearer terms, if there continues to be substantial demand for manufactured goods, implementing robust carbon pricing without adequate border adjustment procedures could inadvertently exacerbate the reliance on foreign import, potentially undermining domestic industries and sustainability efforts.

Expanding on this perspective, examining the distribution of employment across sectors<sup>43</sup> provides valuable insights into the significance of resource utilization for economic growth.

It also allows us to comprehend the consequences of tariff protection of some sectors on the European economy.

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<sup>41</sup> EUROSTAT, *Dataset GDP and main components (output, expenditure and income)*. 2024. Available at: [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=National\\_accounts\\_and\\_GDP](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=National_accounts_and_GDP) (accessed 7 February 2024)

<sup>42</sup> See Table 1 in the Appendix.

<sup>43</sup> See Figure 3 in the Appendix.

In 2021, 56 million European workers were employed in traditionally resource-intensive sectors (Eurostat, 2022)<sup>44</sup>. While it may be asserted that these sectors contribute to less than a fifth of the EU's GDP, it is crucial to recognize their fundamental role in driving economic growth and ensuring the overall stability of the Union.

Whether in 6 years, before 2030, or in 16, before 2050, the transformations required by the Green Deal to the EU's economic landscape underscore the need for strategic approaches to ensure their viability in an ever-evolving European economy that would be greatly damaged, and would certainly not tolerate high levels of unemployment.

The brief explanation presented of the energy needs and the employment structure of the Union serves the purpose of highlighting the importance and the vast potential impact of the EU green deal.

If natural resources and resources intensive industries still hold a forefront role both in energy production and economic growth, to achieve its objectives, the European Green Deal must employ multifaceted initiatives framed as holistic approaches to sustainability, encompassing a wide range of sectors and policy areas, from energy and transportation to agriculture and industry.

Moreover, it allows us to better contextualize the economic and political relevance of the proposed measures.

## **1.2 Carbon Border Adjustment Mechanism (CBAM): what is it and how does it work.**

The Carbon Border Adjustment Mechanism (CBAM) (European Union, 2023)<sup>45</sup> represents a pivotal instrument in the European Union's efforts to address carbon leakage<sup>46</sup>. The President of the EU Commission, Ms. Ursula von Der Leyen, incorporated the implementation of the Carbon Border Adjustment Mechanism (CBAM) into her platform of proposals during her candidacy for the presidency.

In her opening speech to the European Parliament, the then newly elected president declared: "To complement this work, and to ensure our companies can compete on a level playing field, I will introduce a Carbon Border Tax to avoid carbon leakage. This should be fully compliant with World

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<sup>44</sup> EUROSTAT, *Dataset European Union Labour Force Survey (EU LFS)*, 2021.

<sup>45</sup> EUROPEAN PARLIAMENT, COUNCIL OF THE EUROPEAN UNION, *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, 2023, 1-53.

<sup>46</sup> Carbon leakage can be defined as the potential scenario that may arise when businesses decide to shift their production to countries with less stringent emission regulations, due to the expenses associated with climate policies. Such a move could result in a rise in their overall emissions.



Trade Organization rules. It will start with a number of selected sectors and be gradually extended” (European Parliament, 2019)<sup>47</sup>.

The Carbon Border Adjustment Mechanism (CBAM) emerges as a central component of the European Green Deal, extending its impact globally with the double objective of effectively decarbonizing the consumption of goods inside the common market while, at the same time, protecting European industries and economy. In practice, the CBAM is designed to align the EU’s trade strategy with its climate policies.

Thus, border carbon adjustments represent the climate change-associated iteration of border tax adjustments (BTAs), which are fiscal measures implementing, either fully or partially, the destination principle.

The destination principle dictates that taxes should be paid in the location where products are consumed, rather than where they are produced, ensuring the trade neutrality of domestic taxation. In situations lacking tax harmonization, a domestic levy is extended to imports while being rebated for exports<sup>48</sup>; this adjustment serves to level the playing field and, by preserving competitive equality between domestic and foreign products, maintains market fairness.

The imposition of a carbon price through Emission Trading Scheme (ETS), aimed at augmenting the cost of energy inputs, risks creating a disparity for European Union-based production against jurisdictions without the same carbon pricing mechanisms<sup>49</sup>.

This discrepancy could precipitate leakage, wherein production and emissions relocate to regions with laxer environmental standards. In response, policymakers have devised strategies to level the playing field between domestic producers subject to GHG European emission costs and importers exempt from such obligations.

Among these strategies, the Carbon Border Adjustment Mechanism (CBAM) aims at progressively capturing 100% of emissions within sectors covered by the EU Emissions Trading System (ETS)<sup>50</sup>. The Carbon Border Adjustment Mechanism (CBAM) functions<sup>51</sup> by levying a fee on the embedded carbon content of specific imports, that mirrors the costs faced by domestic producers under the ETS (European Union, 2023)<sup>52</sup>.

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<sup>47</sup> EUROPEAN PARLIAMENT, *Political guidelines for the next European Commission 2019-2024 – Opening statement in the European Parliament plenary session 16 July 2019; Speech in the European Parliament plenary session, 27 November 2019*. Publications Office of the European Union, 2020, p. 6.

<sup>48</sup> See figure 4 Appendix.

<sup>49</sup> See figure 13 in the appendix on the effects of carbon taxes on production costs for companies.

<sup>50</sup> See Table 4 in the Appendix.

<sup>51</sup> See Table 2 in the Appendix.

<sup>52</sup> EUROPEAN PARLIAMENT., COUNCIL OF THE EUROPEAN UNION - *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, 2023, p. 17: “carbon price’ means the monetary amount paid in a third country, under a carbon emissions reduction scheme, in the form of a tax, levy or fee or in the form of emission allowances under a

Essentially, CBAM will operate by requiring importers to purchase emission allowances equivalent to the carbon content of the goods they bring into the EU market. Adjustments will be made to accommodate any compulsory carbon pricing mechanisms in the exporting nation, allowing importers to offset the CBAM charge by demonstrating that a domestic carbon tax has already been paid (European Union, 2023)<sup>53</sup>.

According to the Regulation, the calculation of carbon content will consider both direct emissions, stemming directly from the production processes of the CBAM goods, and indirect emissions, resulting from the production of the electricity consumed during the manufacturing of said goods. However, only direct emissions will initially be considered for products in iron, steel, aluminum, and hydrogen (Coppo G., Zingariello A., 2023)<sup>54</sup>.

Given the dearth of precise data from non-EU nations, the carbon content of imported goods is estimated using benchmarks derived from the least efficient 10% of European producers in comparable sectors, with the possibility for importers to demonstrate that their products possess a lower carbon footprint than the assumed average (European Union, 2023)<sup>55</sup>.

While this approach simplifies the Mechanism's implementation, it raises concerns about its effectiveness in taxing imports commensurate with their carbon emissions, particularly for the least efficient producers, those falling below the 10% threshold of European standards, that would then lack motivation to adopt more environmentally friendly technologies.

Furthermore, complications may arise if exporting countries claim that their current climate policies, with similar impacts to a carbon pricing mechanism, do not establish direct prices. In simpler terms, if foreign countries implement precise carbon pricing in the same sectors, figuring out the necessary adjustments is clear-cut.

However, if carbon reduction occurs through loosely defined environmental policies, aligning with the EU system would demand significant comparative analysis and international negotiations.

It has been observed that CBA "as usually proposed does not apply a charge at the border to adjust for domestic non-price-based climate policies, [...] it makes little sense to apply a credit for such policies abroad." (Baršauskaitė, Tipping, 2023)<sup>56</sup>.

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*greenhouse gas emissions trading system, calculated on greenhouse gases covered by such a measure, and released during the production of goods".*

<sup>53</sup> EUROPEAN PARLIAMENT, COUNCIL OF THE EUROPEAN UNION, *Ibidem*, p. 21 article 9 para.1.

<sup>54</sup> COPPO G., ZINGARIELLO A., *Approvato il Regolamento CBAM (Carbon Border Adjustment Mechanism): Previsti nuovi obblighi per gli importatori*, Brussels, 2023, 1-6, also available at [https://vbb.lavasuite.com/media/Insights\\_Articles/22-5-2023\\_cbam\\_italiano.pdf](https://vbb.lavasuite.com/media/Insights_Articles/22-5-2023_cbam_italiano.pdf).

<sup>55</sup> EUROPEAN PARLIAMENT, COUNCIL OF THE EUROPEAN UNION, *Ibidem*, p. 47, Annex IV section 4.1.

<sup>56</sup> BARŠAUSKAITĖ I., TIPPING A., *Border Carbon Adjustments: Priorities for international cooperation*. IISD, 2023, p. 4.

Hence, recognizing the importance of nonprice environmental policies while designing CBA could be interpreted as unfair preferential treatment of foreign producers by domestic stakeholders. On the contrary, solely attributing credit to explicit carbon prices might violate the UNFCCC Paris Agreement's principle of respecting sovereign decisions on how countries address climate change and be perceived by foreign producers as unfair preferential treatment of domestic producers (Baršauskaitė, Tipping., 2023)<sup>57</sup>.

Relevantly, it has been noted (Keen et al., 2021)<sup>58</sup> that nonprice policies generally impose markedly lower private costs on firms than carbon pricing (at equivalent shadow prices)<sup>59</sup>. Nevertheless, costs could still be significant enough to cause competitiveness and leakage concerns, especially at higher levels of domestic abatement.

For indirect emissions, predefined values will be set based on the average CO<sub>2</sub> emissions generated to produce the electricity consumed for the manufacturing of the relevant CBAM goods. Said averages will be calculated based on the following parameters: the average “electricity grid emission factor” in the Union, the average emission factor of the electricity grid in the country of origin, or the CO<sub>2</sub> emission factor of price-setting sources in the country of origin of the goods (Coppo, Zingariello, 2023)<sup>60</sup>.

CBAs offer an alternative to traditional domestic measures used to mitigate emissions, such as free allowances within emission trading schemes, as the EU ETS, or tax exemptions for carbon taxes. Differently from these domestic instruments, which can also reduce carbon pricing<sup>61</sup>, CBAs have the advantage of elevating carbon costs for foreign producers while maintaining their application on domestic firms.

Thus, countries could maintain ambitious climate policies that generate robust carbon prices while simultaneously achieving two interlinked sub-goals: avoiding an unfair loss of competitiveness for domestic enterprises and exerting political pressure on climate laggards to adopt similarly ambitious climate policies. These related consequences represent the primary anticipated effects of the CBAM.

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<sup>57</sup> *Ibidem*.

<sup>58</sup> KEEN M., PARRY I., JAMES ROAF J., *Working Paper Border Carbon Adjustments: Rationale, Design and Impact*. IMF Fiscal Affairs Department, 2021, 1-42.

<sup>59</sup> Shadow prices are commonly defined as the implicit or hypothetical values assigned to goods or services that are not directly traded in the market. Specifically in the context of carbon pricing, shadow prices represent the economic cost associated with carbon emissions or the cost of mitigating those emissions. They serve as theoretical constructs used in economic analysis to capture the external costs or benefits of certain activities, such as carbon emissions, which may not be reflected in market prices.

<sup>60</sup> COPPO G., ZINGARIELLO A., *Approvato il Regolamento CBAM (Carbon Border Adjustment Mechanism): Previsti nuovi obblighi per gli importatori*. Van Bael e Bellis, Brussels, 2023, 1-6.

<sup>61</sup> Domestic instruments such as free allowances in emission trading schemes or tax exemptions for carbon taxes might inadvertently lower carbon pricing. For instance, free allowances could reduce demand for emission allowances, potentially leading to oversupply and lower prices. Similarly, tax exemptions might create cost discrepancies, potentially diminishing the effectiveness of carbon pricing mechanisms. While aimed at mitigating economic impacts on industries, these measures could weaken the carbon pricing signal and hinder efforts to combat climate change.

### 1.3 The expected spillover effects on global economy, taxation and environment.

CBAM expands the reach of prevailing carbon pricing mechanisms, as the EU Emissions Trading System (EU ETS), transcending national boundaries and assuming global influence.

The implementation of the Carbon Border Adjustment Mechanism (CBAM) is expected to serve multiple objectives, aligning with broader goals related to domestic industry competitiveness, emissions leakage prevention, and international climate action. The anticipated spillover effects on the global environment serve as a critical focal point for policymakers and stakeholders alike.

The initial version of the CBAM will affect cement, steel products, aluminum, fertilizers, electricity, and hydrogen and will aim to improve economic efficiency by preventing distortions, motivated by EU Law on Environment, in the relative prices of domestic goods<sup>62</sup>.

Thus, helping to preserve the competitiveness of domestic industries in the face of domestic carbon pricing, particularly for energy-intensive, trade-exposed (EITE) sectors, and to enhance the political acceptability of domestic carbon pricing measures. From the point of view of international trade, the CBAM would essentially function as a particular kind of trade barrier with an environmental basis.

In this sense, it could foster the development and the adoption of new sustainable and green technological innovations while directly protecting continental manufacturers; but policymakers must give due consideration to the anticipated response from their international counterparts, as these measures might be perceived as illegitimate protectionist tactics (Keen et al, 2021)<sup>63</sup>.

It is also worth mentioning that the European CBAM must align with WTO guidelines in both its conception and execution to avoid accusations of protectionism (OECD, 2021)<sup>64</sup>.

As to the effects of the mechanism, the International Monetary Fund predicted (IMF, 2022)<sup>65</sup> how the EU Carbon Border Adjustment Mechanism (CBAM) will significantly increase costs for imports of CBAM-covered products.

The IMF presented two possible scenarios:

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<sup>62</sup> See Figure 13 in the Appendix. In particular, the CBAM would realign domestic prices and foreign prices. The concept of the “relative price of domestic goods” can be understood as the ratio of the price of domestic goods to the price of foreign goods.

<sup>63</sup> KEEN M., PARRY I., ROAF J., *Working Paper Border Carbon Adjustments: Rationale, Design and Impact*, IMF Fiscal Affairs Department, 2021, 1-42.

<sup>64</sup> OECD, *Round table on sustainable development Connecting Climate Ambition and Trade: How to align policies and build international consensus?* Background note prepared for the 41st Round Table on Sustainable Development, 2021, 1-11.

<sup>65</sup> XIAOBEI H., ZHAI F., JUN M., *The Global Impact of a Carbon Border Adjustment Mechanism. A Quantitative Assessment*, Boston University – Global Development Policy Center, Task Force on Climate, Development and International Monetary Fund, 11 March 2022, also available at <https://www.bu.edu/gdp/2022/03/11/the-global-impact-of-a-carbon-border-adjustment-mechanism-a-quantitative-assessment>.

- in the first, covering the initial set of carbon intensive products proposed by the EU, tariff equivalents rise by 3 to 4 percentage points for iron and steel exports from China, Russia, and Brazil, and by approximately 15 percentage points for India<sup>66</sup>. This increase would lead to significantly reduced trade flows between these countries and the EU, with India's iron and steel exports expected to drop by as much as 58% and exports from China, Russia, and Brazil declining by over 10%<sup>67</sup>;

- under the second scenario predicted by the IMF, which expands CBAM coverage to all sectors, including direct and indirect emissions, tariffs increase for exports of all manufactured goods, resulting in significant export declines for most countries, particularly India, China, and Russia<sup>68</sup>. Developing economies would be particularly impacted, with Mozambique experiencing a 67% decrease in exports to the EU<sup>69</sup>.

While the first scenario may have a relatively modest macroeconomic impact on most countries, the expansion of CBAM to all products would lead to more pronounced contractions in GDP for nations heavily reliant on CBAM exports, such as China, Russia, Mozambique, and Ukraine.

These findings underscore the far-reaching implications of CBAM implementation on global trade and economies, suggesting that the CBAM might exacerbate the gap between developing and developed countries in terms of GDP and, consequently, welfare.

It also sheds light on why certain countries might resist the adoption of CBAM, anticipating a broader reinstatement of indirect taxes on the trade of carbon-intensive products.

This opposition stems from the expectation of taxation structures that could restrict global trade, thus jeopardizing the perpetuation of their existing trade advantages and economic interests. Ultimately, by forcing carbon intensive economies to pay heavier prices, CBAM holds the potential to bolster adherence to the foundational "polluter pays" principle on a global scale.

It should also be noted that by conditioning access to the European common market, the proposal will strengthen incentives for carbon pricing and related actions in other countries.

In other words, gaining access to the European Union's internal market will require adapting national production systems to stricter environmental standards, consequently curbing global emissions.

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<sup>66</sup> See figure 15 in the Appendix.

<sup>67</sup> See figure 14 in the Appendix.

<sup>68</sup> See figure 16 in the Appendix.

<sup>69</sup> See figure 17 in the Appendix.

Considering what said, it may be stated that there are three main scenarios that CBAM could produce: (1) non-EU countries adopt ambitious climate policies<sup>70</sup>; (2) mutual recrimination and protectionist trade policies; or (3) survival of the status quo (Benson et al, 2023)<sup>71</sup>.

Internally, European policymakers will need to address the adherence of the mechanism to the current international legal framework, adverse to trade limitations.

## **1.4 The Challenges to the International Legal Framework.**

### *1.4.1. Compliance with WTO regulations.*

The CBAM proposal arises within a context where the international climate change framework is guided by the principle of common but differentiated responsibilities and respective capabilities (Espa et al, 2023)<sup>72</sup>.

The principle acknowledges that while all nations share the responsibility of addressing climate change, they vary significantly in their capacity to do so effectively; it also underscores the need for flexibility, highlighting that developing countries may require support and assistance in transitioning to more sustainable practices.

Conformably, the EU has framed the CBAM initiative as a step forward in the common fight against climate change and as a policy that, imposing common standards to national and foreign entities, ensures trade neutrality, thus reducing the risks of carbon leakage and avoiding discriminating foreign enterprises.

In addition, the Union contended that domestic industries already adhere to rigorous EU emission standards.

Despite this logic, as a unilateral tariff system with significant implications for global trade dynamics, CBAM could practically act as a tool for environmental trade protectionism.

From a legal standpoint, in order not to be considered an illicit protectionist measure under WTO rules, the mechanisms should respect the principles of non-preferentiality and reciprocity (Benson et al, 2023)<sup>73</sup>.

These two principles constitute the cornerstone of the WTO doctrine of treating all member states impartially, thereby forbidding discriminatory trade practices.

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<sup>70</sup> Motivated by a desire to access the European market, See Table 5 in the Appendix.

<sup>71</sup> BENSON E., MAJKUT J., REINSCH W. A., STEINBERG F., *Analyzing the European Union's Carbon Border Adjustment Mechanism*, Center for Strategic and International Studies (CSIS), Washington D.C., 2023, 1-9.

<sup>72</sup> ESPA I., FRANCOIS J., VAN ASSELT H., *The EU Proposal for a Carbon Border Adjustment Mechanism (CBAM): An Analysis under WTO and Climate Change Law*. Working Paper no. 06, World Trade Institute, Bern, 2022, 1-31.

<sup>73</sup> BENSON E., MAJKUT J., REINSCH W. A., STEINBERG F., *Analyzing the European Union's Carbon Border Adjustment Mechanism*. Center for Strategic and International Studies (CSIS), Washington D.C., 2023, 1-9.

The European Union posits that the CBAM does not discriminate, as import levies parallel carbon costs borne by EU manufacturers.

Furthermore, it may be stated that goods produced “in a more carbon-intensive manner are not “like” products” (Benson et al, 2023)<sup>74</sup>.

In this regard, it should be noted that, in the past, WTO adjudications have been based product likeness on the production methodologies. Therefore, it is to be expected that some implementations of the CBAM may undergo individual litigation.

For instance, a nation could file a complaint against the CBAM not in its entirety, but to contest the methodologies employed to determine the carbon footprint of one specific commodity, such as steel. Such a possibility would multiply case-specific rulings.

Moreover, in the case of steel, it will be necessary to distinguish between the use of electric arc furnaces and blast furnaces, since production based on the latter is generally deemed to be more carbon intensive. Similarly, the assessment of aluminum will present an even greater challenge due to the similarity in manufacturing processes among aluminum companies.

The burden would rest on a panel to ascertain whether varying electricity sources, such as hydropower versus coal power, yield fundamentally distinct products (Benson et al, 2023)<sup>75</sup>. Besides these considerations, Article XX of the General Agreement on Tariffs and Trade (GATT) provides exceptions to the general principles of non-discrimination in international trade.

These exceptions allow WTO member states to implement trade limitations deemed necessary to achieve certain policy objectives, such as protecting public health or the environment.

For the CBAM to be considered consistent with Article XX GATT, it must demonstrate that it serves a coherent policy objective, such as addressing carbon leakage and combating climate change, and that it is applied in a manner that is not arbitrary or unjustifiably discriminatory. In addition, the CBAM must demonstrate that it is a necessary measure to achieve its stated objectives. Although the EU Commission claims that the main rationale behind the mechanism is the decarbonization the internal and global economy, legal significance cannot be derived from its stated objectives.

Instead, the CBAM’s compatibility with the WTO rules depends on whether its design features effectively and proportionally limit carbon leakage.

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<sup>74</sup> BENSON E., MAJKUT J., REINSCH W. A., STEINBERG F., *Already quoted*, p. 4. The authors underline that the European Union itself has recalled the idea that considering production processes may warrant distinguishing goods based on carbon intensity.

<sup>75</sup> *Ibidem*.

Demonstrating such consistency is crucial for potential WTO compatibility and may bolster a defense under Article XX GATT exceptions if the CBAM is found to violate nondiscrimination rules (Espa et al, 2023)<sup>76</sup>.

Moreover, Article III:4 GATT, clarifies that a measure does not necessarily accord less favorable treatment if its detrimental effects “can be explained by factors or circumstances unrelated to the foreign origin of the product” (Espa et al. 2023)<sup>77</sup>.

Hence, under this consideration, the implementation of trade restrictions on goods originating from significant carbon-intensive production processes could be legally compliant with GATT provisions. In conclusion, presenting CBAM as a climate measure could improve its chances of compatibility with WTO regulations only if substantiated evidence of carbon leakage risks exists and if CBAM effectively mitigates these risks<sup>78</sup>.

The European Commission’s proposal specifically targets sectors with the highest risk of carbon leakage aiming to optimize environmental impact, while leveraging political and legal support to validate the Green Deal initiative.

#### *1.4.2. Emissions determination and international standards.*

It should be highlighted that, to consider CBAs as consistent with the WTO rules, these systems should precisely align with the carbon pricing framework implemented within the imposing jurisdiction (Espa et al, 2023)<sup>79</sup>.

This alignment is crucial both to prevent carbon leakage and to avoid imposing on imported goods overly stringent requirements that are not similarly applied to domestic production, thus violating the principle of trade neutrality.

Taking into consideration the various forms of carbon pricing systems - such as emission trading schemes, carbon taxes, and hybrids thereof - attempting complete multilateral harmonization of every aspect of CBA would likely prove futile (Keen et al, 2021)<sup>80</sup>.

Nevertheless, there certainly is value in international discussions focusing on standards and best practices. The first challenge associated with any international system of taxation of carbon lies in determining the greenhouse gas (GHG) emissions embedded in products covered by Carbon Border Adjustment (CBA) measures.

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<sup>76</sup> ESPA I., FRANCOIS J., VAN ASSELT H., Already quoted, 1-31.

<sup>77</sup> ESPA I., FRANCOIS J., VAN ASSELT H., Already quoted, p. 23.

<sup>78</sup> See Table 3 in the Appendix on the consequences of differences between legislations on carbon emission over jurisdictions.

<sup>79</sup> ESPA I., FRANCOIS J., VAN ASSELT H., Already quoted, 1-31.

<sup>80</sup> KEEN M., PARRY I., ROAF J., Already quoted.



The concerned task holds critical significance both for jurisdictions implementing CBAs and for exporters seeking to access the connected markets. The optimal approach would rely on actual emissions data, but use of actual data requires a high number of extensive, costly, and complex technical analysis.

An alternative to the use of precise emission data would be the use of industrial or national averages or assumptions, effectively imposing a common benchmark. Yet, relying on such benchmarks could disadvantage producers emitting less than assumed, as they might not be incentivized to decarbonize their production. Paradoxically, it might be more cost-effective for them to increase carbon emissions.

These obstacles are exacerbated by the absence of a universally accepted standard. The lack of a global standard on emissions calculation implies that each jurisdiction may devise its own methodology, potentially leading to disparities and additional burdens for exporters (Baršauskaitė, Tipping., 2023)<sup>81</sup>.

Furthermore, the process of collecting and certifying data by accredited entities poses significant costs, particularly for developing countries that might not have the resources to establish trusted certifying bodies nor to buy the services of foreign certifying agencies (Benson et al, 2023)<sup>82</sup>.

The absence of domestically collected data and domestically issued certifications would then subject companies in developing countries to regulations established, or benchmark assumed, in other countries, effectively allowing foreign countries to determine the degree of access to international trade of poorer countries.

It should also be highlighted that even if developing countries might have, in recent decades, established emission standards for industrial facilities, they might entirely lack the organizational capabilities to shift towards goods-based standards (Benson et al, 2023)<sup>83</sup>.

The introduction of a standard by the European Union (EU) for its Carbon Border Adjustment Mechanism (CBAM) underscores these challenges.

First, as the European standard was not designed through international negotiations, the development of other national standards might exacerbate differences and create trade inefficiencies.

Second, the absence of precise data on developing countries forces the adoption of benchmarks devised in Europe, specifically the benchmark of the 10% least efficient percent of European companies. If all the companies, in a given country, are assumed to be as efficient as the least 10%

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<sup>81</sup> BARŠAUSKAITĖ I., TIPPING A., *Border Carbon Adjustments: Priorities for international cooperation*. IISD, Winnipeg, 2023, 1-10.

<sup>82</sup> BENSON E., MAJKUT J., REINSCH W. A., STEINBERG F., - Already quoted, 1-9.

<sup>83</sup> *Ibidem*.

of European industries, less efficient companies might lack any incentive to improve their environmental performance, as they are already deemed to meet the assumed standard, and more efficient companies would effectively be penalized. Therefore, benchmarks could potentially hinder the development and implementation of more ambitious environmental initiatives within developing nations.

To address these challenges, international collaboration will likely become central. Such efforts would ideally involve close cooperation between standard-setting bodies such as the International Organization for Standardization (ISO) and relevant trade organizations such as the World Trade Organization (WTO).



## CHAPTER 2: THE IMPACT ON EU TRADE PARTNERS

### 2.1. EU and its Partners: Trade “State of the Art”.

To comprehensively understand the implications of the proposed Carbon Border Adjustment Mechanism (CBAM), it is necessary to move beyond simulations of its impact on key exporters of affected goods. By virtually imposing European standards on different countries, the European Union could also alter decades-long trends and tendencies of international trade.

This chapter aims at exploring the most recent prevailing trends that have influenced the trade structure of the European Union, offering insights into their nature and their consequential global effects. This is to illustrate the evolving dynamics that have determined the EU trade landscape, shedding light on their impact on the global scene.

Specifically, CBAM will not only reshape the Union’s trade relationships with the global community but also influence the modern evolution of international trade and, more relevantly, of developing countries.

Considering what has been said about the impact of CBAM on developing countries, it seems possible to state that this broader perspective is essential for understanding its true influence on international dynamics.

The change in trade partners of the EU between 2002 and 2021 reveals significant shifts in the bloc’s import and export connections. For instance, during the selected period, there has been a noticeable diversification of trade partners for the EU, with emerging economies such as China, India, and Turkey playing increasingly significant roles<sup>84</sup>.

Notably, while overall EU trade expanded, the percentage growth in trade with developing countries exceeded that with developed ones<sup>85</sup>. Consequently, developed nations such as the United States of America saw a partial replacement by developing countries across Asia, Africa, and Latin America (Brauch et al, 2021)<sup>86</sup>.

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<sup>84</sup> See Table 6 and Figure 18 in the Appendix.

<sup>85</sup> EUROSTAT, *Data set Extra-EU trade by partner*, 2021. See also: EUROSTAT, *International trade in goods – a statistical picture*, Online Publications Series, 2023.

<sup>86</sup> See, for a general overview, BRAUCH M. D., ARNOLD J., KLONSKY E., EVERARD F., *Carbon Border Adjustments in the EU, the U.S., and Beyond*, Event Highlights, Columbia Centre on Sustainable Investment, A Joint Center of Columbia Law School and the Earth Institute, Columbia University, New York, 2021, 1 – 10, available at <https://ccsi.columbia.edu/content/event-highlights-carbon-border-adjustments-eu-us-and-beyond>.

### 2.1.1. Africa.

Beyond Asian economic powerhouses, EU trade relations with African countries became increasingly important in the last two decades. During the financial crisis and the European debt sovereign crises of 2012, imports from Africa experienced a decline. However, they steadily resumed growth, indicating a resurgence in the importance of these countries for the EU.

By 2018, EU imports of goods from Africa totaled EUR 151 billion. Despite the setbacks during the 2008 and 2012 crises, the subsequent growth underscores the strengthening trade connections between the EU and African nations<sup>87</sup>.

EU exports of goods to Northern Africa witnessed an uninterrupted decade of growth from EUR 60 billion in 2008 to EUR 78 billion in 2018, with an average annual growth rate of 2.8%. Among the five African regions<sup>88</sup>, Eastern Africa experienced the highest growth rate for exports at 4.2%. Similarly, trade with Western Africa and Southern Africa registered growth rates of 3.3% and 1.6% respectively. Only Middle Africa experienced a decline in exports of goods, with a negative growth rate of -1.9% (Maliszewska et al, 2023)<sup>89</sup>.

Observing data from the last 10 to 20 years it can be asserted that traditional trading partners may have experienced fluctuations in their trade volumes with the EU. On the contrary, developing countries, including African countries, have generally benefited from strengthened trade ties. Therefore, focusing exclusively on the most prominent world economies may obscure the fact that in the last 20 years new areas of the planet emerged as important trading partners for the EU. The numerous shifts in trade partnerships are indicative of the dynamic nature of global trade and highlight the importance of considering ongoing trends when evaluating the potential impact of CBAM. Should this pattern persist, it is foreseeable that developing countries may play a more prominent role in the Union's future international trade policies. By imposing new demanding requirements, CBAM may alter said predictions.

### 2.1.2. Latin America

As we reflect on the evolving landscape of global trade, it becomes evident that decades of trends shaping trade for billions of people may be on the brink of change. Considering that developing

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<sup>87</sup> See Figure 19 in the Appendix.

<sup>88</sup> Northern Africa, Middle Africa, Southern Africa, Western Africa, and Eastern Africa.

<sup>89</sup> See Figure 20 in the Appendix. See also, for further details, MALISZEWSKA M., CHEPELIEV M., FISCHER C., EUIJIN J., *How developing countries can measure exposure to the EU's carbon border adjustment mechanism*, June 2023, in <https://blogs.worldbank.org/en/trade/how-developing-countries-can-measure-exposure-eus-carbon-border-adjustment-mechanism#:~:text=A%20country's%20exposure%20to%20the,their%20competitiveness%20in%20EU%20markets.>

countries are likely to be more affected by CBAM, it can be inferred that the proposal may disrupt dynamics that have been established over the past decade, building new barriers and obstacles between the Union and developing countries.

The trajectory of EU trade relations with African and Latin American countries underscores this transformative shift. Despite facing setbacks during periods of economic turmoil, such as the financial crisis of 2008 and the European debt sovereign crises of 2012, imports from developing countries assumed growing significance for the EU. Yet, as the proposed Carbon Border Adjustment Mechanism (CBAM) looms on the horizon, there is a recognition that developing countries may face disruptions to established dynamics.

Similar dynamics can be observed for Latin American countries. Exemplarily, EU-Chile bilateral trade grew by 169% between 2002 and 2022<sup>90</sup>. Building on these connections, both parties signed a Memorandum of Understanding aimed at strengthening trade connections<sup>91</sup>.

The EU-Chile agreement signifies a pivotal advancement towards establishing a trade environment characterized by fewer barriers and enhanced accessibility. With the elimination of tariffs on the vast majority of EU exports and the dismantling of trade restrictions, the agreement paves the way for a seamless flow of goods and services between the EU and Chile.

By facilitating greater market access and simplifying trade procedures, both parties are poised to capitalize on expanded economic cooperation and a plethora of growth opportunities.

The agreement is expected to increase EU exports to Chile by €4.5 billion over time, representing a substantial increase in trade volumes. Moreover, with 99.9% of EU exports becoming tariff-free, the agreement opens new avenues for businesses on both sides to expand their market presence and capitalize on emerging opportunities.

These figures underscore the significant economic benefits and growth potential inherent in the move towards a barrier-free trade relationship between the EU and Chile.

## **2.2. Assessing the CBAM Impact on EU Trade Partners.**

The implementation of a Carbon Border Adjustment Mechanism (CBAM) is poised to have particularly profound effects on global trade patterns for countries heavily reliant on exporting carbon-intensive products to the European Union (EU).

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<sup>90</sup> EUROPEAN COMMISSION, *Datasets EU trade relationships by country/region*, 2024.

<sup>91</sup> EUROPEAN UNION, *Memorandum of Understanding establishing a partnership between the EU and Chile on sustainable raw materials value chains*. Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, 2023, 1-5

As noted, “*CBAM will [...] probably disproportionately impact some economies.*” (Magacho et al, 2022)<sup>92</sup>.

In terms of total volume, the economies most significantly affected include Turkey, Ukraine, China, and Russia<sup>93</sup>. Russia exports approximately \$10 billion worth of CBAM products, distributed evenly across Iron and Steel, Aluminum, Fertilizers, and Electricity.

China, Ukraine, and Turkey each export more than \$2.5 billion worth of CBAM products to Europe, with a concentrated focus on iron and steel.

Notably, iron and steel emerge as the most impacted products in Turkey, as well as in the USA, other BRICS nations (Brazil, India, and South Africa), South Korea, and Ukraine.

In terms of total volume, the effect on African countries is predicted to be particularly significant, considering the importance of the EU market for African exports<sup>94</sup>. In total, African exports in CBAM covered products are valued at over US\$11 billion, 65% of said exports<sup>95</sup> stem solely from the EU (Baker et al, 2022)<sup>96</sup>.

Nevertheless, solely focusing on overall volume presents the risk of downplaying CBAM's impact on developing countries. As previously noted, such misreading could inevitably result in a misinterpretation of the actual ramifications of the mechanism.

### 2.2.1. *The CBAM exposure index.*

Taking into account multiple variables and more appropriately describing the impact of the European measure, the World Bank has recently presented the “CBAM exposure index”<sup>97</sup>.

The first variable considered by the index is the percentage of high emissions exports directed to the European continent.

Among the different countries mentioned in the Index, Cameroon displays the highest dependency on goods affected by the Carbon Border Adjustment Mechanism (CBAM) directed towards the European Union (EU), with an astounding 93.4% of its CBAM-covered exports destined for EU Member States<sup>98</sup>.

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<sup>92</sup> MAGACHO G., ESPAGNE É., GODIN A., *Impacts of CBAM on EU trade partners: consequences for developing countries*. AFD Research Papers, 2022, p. 7.

<sup>93</sup> See Figure 22 in the Appendix.

<sup>94</sup> See figure 21 in the Appendix.

<sup>95</sup> Approximately US\$7.2 billion

<sup>96</sup> BAKER P., BOODHOO BEEHARRY T. Z., LOAN L., QUILLES P., RIA R., *Designing an African response to Carbon Border Adjustment Mechanism*, African Economic Conference: Supporting Climate Smart Development in Africa, 2022, p. 5 - 6.

<sup>97</sup> See: Table 7 in the Appendix; MALISZEWSKA M. et al, 2023, Already quoted.

<sup>98</sup> See Table 7 in the Appendix.

Following closely, Zimbabwe demonstrates a significant reliance, directing an overwhelming 87.0% of its CBAM-affected exports to EU countries. Similarly, Mozambique exhibits substantial dependence, with approximately 73.7% of its CBAM-covered exports directed towards the common market.

Furthermore, “Mozambique is [...] amongst the most impacted African countries with welfare losses estimated between US \$1 billion to US \$5 billion. Owing to the [...] EU CBAM, Mozambique’s GDP is also expected to fall by approximately 2.5%” (Baker et al, 2022)<sup>99</sup>. Emission intensive products constitute more than 18% of Mozambique’s GDP, the highest percentage in Africa. (Baker et al, 2022)<sup>100</sup>.

Among the countries of the European continent, noteworthy is Albania, with around 58.7% of its CBAM-covered products, being exported to EU countries. Belarus follows suit, addressing approximately 50.2% of its CBAM-affected exports to the EU market.

Lastly, the United Kingdom shows a remarkable dependency, with a substantial 68.9% of its CBAM-covered products exported to the EU. Notably, it stands out as the developed nation with the highest proportion of exports impacted by CBAM measures.

This data underscores the imperative for impacted nations to carefully consider potential economic implications and adjust their strategies to navigate the evolving landscape of global carbon regulations and trade dynamics.

They also indicate which countries would see their cement, iron and steel, aluminum, and energy industries most affected by the full implementation of the CBAM.

To avert the economic peril facing these industries, these nations could pro-actively institute new carbon pricing measures to offset CBAM charges, thereby sustaining their export relationships with the European Union, or build new trade connections with countries outside the European block (Beaufils et al)<sup>101</sup>.

In the first case, the main effect of the European mechanism would then be the imposition of new environmental standards across the globe. In the second case it would mainly redirect international trade and stimulate European production of the same goods.

Nevertheless, focusing only on one metric would paint a partial picture. To better understand the economic significance of CBAM and which incentives might guide the actions of foreign

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<sup>99</sup> BAKER P., BOODHOO BEEHARRY T. Z., LOAN L., QUILES P., RIAR., *Designing an African response to Carbon Border Adjustment Mechanism*, Already quoted, p. 7.

<sup>100</sup> Ivi. See also Table 8 in the Appendix

<sup>101</sup> BEAUFILS T., JAKOB M., WARD H., WENZ L., *Assessing different European Carbon Border Adjustment Mechanism implementations and their impact on trade partners*. Communication Earth and Environment 4, N. 131, 2023, 1-9.



governments, the World Bank also observed the relative importance of CBAM industries on these countries' GDPs.

Of the previously mentioned countries, the most affected seems to be Mozambique, that relies on CBAM-covered products exports for 6.9% of its GDP. Zimbabwe relies on CBAM-covered products exports for 0.4% of its GDP, Albania for 0.7%, Belarus for 1.4%, and the UK for 0.2%.

Cameroon's industries covered by CBAM are almost entirely dependent on exports to the EU, yet these exports contribute to merely 0.2% of its GDP.

The relatively minor economic significance of these sectors may constrain potential public responses or adaptation strategies.

In other words, if the cost of implementing new environmental policies compliant with EU standards surpasses 0.2% of Cameroon's GDP<sup>102</sup>, there may be little incentive to pursue said reforms. Similar considerations apply to the other countries affected by CBAM.

Therefore, to understand which countries might be affected by CBAM to the point in which the implementation of new policies might be considered, it is necessary to rely on yet another metric, the aggregate relative CBAM exposure index<sup>103</sup>.

Combining the data available, we can observe how the ten most affected countries would be, in order of greater index value: Zimbabwe, Ukraine, Georgia, India, Belarus, Trinidad and Tobago, the Arab Republic of Egypt, the Russian Federation, Venezuela and South Africa.

Besides Europe, the continent most represented is Africa (Zimbabwe, Arab Republic of Egypt, South Africa).

The CBAM's introduction underscores a pivotal moment in global trade, where carbon emissions are increasingly factored into the economic equation, reshaping trade dynamics and possibly incentivizing carbon-efficient production practices on a global scale.

The following subchapter will focus specifically on case studies to showcase the direct international consequences of the proposal in fast developing areas of the world, specifically in Northern Africa, Eastern Africa and South America.

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<sup>102</sup> Cameroon's total GDP in 2023 amounted to around 46 billion euros, 0.2% of GDP would amount to 9.2 mln of euros. Figures from the World Bank, at <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=CM>.

<sup>103</sup> It is defined as: the aggregate relative CBAM exposure index is determined by aggregating the total surplus embodied carbon payments. This calculation involves multiplying the assumed price by the sum of exports to the EU across all covered sectors, then multiplying this by the difference between the country's emissions intensity and the EU average intensity. Finally, the result is divided by the sum of the country's total value of exports of CBAM products to the world.

### 2.2.2. Border Carbon Adjustment: Rationale, Design and Impact.

To better contextualize the effects of the mechanism it is first necessary to present the rationale behind the project. The rationale lies in addressing three primary concerns.

First, the competitiveness of domestic industries, particularly those reliant on emissions-intensive processes, may face challenges due to European carbon pricing schemes and general efforts against climate change and GHG emissions<sup>104</sup>.

With approximately 30 countries and the EU implementing carbon pricing by 2021, the landscape is strongly diverse, with significant differences in pricing levels and coverage<sup>105</sup>. This disparity in carbon pricing can create strong differences between the production costs of domestic and foreign goods.

Through the implementation of CBAM, policymakers aim to level the playing field by imposing charges on the carbon content of imports and exports, offsetting the difference in carbon prices between domestic and foreign markets.

Such a strategy ensures that foreign producers bear a similar carbon cost burden as domestic producers, thereby preventing carbon leakage and maintaining the competitiveness of domestic industries.

Without measures to address leakage, stringent carbon pricing in one country may incentivize industries to relocate to regions with weaker regulations, resulting in no net reduction in global emissions<sup>106</sup>. CBAM aims to mitigate this risk by partially offsetting emissions increases in foreign countries induced by domestic mitigation policies.

Internationally, CBAM may serve as a catalyst for global climate action. By conditioning access to the European common market, CBAM creates a financial incentive for nations to adopt similar measures. Moreover, CBAM can enhance the international credibility of carbon pricing schemes, indirectly encouraging broader adoption.

Overall, the rationale behind CBAM revolves around maintaining the competitiveness of domestic industries, mitigating the risk of emissions leakage, and incentivizing global climate action.

As already said, the Carbon Border Adjustment Mechanism (CBAM) imposes a fee on imported goods' embedded carbon content, aligning costs with those faced by domestic producers under the ETS (European Union, 2023)<sup>107</sup>.

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<sup>104</sup> See figure 13 in the Appendix.

<sup>105</sup> BARŠAUSKAITĖ I., TIPPING A., Already quoted, 1-10.

<sup>106</sup> BALACHANDAR V., BREKENRIDGE A., GATZEN C., PEICHERT P., Already quoted.

<sup>107</sup> EUROPEAN PARLIAMENT, COUNCIL OF THE EUROPEAN UNION - *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, 2023.

Importers, thus, must purchase emission allowances equivalent to the goods' carbon content, with adjustments for existing carbon pricing mechanisms in exporting countries (European Union, 2023)<sup>108</sup>.

The calculation includes direct and indirect emissions, initially focusing on products like iron, steel, aluminum, and hydrogen (Coppo G., Zingariello A., 2023)<sup>109</sup>. Estimates are based on benchmarks from the least efficient European producers, with importers able to prove lower carbon footprints. Multiple studies on the impact of the mechanism have investigated CBAM capability to mitigate carbon leakage<sup>110</sup>. It has been underlined that CBAs could potentially lead to a substantial reduction in leakage with estimates in a range of -5% to 25%<sup>111</sup>. However, the degree of leakage varies among sectors and countries, affecting in both instances those with higher energy consumption<sup>112</sup>.

In simpler terms, the production of the same products in different countries results in non-uniform emissions. Hence, for a comprehensive understanding of CBAM's impact, it is essential to evaluate the emissions of each sector in every country. Countries with lower carbon production processes may become relatively more attractive, even without the implementation of new green policies.

For instance, it has been underlined (UNCTAD, 2021)<sup>113</sup> that China and the Russian Federation could face more substantial restrictions than Turkey and India regarding steel exports, given that the former employ more polluting methods in steel production. All the mentioned countries produce steel with higher polluting methods than EU countries, but those that are relatively less carbon intensive (Turkey and India) will be subject to smaller levies.

In essence, although the mentioned countries may not respect European standards, imports from Turkey and India could incur lower charges. Consequently, these countries may find it easier to adapt compared to Russia and China and may even substitute them as EU's major trading partners of steel<sup>114</sup>.

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<sup>108</sup> EUROPEAN PARLIAMENT, COUNCIL OF THE EUROPEAN UNION, *Ibidem*, p. 21, article 9, para.1.

<sup>109</sup> COPPO G., ZINGARIELLO A., Already quoted, 1-6.

<sup>110</sup> UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT (UNCTAD). *A European Union Carbon Border Adjustment Mechanism: Implications for developing countries*. 2021, 1-31.

<sup>111</sup> See figure 24 in the Appendix. The United Nations, simulating two different prices per ton of CO<sub>2</sub> emitted (44\$ and 88\$), estimated that CBAM may indeed halve the rate of leakage.

<sup>112</sup> See figure 23 in the Appendix.

<sup>113</sup> UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT (UNCTAD). *A European Union Carbon Border Adjustment Mechanism: Implications for developing countries*. 2021, 1-31.

<sup>114</sup> This last line allows us to reflect on a possible challenge faced by the mechanism and the Union. It exists a looming risk of higher-polluting countries attempting to circumvent CBAM provisions by relying on lower-polluting countries as conduits to sell CBAM-covered products in Europe.

Higher-polluting countries (such as Russia and China) may register their products as made in lower polluting countries (such as Turkey or India), finding alternative routes to evade strong levies, and functionally maintaining their market share in the EU. Lower-polluting countries with strategic geopolitical and historical trade ties with both higher-polluting countries and the EU may become attractive options for such activities. Similar endeavors have been observed in relation to the European sanctions imposed on Russia in the context of its invasion of Ukraine.

Considering said effects, the implementation of CBAM will inevitably reshape and influence the modern system of trade. Particularly, developing economies such as African trade partners and Latin American countries would face substantial tariffs due to the carbon emissions associated with their products.

### **2.3. Case Studies: Morocco, Mozambique and Chile.**

#### *2.3.1. Morocco.*

Mozambique and Morocco stand out as two of the most impacted nations on the African continent. The former is one of the world's least developed nations and heavily depends on its natural resources for industrial production and economic growth. The latter boasts a more diversified economy and stronger institutional capacities.

Regarding trade relations with the Union, in 2022 Morocco directed 64% of its exports to the EU, whereas Mozambique directed only 30% (PÖHL D., 2023)<sup>115</sup>.

However, considering carbon intensive exports, Mozambique relies far more significantly on the European continent, directing 56% of its energy intensive exports to the EU, compared to just 2.8% for Morocco.

Relevantly, Mozambique's GDP is also 18 times more reliant on exports to the EU than Morocco that relies on exports to Europe for only 0,3% of its GDP<sup>116</sup>.

These distinctions in the two economies, coupled with varying trade relationships with the EU, highlight the need for comprehensive analysis when assessing the potential impacts of CBAM in Africa.

The first of the two African case studies presented in this work is Morocco. The north African country boasts a varied economy exporting machinery, equipment, electric vehicles, chemicals (including fertilizers), manufactured goods, and food items.

Morocco has a notably high emissions intensity, over 50% above the EU average, due to energy sources, efficiency, and lacking energy and industrial sector reforms. Additionally, Morocco's ability to report CO<sub>2</sub> emissions effectively remains unclear due to the current absence of a functional monitoring and reporting system. (Pöhl, 2023)<sup>117</sup>.

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This scenario would undermine CBAM's effectiveness in curbing emissions, allowing high-carbon products to enter the EU market illegally. It not only hampers climate change efforts but also underscores the need for strong enforcement to prevent frauds.

<sup>115</sup> PÖHL D., *Gli impatti del CBAM sui paesi in via di sviluppo*, 2023, 1-7.

<sup>116</sup> See Table 9 in the Appendix.

<sup>117</sup> PÖHL D., see footnote 115.

Nevertheless, it is essential to remember that while the EU absorbs over two-thirds of Morocco's total exports, only 2,8% of said exports fall under CBAM<sup>118</sup>, with fertilizers being the most exported product. Therefore, the impact of the new proposal on the overall wealth and industrial structure of the country may be limited<sup>119</sup>.

Actually, it has been estimated (UNCTAD, 2021)<sup>120</sup> that even though the European mechanism is expected to significantly curtail the rise in emissions by strongly discouraging the production of highly polluting products<sup>121</sup>, Morocco would not diminish its total emissions after the full implementation of the CBAM. That is why it is first necessary to attention the welfare effects of CBAM.

According to the United Nations (UNCTAD, 2021)<sup>122</sup>, developed countries stand to reap welfare benefits<sup>123</sup> of \$11 billion under the current CBAM scheme, which could soar to \$141 billion with its extension to all sectors. Meanwhile, developing nations could face net welfare losses of up to \$106 billion.

Thus, the proposal would effectively redirect global gains from international trade, transferring a substantial amount of wealth from developing to developed countries, particularly if the former fail to adopt greener production technologies.

Environmentally, by forcing the world's current wealthiest countries to consume more sustainable products, the mechanism will support the global reliance on greener technologies and diminish global pollution levels<sup>124</sup>.

According to the United Nations, if the European Union were to impose a domestic carbon price of \$44 per tonne of carbon emissions only from fossil fuel combustion and industrial processes, Morocco would suffer a wealth loss of 8,46 million dollars, or of 14,16 million with a \$88 tax per tonne<sup>125</sup>. Such welfare loss is a consequence of the use of fossil fuels and relatively inefficient industrial processes in the country. The levies would then have the effect of rising prices for Moroccan products, discouraging demand.

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<sup>118</sup> See Table 10 in the Appendix.

<sup>119</sup> See Table 7 and Table 10 in the Appendix.

<sup>120</sup> UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT (UNCTAD). *Already quoted*, 1-31.

<sup>121</sup> See Table 10 in the Appendix.

<sup>122</sup> UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT (UNCTAD). *Already quoted*. 1-31.

<sup>123</sup> See Table 13 in the Appendix.

<sup>124</sup> See Table 12 in the Appendix. Under full CBAM implementation, energy intensive exports from developed countries would become relatively cheaper than exports from developing countries.

See also Table 14 in the Appendix on total CO<sub>2</sub> emissions.

<sup>125</sup> See Table 11 in the Appendix.

However, should the Union to impose a carbon tax on imports of electricity and products from all energy intensive industries Morocco may register an increase in total wealth of 23,22 million of dollars that could soar to 40,64 million with a \$88 tax per tonne <sup>126</sup>.

These data suggest that Morocco stands to benefit from such a policy shift in the long term, likely due to its comparative advantage in renewable energy production and its potential to capitalize on exporting cleaner energy and products to the EU market.

The two different estimates may sound counterintuitive, but it is crucial to remember that Europe relies heavily on energy imports, primarily fossil fuels such as petroleum derivatives and various forms of gas. A carbon tax would substantially increase the cost of these imports and pave the way for energy imports from Morocco's renewables, offering unmatched competitiveness. At that point any higher rate of carbon tax would simultaneously increase Morocco's net gains by raising general prices of electricity all over the Union.

In this sense the negative effects of the carbon tax on Moroccan industrial production would not be cancelled, but rather surpassed by the positive effects on the energy market. CBAM would then effectively redistribute wealth inside Morocco by favoring greener sectors.

Under this light, the recent investments of the Moroccan government in renewable energy assume utmost importance. The government of Morocco has recently approved ambitious emission reduction plans, targeting a 52% renewable energy share and 15% energy consumption cut. More sustainable energy production techniques may increase the appeal of the North African economy, supporting its energy exports towards Europe.

Notwithstanding the positive attitudes of the government, regarding African projects for greener technologies it has been noted that "*Without international support for the green transition, the decarbonization process will struggle to take off in many countries, increasing economic instability and consequently compromising the effectiveness of climate goals*" (Pöhl, 2023)<sup>127</sup>.

In other words, despite Morocco's efforts to transition its economy towards decarbonization and align its energy production systems with greener standards, the North African country might still struggle to meet these goals, due to its overall low level of technological advancement.

In this regard, if CBAM will heighten, even if only temporarily, the economic difficulties of developing economies, combined with the existing financial difficulties of said countries, it may entirely alter any progress, technical, environmental, or socio-economic.

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<sup>126</sup> See Table 11 in the Appendix.

<sup>127</sup> PÖHL D., *Already quoted*, at p. 7.

Overall, the different impacts on Morocco's total wealth under these two scenarios highlight the significance of policy decisions regarding carbon pricing and their potential consequences for both domestic and international economies.

Considering what has just been said, it can be stated that the predicted effects of CBAM full implementation on Morocco are still ambiguous.

### 2.3.2. Mozambique

The second African country that is presented in this work is Mozambique. According to the same simulations conducted by the UN in the case of Morocco, the effects on wealth of the CBAM may be positive<sup>128</sup>. However, as it has been pointed out for Morocco, such effects will not be evenly distributed across sectors.

This sub-Saharan country relies on the EU for 56% of its CBAM exports<sup>129</sup>, constituting 5.5% of its GDP<sup>130</sup>. Relevantly, energy intensive industries constitute more than 18% of its GDP, making Mozambique one of the most sensible countries to the implementation of CBAM<sup>131</sup>.

In clearer terms, exports to Europe account for a third of the total production value of all Mozambiquan CBAM products. A relevant shock induced by CBAM may then seriously damage all the affected industrial sectors that in turn represent almost a fifth of the total Mozambiquan GDP. The reduced industrial output could also disrupt the employment structure of the country and heighten the incidence of poverty<sup>132</sup>, as underlined by the UN: "*exports from EITE industries provide a substantial source of employment and income for local people. If CBAs are applied, they could limit market access of these countries and potentially increase poverty levels*" (UNCTAD, 2021)<sup>133</sup>.

These concerns led the United Nations to define Mozambique as "[...] *the most exposed LDC*" (UNCTAD, 2021)<sup>134</sup>.

At the same time the UN predicted for Mozambique net GDP gains estimated between 6,83 and 64,13 million dollars as an effect of CBAM, and a consequent net increase of emission from 1,24 to 3,72 million tons.

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<sup>128</sup> See Table 11 in the Appendix.

<sup>129</sup> According to the OECD this figure may be as high as 73,7%.

<sup>130</sup> See Table 9 in the Appendix. According to the OECD this figure may be as high as 6,9%.

<sup>131</sup> See Table 8 in the Appendix.

<sup>132</sup> See Figure 27 in the Appendix, where Mozambique is represented with the abbreviation "MOZ".

<sup>133</sup> UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT (UNCTAD), *Already quoted*, p. 12. EITE is the abbreviation for "Emissions Intensive Trade Exposed industries".

<sup>134</sup> UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT (UNCTAD), *Already quoted*, p. 9. See also Figure 2 in the Appendix. LDC stands for "Least developed countries".

To understand the motivations behind this strong ambiguity it may be useful to look at the more precise estimates on Mozambique exports (Xiaobei et al, 2022)<sup>135</sup>.

Considering the current state of Mozambique production techniques, its exports of energy intensive products would be subject to relatively small fees<sup>136</sup>. Mozambique, in fact, could be subject to smaller fees than other developing countries, such as Egypt, Turkey and India but even to lower fees than major developed countries as the United States of America or Japan.

It is also essential to point out that Mozambique relies on carbon intensive industries far more than these other countries for economic growth.<sup>137</sup>

The strongest obstacle for Mozambique would then be the ability to prove the low carbon content of its exports. Should the country succeed, it would face an estimated decrease in exports for chemicals and cement of just -5% and a decrease in exports of non-ferrous metals such as aluminum of -1%. Such losses would be compensated for by a 5% to 7% increase of exports of iron and steel<sup>138</sup> and a staggering 20% increase in the export of textiles after the full implementation of CBAM<sup>139</sup>.

These predictions align with the positive effects estimated by the United Nations and justify the positive expectations on the net welfare effects.

Particularly significant is the -1% estimate regarding aluminum exports. The primary risk for Mozambique regarding the introduction of CBAM is tied to its aluminum production and export flow to the EU, constituting 50% of the country's total exports in this sector (PÖHL D., 2023)<sup>140</sup>. In absolute terms, aluminum exports are valued at over one billion dollars<sup>141</sup>. If the country were indeed able to shield its important aluminum industry from high tariffs it may register net positive gains in the long term, as predicted.

Notwithstanding, the presented estimates are not universally accepted. As already mentioned, the OECD estimates that 70% of CBAM exports of Mozambique are directed towards Europe, about 20% more than estimated by the UN. A similar estimate was presented in 2022 by others (Xiaobei et al, 2022)<sup>142</sup>.

Moreover, even if Mozambique may be in a relatively better position compared to other countries, if the Union decided to factor in “*all indirect emissions from upstream value chains [...] in*

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<sup>135</sup> XIAOBEI H., ZHAI F., JUN M., already quoted, 2022.

<sup>136</sup> See Figure 15 in the Appendix. Said effects are motivated by manufacturing sectors that are relatively labor intensive and do not rely extensively on modern technologies.

<sup>137</sup> See Figure 25 in the Appendix, where Mozambique is indicated with the abbreviation “Moz”.

<sup>138</sup> See Figure 14 in the Appendix, where Mozambique is indicated with the abbreviation “Moz”.

<sup>139</sup> See Figure 16 in the Appendix, where Mozambique is indicated with the abbreviation “Moz”.

<sup>140</sup> PÖHL D., *Already quoted*, 2023.

<sup>141</sup> See Figure 23 in the Appendix.

<sup>142</sup> XIAOBEI H., ZHAI F., JUN M., *Already quoted*, 2022.



*calculating the carbon contents*” (Xiaobei et al, 2022)<sup>143</sup>, the African country could incur in a major decrease in export to the European continent that could reach -70%<sup>144</sup>.

According to the authors “*This is an extreme case, as the future expansion of CBAM may or may not be able to cover all goods and using the widest definition of Scope 3 emissions due to technical difficulties especially on data collection and verification*” (Xiaobei et al, 2022)<sup>145</sup>. Even if highly unlikely, this scenario underlines that uncertainty surrounds Mozambique’s future.

Considering the utmost importance that the EU market has for the African country, it is vital to cautiously evaluate any future development.

### 2.3.3. Chile

Chile emerges as a compelling case study for examining the potential impacts of the Carbon Border Adjustment Mechanisms (CBAM), particularly with the view of its robust trade relations with the European Union.

As already said, EU-Chile bilateral trade soared by 169% between 2002 and 2022. The recent signing of a Memorandum of Understanding further solidifies the shared commitment to enhancing trade connections. Given these significant trade volumes, Chile stands poised to experience notable effects from CBAM implementation<sup>146</sup>.

With the EU-Chile agreement eliminating tariffs on the vast majority of EU exports and streamlining trade procedures, any modification induced by CBAM can reshape the flow of goods and services between these partners, limiting Chile’s exports in significant ways. In this sense, CBAM may act to limit the effects of the agreement.

Furthermore, it should be recalled that Chile is the South American country relatively most dependent on the EU for CBAM-covered exports, excluding Venezuela<sup>147</sup>.

Similarly to Mozambique and Morocco, the UN predicted for Chile net GDP gains and a net increase of emission after the implementation of the mechanism<sup>148</sup>.

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<sup>143</sup> XIAOBEI H., ZHAI F., JUN M., *Already quoted*. 2022, p. 5.

<sup>144</sup> See Figure 17 in the Appendix.

<sup>145</sup> XIAOBEI H., ZHAI F., JUN M., *Already quoted*. 2022, p. 5.

<sup>146</sup> See *Memorandum of Understanding establishing a partnership between the EU and Chile on sustainable raw materials value chains*. Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, 2023, 1-5.

<sup>147</sup> See Table 7 in the Appendix. It must be noted that Venezuela’s dependence on the European market for its CBAM-covered products could be motivated, at least partially, by sanctions imposed by the US. With 44.5% of its CBAM-covered exports destined for the EU, Venezuela’s reliance on this market can be interpreted as a direct result of the country’s inability to rely on the US market. The European market emerges as the wealthiest and largest single destination for Venezuela's exports, particularly in key sectors like petroleum or CBAM-covered products.

<sup>148</sup> See Table 10 and Table 11 in the Appendix.

However, it should be noted a major difference. For Mozambique and Morocco, the GDP gains predicted increased with a stricter version of CBAM. That is to say, the African countries may be better off, in terms of overall GDP growth, with a full implementation of CBAM, applied to fuel combustion, industrial processes, imports of electricity and products from energy intensive industries.

A basic implementation of a carbon tax applied only on fossil fuel combustion and industrial processes would limit their positive gains; in the case of Morocco it would even determine a net loss of welfare<sup>149</sup>.

In simpler terms, it has been predicted that a full implementation could, if correctly absorbed, theoretically benefit the two African countries more than a partial implementation. This prediction is not confirmed for Chile, that would be better off in case of a partial implementation.

In the case of Chile, the United Nations forecasted a net welfare increase of \$120.9 million with a base tax set at \$44<sup>150</sup> per tonne of carbon emitted. However, this figure dropped to \$63.26 million with a full CBAM implementation<sup>151</sup>.

Considering the slight decrease in benefits resulting from a full CBAM implementation, it becomes evident that the country remains relatively more susceptible to its negative effects.

While Chile's industrial processes and fuel consumption may align more easily with EU standards, as indicated by the positive effects predicted for a carbon tax on fuel consumption and industrial processes, its energy-intensive industries might not be as compatible, as underscored by the worsened effects of a full CBAM implementation. Therefore, it seems appropriate to specifically investigate Chilean exports to Europe.

Chilean exports to the European Union exhibit an uneven distribution pattern. Predictably, larger economies such as France or Germany import more than smaller states. However, this disparity is almost completely overturned for CBAM imports, which demonstrate considerable variations irrespectively of a country's size<sup>152</sup>.

Put differently, the percentage of CBAM products within the total imports from Chile to European countries varies significantly, regardless of the overall size of each European nation<sup>153</sup>.

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<sup>149</sup> See Table 10 and Table 11 in the Appendix.

<sup>150</sup> For an \$88 tax, the United Nations projected a net welfare increase of \$225.82 million for a base tax and \$119.81 million for a full CBAM implementation with the same tax rate.

<sup>151</sup> See Table 11 in the Appendix

<sup>152</sup> See Table 15 in the Appendix. It is necessary to underlined that the figures presented are an estimate based on data published by the Chilean government, namely by <https://www.aduana.cl/base-de-datos-dinamicas-de-exportaciones/aduana/2020-11-19/151830.html>. Different sources, such as the World Bank, estimate lower figures (see, Table 7).

<sup>153</sup> Exemplarily France and Germany present a notable difference. While 41% of Germany's imports from Chile consist of CBAM-covered products, only a mere 3% of French exports fall into this category. See Table 15 in the Appendix.

It can be noted that countries such as Belgium and Bulgaria import from Chile almost exclusively products that may be interested by the initial version of CBAM. Germany, Spain, Finland, and the Netherlands imports from Chile are constituted by CBAM covered products for more than a third<sup>154</sup>. It is crucial to highlight these disparities when evaluating the impacts of the mechanism. While the Union may act cohesively in terms of tariffs, its economic landscape remains highly fragmented. If most of Chilean exports of CBAM products are concentrated in few EU countries<sup>155</sup>, the imposition of new tariffs could compel some domestic producers to seek alternative markets, effectively closing off a vital avenue for Chilean energy-intensive industries.

For instance, 49% of Finland's imports from Chile are CBAM-covered products<sup>156</sup>. Finland may opt for more economical suppliers after the implementation of new tariffs.

There is no guarantee that Chilean producers, who may have needed years to establish trade ties with Finnish industries and consumers, will be able to redirect their exports to other European nations. There is also no guarantee that the industrial needs of the Finnish economy may be shared by other EU countries.

On the other hand, it may be true that other countries heavily dependent on imports from Chile, such as Bulgaria, will keep relying on imports from Chile because of high transition costs, at least initially.

This analysis highlights another crucial aspect of implementing the mechanism. There are significant differences in the domestic economies of European member states.

For instance, if some countries may decide to import less from Chile because of newly found cheaper suppliers, other countries might choose to keep relying on Chilean imports, even at higher prices because of a stronger historical dependence.

In simpler terms, certain European economies heavily reliant on Chilean exports may exhibit greater resilience to price hikes motivated by tariffs.

This finding points out a broader principle: the varying internal distribution of imports affected by CBAM suggests that its effects may not follow a linear trajectory across countries.

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<sup>154</sup> See Table 15 in the Appendix.

<sup>155</sup> See Figure 26 in the Appendix.

<sup>156</sup> See Table 15 in the Appendix.

## 2.4. Mitigation Strategies for Trade Partners.

### 2.4.1. Technical and legislative strategies.

The newly proposed mechanism expands globally the reach of European green policies to address climate change and modern global environmental challenges. By doing so, it will reshape international trade and directly impact the internal industrial structures of other countries.

Therefore, it is crucial to present the different strategies that countries worldwide, specifically the main trade partners of the Union, can implement to protect their production sectors and ensure positive outcomes.

The first risk associated with the new measure relates to the lack of a universal emissions calculation standard. As already noted, this lack of a shared standard may create disparities and burdens for exporters, as each jurisdiction may devise its own methodology (Baršauskaitė, Tipping, 2023; Ülgen, 2023)<sup>157</sup>.

Additionally, due to limited data available from non-EU countries, the carbon content of imported goods is estimated using benchmarks from the least efficient 10% of European producers. Importers can demonstrate that their products have a lower carbon footprint than this average (European Union, 2023), but failure to do so may result in particularly high tariffs that could prevent access to the European common market<sup>158</sup>.

As already seen in the subparagraphs concerning Mozambique and Morocco, certain developing countries could benefit from the implementation of CBAM, provided they can demonstrate that some of their production processes are indeed less polluting than other<sup>159</sup>.

Both these challenges can be addressed by one specific policy decision: the creation of internationally accredited environmental agencies.

These agencies would need to manage a unit of measurement of GHG pollutants and collect precise data on national emissions.

The creation of said agencies would require robust international cooperation and substantial financial investment. Specifically, establishing environmental agencies would involve setting standardized procedures and guidelines, training personnel, and developing the necessary infrastructure (Pöhl, 2023)<sup>160</sup>.

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<sup>157</sup> BARŠAUSKAITĖ I., TIPPING A., Already quoted in note n. 56, p. 4; In the same sense, see ÜLGEN S., *A Political Economy Perspective on the EU's Carbon Border Tax*, in Strategic Europe, Carnegie Endowment for International Peace, May 9, 2023, 11 – 13, also available in <https://carnegieendowment.org/research/2023/05/a-political-economy-perspective-on-the-eus-carbon-border-tax?lang=en&center=europe>.

<sup>158</sup> EUROPEAN PARLIAMENT, COUNCIL OF THE EUROPEAN UNION, *Regulation (EU) 2023/956* Already quoted, p. 47, Annex IV section 4.1.

<sup>159</sup> See Tables from 11 to 13 and Figures from 14 to 17 in the Appendix.

<sup>160</sup> PÖHL D., *Already quoted*, 2023.

This effort would facilitate a consistent and fair emissions calculation methodology, helping exporters comply with regulations and avoid prohibitive tariffs, ultimately ensuring access to the European common market (Coppo G., Zingariello A., 2023)<sup>161</sup>.

Developed countries may have already established said agencies and the necessary infrastructure, or similar agencies that could be repurposed. On the other hand, developing countries may lack the necessary knowledge, resources, and experience. (Pöhl, 2023)<sup>162</sup>.

The second major challenge associated with the new mechanism involves establishing and enforcing greener internal standards. It seems evident that, in addition to accurately measuring industrial emissions, the enforcement of new standards for companies, ensuring they genuinely adopt more sustainable production methods is also required. Regardless of a country's economic status, several steps are crucial for meeting these higher environmental standards.

First, countries should invest in research and development to devise and adopt cleaner technologies and sustainable practices<sup>163</sup>.

Second, involved parties should implement robust regulatory frameworks and environmental policies; including setting clear emissions targets, enforcing compliance, and providing incentives for businesses to adopt green technologies.

Third, Governments should engage with industry leaders, environmental experts, and civil society to develop and implement effective strategies.

Fourth, countries should prioritize education and training programs to build a skilled workforce capable of supporting sustainable practices and technologies.

By taking these steps, countries can effectively address the challenge of establishing greener internal standards and align their industrial systems to said standards. Nevertheless, all these steps require a substantial investment and can be truly effective only in a time span of several years.

Developed countries may have already started these processes and may possess stronger financial resources that could support national reforms.

On the other hand, developing countries would encounter significant obstacles, as they would need to invest heavily, while simultaneously facing welfare losses induced by CBAM.

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<sup>161</sup> COPPO G., ZINGARIELLO A., Already quoted, 1-6.

<sup>162</sup> PÖHL D., *Already quoted*, 2023.

<sup>163</sup> Developed countries would undoubtedly have an advantage due to their generally well-funded research and development centers, both in the public and private sectors. The ability to adapt to greener requirements through research is one factor that can partially elucidate and forecast opposition to the mechanism, as indicated in Figures 5 and 9 in the Appendix.

Indeed, it has been stated that CBAM “[could decrease] *government revenue and subsequently the budget available for green investments*” (Baker et al, 2022)<sup>164</sup>.

These difficulties open the reflection on a third possible mitigation strategy for trade partners. Countries may also choose to transition their economies altogether to focus on different industries for economic growth.

As seen in the case of Morocco, industries like renewable energy production could more easily benefit from the implementation of CBAM. In contrast, other industries may need significant reforms to meet the new requirements.

If the cost of establishing or supporting greener industries is lower than that of adapting existing, more polluting industries, it would be more advantageous to decarbonize national economies by shifting towards greener sectors rather than attempting to make heavily polluting industries sustainable.

In simpler terms, countries may adapt by focusing on new industries instead of trying to innovate already existing ones. It has been noted that such choice would need “*deep innovation in production, operating, logistical and commercial processes [...]*.” (Gómez, 2021)<sup>165</sup>.

Additionally, there may be political resistance from stakeholders accustomed to the status quo, which could impede progress.

Moreover, countries would face the risk of job displacement in sectors undergoing decline, necessitating effective strategies for retraining and redeployment of workers employed in more polluting sectors<sup>166</sup>.

Furthermore, shifting to greener industries would necessarily generate uncertainties regarding market demand and profitability. In this sense, Governments would almost certainly be required to provide incentives and support to facilitate the transition, such as subsidies, tax breaks, and favorable regulatory frameworks (Lee-Makiyama, 2021)<sup>167</sup>.

While transitioning to greener industries may offer long-term environmental and economic benefits, it requires careful planning, investment, and proactive measures to overcome the challenges associated with such a shift.

Specifically, the required new investments might force developing countries to indebt relevantly, potentially destabilizing their economies and hardening long term prospects of growth.

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<sup>164</sup> BAKER P., BOODHOO BEEHARRY T. Z., LOAN L., QUILES P., RIA R., *Designing an African response to Carbon Border Adjustment Mechanism...* p. 20, Already quoted in note n. 96.

<sup>165</sup> GÓMEZ J. F., Already quoted, p. 194.

<sup>166</sup> See Figure 27 in the Appendix.

<sup>167</sup> LEE-MAKIYAMA H., *The EU Green Deal ...*, Already quoted.

#### 2.4.2 Fiscal strategies

The last challenge associated with the mechanism relates to leakage. As noted, by conditioning access to the European common market, CBAM creates an incentive for nations to adopt similar measures. (Magacho et al, 2022)<sup>168</sup>.

To understand why it is sufficient to mention that to comply with European requirements, trade partners would need to establish and enforce greener policies and stronger environmental standards. In the absence of measures to tackle carbon leakage, strict regulations in one country could prompt industries to move to areas with less stringent policies. (Balachandar et al, 2023)<sup>169</sup>.

In this sense, complying trade partners would face the same exact challenge that motivated the creation of CBAM in the first place. Internationally, the new European legislation would then stimulate the introduction of new environmentally motivated tariffs.

Complying countries will need to protect their own industries from the competitive edge gained by those operating in regions with lax environmental regulations through a complex web of environmental trade barriers, further complicating international trade relations and potentially sparking trade disputes. (Benson et al, 2023)<sup>170</sup>.

If the new European Policy can indeed prompt other major world economies to adopt more robust environmental policies, it could catalyze the global proliferation of CBAs (Carbon Border Adjustment mechanisms).

This could set off a domino effect, where nations globally are compelled to implement similar measures to remain competitive in international trade while imposing stricter environmental standards. This cascading adoption of CBAs could significantly reshape global trade dynamics, leading to a more comprehensive integration of environmental considerations into international economic activities.

Thus, while CBAM aims to encourage greener practices, it also risks triggering a cycle of retaliatory tariffs and highly expensive protectionist measures, underscoring the need for coordinated global action to address environmental and economic challenges in a balanced manner.

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<sup>168</sup> MAGACHO G., ESPAGNE É., GODIN A., *Impacts of CBAM on EU trade partners*, Already quoted.

<sup>169</sup> BALACHANDAR V., BREKENRIDGE A., GATZEN C., PEICHERT P., *Carbon Border Taxes: help or harm to European industry?* in *Frontier Economics*, 10 September 2023 available at: <https://www.frontier-economics.com/es/es/noticias-e-informacion/publicaciones/article-i7771-carbon-border-taxes-help-or-harm-to-european-industry/#>.

<sup>170</sup> BENSON E., MAJKUT J., REINSCH W. A., STEINBERG F., *Analyzing the European Union's Carbon Border Adjustment Mechanism*. Center for Strategic and International Studies (CSIS), Washington D.C., 2023, 1-9.

Although international cooperation and agencies may possess the capacity to facilitate collaboration and protect international trade from witnessing major contractions, tariffs would still be managed locally.

Consequently, indirect taxation would become central to the budgets of many countries. With tariffs potentially playing a more significant role in trade regulation, countries may increasingly rely on indirect taxation to generate revenue and offset any economic impacts resulting from trade disruptions<sup>171</sup>.

Regarding the likelihood of tariffs gaining consideration not as protectionist but as an environmental measure it has been noted that “*Legal risk might be reduced if revenues are earmarked for green investment, just transitions, or international climate finance*” (Keen et al, 2021)<sup>172</sup>.

The extent to which CBAM could stimulate and induce broader adoption of indirect taxation as a new global means to manage international trade, depends on how many countries would impose greener policies.

As developed countries stand to benefit relevantly from the implementation of the mechanism it can reasonably be assumed that wealthier countries will have both the resources and the incentives to implement similar ones<sup>173</sup>.

This final aspect underscores a pivotal consideration in analyzing the CBAM. It will exert fundamentally distinct influences on affluent nations compared to impoverished ones.

## **2.5. Challenges and opportunities.**

### *2.5.1. Developed countries.*

Developed countries stand to benefit from the mechanism, conversely, developing countries may need to prepare for net losses that could relevantly damage their economies.

The main purpose of the European proposal is, as underlined by Commission’s president Ursula Von Der Leyen (European Parliament, 2020)<sup>174</sup>, fighting climate change through the influence of the common market. The new legislation hopes to reduce global emissions by addressing demand towards suppliers that adhere to higher environmental standards.

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<sup>171</sup> See figure 28 in the Appendix on potential revenues through environmental tariffs.

<sup>172</sup> KEEN M., PARRY I., ROAF J., Already quoted, p. 20.

<sup>173</sup> See Table 13 in the Appendix.

<sup>174</sup> EUROPEAN PARLIAMENT, *Political guidelines for the next European Commission 2019-2024 – Opening statement in the European Parliament plenary session 16 July 2019; Speech in the European Parliament plenary session, 27 November 2019*. Publications Office of the European Union, 2020, 1-48.



As already shown, developed countries stand to gain from the implementation of this mechanism due to their possession of more advanced production techniques and generally more sustainable industries.

Although not all developed countries currently adhere to the European Union's environmental standards, it is anticipated that they could more readily adapt to these regulations than countries lacking the same level of technological advancement (Fallmann et al, 2022)<sup>175</sup>.

These predictions have been confirmed by various authors the International Monetary Fund (Xiaobei et al, 2022)<sup>176</sup> and international bodies (OECD, 2021)<sup>177</sup>. Developed countries registered generally low scores in the OECD Exposure index<sup>178</sup>, with the notable exception of the United Kingdom.

Nevertheless, not all developed countries share the same perception of the mechanism. It is worth mentioning that not all the relatively wealthier world economies intend to transition in the near future to more sustainable production methods.

Specifically, Governments in countries where climate change skepticism is prevalent are expected to exhibit greater resistance to CBAM. Conversely, nations with widespread concern about climate change may view CBAM as a legitimate and necessary measure.

There is no absolute correlation between the GDP of a country and its stance towards climate change, therefore it cannot be assumed that all developed countries will align with the Union's policies on environmental protection. Relevantly, it has been highlighted that not even all European Governments share the same views on the subject. (Siddi, 2020)<sup>179</sup>.

The previously mentioned study conducted in 2022 about international opposition to the mechanism (Overland, Sabyrbekov, 2022)<sup>180</sup> predicted the strongest opposition from the Islamic Republic of Iran, Ukraine, the United States of America, the United Arab Emirates, and the Arab Republic of Egypt.

Not all the countries mentioned as main opposers of the mechanism are developing countries that oppose the mechanism because of a lack of necessary resources to adapt<sup>181</sup>.

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<sup>175</sup> FALLMANN H., RITCHIE A., CHEN Y., *The EU's proposed Carbon Border Adjustment Mechanism (CBAM) and its implications for Asia*, Asia Society, 2022, 1-22.

<sup>176</sup> XIAOBEI H., ZHAI F., JUN M., Already quoted, 2022.

<sup>177</sup> OECD, *Round table on sustainable development Connecting Climate Ambition and Trade: How to align policies and build international consensus?* Background note prepared for the 41st Round Table on Sustainable Development, 2021, 1-11.

<sup>178</sup> See Table 7 in the Appendix.

<sup>179</sup> SIDDI M., *The European Green Deal ...*, Already quoted, p. 8.

<sup>180</sup> OVERLAND I., SABYRBEKOV R., *Know your opponent: Which countries might fight the European carbon border adjustment mechanism?* Already quoted, p. 11.

<sup>181</sup> See Figures from 14 to 16 in the Appendix for a general overview on international opposition to the mechanism.

Relevantly, the United States of America, the People's Republic of China and the Russian Federation are also among the fifteen most vocal predicted opposers<sup>182</sup>.

Although wealthier economies may possess the resources to transition towards more sustainable production systems, there is no guarantee that they will choose to do so. This reluctance can be attributed to factors such as internal domestic politics, long-term industrial strategies, as in the case of China, or to an economic dependence on heavily polluting industries, as exemplified by Russia (Leonard et al, 2021)<sup>183</sup>.

It may also be necessary to remember that although the United Nations (UNCTAD, 2021)<sup>184</sup> have predicted net income gains for developed economies<sup>185</sup>, it should be underlined that not all the wealthier economies are expected to gain from the new European environmental policies.

For instance, the UN has simultaneously predicted a possible strong increase in GDP for Japan and the United States of America and a net loss of welfare for Canada<sup>186</sup>.

### 2.5.2. *Developing countries.*

CBAM would impose heavier levies on developing countries, limiting their exporting capabilities. Specifically, developing countries would register contractions in the exports of paper products, petroleum and coal, chemicals, cement, glass, iron, steel, aluminum, and electricity<sup>187</sup>; with electricity, cement and glass registering the most evident decrease.

These sectors possess a relevant role in the total economic output of many developing countries that still rely on manufacturing and other energy intensive sectors for their economic growth and social development<sup>188</sup>.

Given their existing financial difficulties and economic uncertainties, it is predicted that these countries will also struggle to adapt and innovate (Pöhl, 2023)<sup>189</sup>.

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<sup>182</sup> See figures 9 and 10 in the Appendix, which present the predicted strongest opponents of the project. The 15 countries predicted to be the most vocal opponents include: the Islamic Republic of Iran, Ukraine, the United States of America, the United Arab Emirates, the Arab Republic of Egypt, the Republic of India, the People's Republic of China, the Republic of Kazakhstan, the Russian Federation, the Republic of Belarus, Libya, the Kingdom of Saudi Arabia, the Republic of Indonesia, Bosnia and Herzegovina, and the State of Kuwait.

<sup>183</sup> LEONARD M., PISANI-FERRY J., SHAPIRO J., TAGLIAPIETRA S., WOLFF G. B., *The geopolitics of the European green deal*. Policy contribution no. 04, European Council on Foreign Relations, 2021, p. 20.

<sup>184</sup> UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT (UNCTAD), *A European Union Carbon Border Adjustment Mechanism*, Already quoted, p. 25.

<sup>185</sup> See Table 12 and 13 in the Appendix.

<sup>186</sup> See Table 11 in the Appendix.

<sup>187</sup> See Table 12 in the Appendix.

<sup>188</sup> See Figure 11 in the Appendix.

<sup>189</sup> PÖHL D., Already quoted, p. 6.

It is worth mentioning that the affected sectors are generally labor-intensive in developing countries and provide employment and wages for a substantial portion of the population<sup>190</sup>.

Thus, contracting GDPs would also lead to significant layoffs, potentially undermining societal stability.

For instance, in Mozambique, up to 6% of all wages may depend on CBAM sectors, either through direct employment or indirectly through related industries.

In Europe, Serbia and Bosnia have the highest estimated percentage of employment dependent on CBAM industries, respectively 2.8% and 3% of the total workforce<sup>191</sup>.

Nevertheless, it should be remembered that not all developing countries will be affected in the same way by the new mechanism. As already said, some developing countries would face lower tariffs compared to others<sup>192</sup>.

Consequently, some developing countries might see only minor reductions in exports and minimal impact on their gross domestic products. Therefore, they would need only limited investments to mitigate the negative effects of the mechanism.

However, it would still be necessary to sustain the relevant costs of establishing internationally accredited environmental agencies and reliably prove the claimed green attributes of their economies.

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<sup>190</sup> See Figure 27 in the Appendix.

<sup>191</sup> See Figure 27 in the Appendix.

<sup>192</sup> See Figure 15 in the Appendix.

## CHAPTER 3: CBAM, SUSTAINABLY AND DEVELOPMENT: THE NEW FRONTIER OF INTERNATIONAL TAXATION?

### 3.1. Linking CBAM to Sustainable Development Goals.

#### 3.1.1. CBAM and its possible role in achieving Sustainable Development Goals.

At the heart of global development aspirations lie the “*Sustainable Development Goals*” (SDGs), a set of 17 interconnected objectives crafted by the United Nations to address pressing socio-economic and environmental challenges facing humanity<sup>193</sup>.

These goals, adopted in 2015 as part of the 2030 Agenda for Sustainable Development, serve as a universal call to action, to address the most relevant challenges of today, end poverty, protect the planet, and ensure prosperity for all by 2030.

Developed through an extensive consultative process involving governments, civil society, academia, and the private sector, the SDGs reflect a shared commitment to transform our world for the better. (United Nations, 2023)<sup>194</sup>.

For the UN, the SDGs serve as a roadmap towards a more just, resilient, and sustainable world, embodying the Organization’s core values and vision for a better future for all.

By addressing these interconnected challenges in a holistic manner, the SDGs aim at fostering peace, prosperity, and well-being for current and future generations.

Moreover, the SDGs embody the principles of multilateralism and international cooperation, highlighting the importance of collective action and partnership across borders to tackle shared global issues effectively. The count of indicators used in the global SDG database surged from 115 in 2016 to 225 in 2023.

As a consequence, the data entry records within the database multiplied from 330.000 in 2016 to 2.7 million by May 2023. This exponential growth underscores the remarkable expansion of the global SDG database within a mere seven years. (United Nations, 2023)<sup>195</sup>.

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<sup>193</sup> The 17 goals set by the UN: No Poverty, Zero Hunger, Good Health and Well-being, Quality Education, Gender Equality, Clean Water and Sanitation, Affordable and Clean Energy, Decent Work and Economic Growth, Industry, Innovation and Infrastructure, Reduced Inequality, Sustainable Cities and Communities, Responsible Consumption and Production, Climate Action, Life Below Water, Life on Land, Peace, Justice and Strong Institutions, Partnerships for the Goals.

<sup>194</sup> UNITED NATIONS, *The Sustainable Development Goals Report 2023: Special Edition*. United Nations, New York, 2023, p. 8.

<sup>195</sup> UNITED NATIONS, *The Sustainable Development Goals Report 2023* ..., already quoted, 1-80.

Countries are now at the midpoint of the ambitious 2030 Agenda, relevantly the collective efforts of nations worldwide are falling short of meeting most of the SDGs within the designated timeframe<sup>196</sup>.

According to the UN: *“of the approximately 140 targets that can be evaluated, half of them show moderate or severe deviations from the desired trajectory. Furthermore, more than 30 per cent of these targets have experienced no progress or, even worse, regression below the 2015 baseline”*<sup>197</sup>.

While there have been notable strides in certain areas, a disconcerting number of targets are either progressing at a remarkably slow pace or even regressing, signaling the need for a renewed sense of urgency and concerted action.

The Green Deal asserts its alignment with the SDGs and prioritizes citizen well-being as core principles guiding the European Union’s policy formulation and initiatives.

It underscores the belief that economic growth, social equitability, and environmental advancement are harmonious and mutually beneficial objectives.

The Green Deal outlines nine key policy domains on which it will have a relevant influence, including Climate Action, Clean Energy, Sustainable Industry, Building and Renovation, Pollution Reduction, Sustainable Agriculture, Biodiversity, and Sustainable Mobility (EU Commission, 2023)<sup>198</sup>.

Nevertheless, the actions of the EU alone cannot change the direction of the world trends.

In this sense, it must be noted the importance of other major world economies, notably the US and China.

If the EU alone accounts for only 10% of world emissions, the three biggest world economies together (US, China and Europe) account for 54% of global emissions<sup>199</sup>.

In the realm of cooperative climate action, the global community often finds itself in a challenging scenario akin to the famous prisoner’s dilemma. This dilemma highlights a situation where individual actors - in this case, nations - must decide whether to cooperate for a common good or pursue their self-interest.

The dilemma arises because while cooperation yields the best overall outcome, there still is a temptation for each nation to defect, fearing that others will not cooperate and seeking to maximize their own gains.

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<sup>196</sup> See Figure 29 in the Appendix.

<sup>197</sup> UNITED NATIONS., The Sustainable Development Goals Report 2023 . . . , already quoted, p. 8.

<sup>198</sup> EUROPEAN COMMISSION, *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of The Regions, A Green Deal Industrial Plan for the Net-Zero Age*. Brussels, 2023,

<sup>199</sup> See Figure 30 in the Appendix.

The same dynamic in climate change leads to a suboptimal outcome where nations prioritize their short-term interests over long-term sustainability, fearing that other countries might free ride on their efforts.

The predicament has historically hindered effective cooperation, leading to dramatic setbacks such as those witnessed in the Kyoto agreement and the 26th Conference of Parties (COP26) in Glasgow, 2021 (Devarajan et al., 2023)<sup>200</sup>.

A possible solution is represented by a strategy of “*persuasive coercion*”, the ideation of a mechanism that penalizes nations that avoid their responsibilities and might benefit from noncompliance. In this sense a climate alliance (or “*club*”<sup>201</sup>), could be the most effective solution (Perdana, Vielle, 2023)<sup>202</sup>.

Integrating the Carbon Border Adjustment Mechanism (CBAM) with a climate club would allow participating countries to strictly manage emissions and coordinate tariffs on imports, addressing issues of leakage and burden sharing.

Therefore, it is necessary to focus “*on analyzing the impacts when a border tariff protection is implemented amongst a climate club consisting of the EU, the US, and China.*” (Perdana, 2023)<sup>203</sup>.

The carbon border adjustment mechanism (CBAM tariffs) implemented by the European Union effectively counteracts the unfair competitive advantage enjoyed by noncompliant countries in the markets of compliant nations.

However, their impact on the trade of noncompliant countries is limited, as these nations can redirect their trade to other noncompliant counterparts.

In other words, the EU’s strong commitment and unilateral actions have limitations. As an economic union, the EU alone cannot advance the UN SDGs without similar efforts from major emitters like China and the US.

The main obstacle to the creation and the maintenance of the “*climate club*” between these three players would be represented by their different climate objectives.

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<sup>200</sup> DEVARAJAN S., GO D. S., ROBINSON S., THIERFELDER K., *How Carbon Tariffs and Climate Clubs Can Slow Global Warming*, 22-14 WP, Peterson Institute of International Economics, Washington D.C., 2022, 1 – 45.

<sup>201</sup> A climate club is a coalition of countries that voluntarily come together to take collective action on climate change. These countries agree to implement more ambitious climate policies and to cooperate on initiatives aimed at reducing greenhouse gas emissions. The goal is to enhance global climate action by setting common standards, sharing technologies, and potentially imposing trade measures like carbon tariffs on non-member countries to encourage broader participation. Climate clubs seek to overcome the free-rider problem in international climate agreements by creating incentives for countries to join and comply with the club's climate objectives.

<sup>202</sup> PERDANA S., VIELLE M., *Carbon Border Adjustment Mechanism in the Transition to Net-Zero Emissions: Collective Implementation and Distributional Impacts*, Environmental Economics and Policy Studies, vol. 25, 2023, 299–329.

<sup>203</sup> PERDANA S., VIELLE M., *Carbon Border Adjustment Mechanism in the Transition to Net-Zero Emissions: Collective Implementation and Distributional Impacts*. Environmental Economics and Policy Studies, vol. 25, 2023, pp. 299–329. At p. 301

The EU currently aims to achieve a 100% reduction in emissions by 2050, compared to 1990 levels, China, on the other hand, will not implement any relevant reduction until 2030 and would reach achieve a 100% reduction in emissions compared to 1990 levels only by 2060<sup>204</sup>.

The differences in overall environmental goals would be reflected in the adopted carbon taxes and might obstacle international cooperation<sup>205</sup>.

It seems possible to state that without significant international cooperation or without leveraging its internal market to compel other countries to adopt greener policies, the EU will struggle to advance SDGs on a global scale (Sarangi, 2023)<sup>206</sup>.

### 3.1.2. CBAM and Social Equality.

While this policy aims at levelling the playing field for EU Industry, it also raises significant concerns related to social equality, both within the EU and globally.

Firstly, CBAM's impact on social equality within the EU must be examined.

The overall implementation of the Green Deal (GD), which includes CBAM, could trigger sustainability impacts not only regarding financial and economic support, but also because of associated social inequities (Filipović et al., 2022)<sup>207</sup>.

It applies unequal additional pressures on specific regions of the EU that have energy and carbon-intensive industries, on vulnerable households, and on substantial transport users in the short run<sup>208</sup>. These impacts highlight the necessity for policymakers to mitigate negative effects, particularly on low-income households that might be disproportionately affected by increased prices for imported goods.

The EU has not ignored these possible controversies and has set up a comprehensive framework and a vast fund designed to support vulnerable communities. The Just Transition Mechanism (JTM) Fund is an EU financial tool designed to support regions and workers most affected by the shift to a low-carbon economy<sup>209</sup>.

Funded by the EU budget, member state co-financing, and private investments, it targets regions heavily reliant on fossil fuels and carbon-intensive industries, such as coal mining areas.

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<sup>204</sup> See Figure 31 in the Appendix.

<sup>205</sup> See Figure 32 in the Appendix.

<sup>206</sup> SARANGI U., *Implications of Carbon-Border Adjustment Mechanism (CBAM) and its Ramifications in Achieving Sustainable Development Goals and the United Nations 2030 Agenda*, in *International Journal of Legal Studies*, 2(14) 2023, 603 - 620.

<sup>207</sup> FILIPOVIĆ S., LIOR N., RADOVANOVIĆ M., *The green deal – just transition and sustainable development goals Nexus* Renewable and Sustainable Energy Reviews, Elsevier, vol. 168(C). 2022. 1-12. Fig 6.

<sup>208</sup> See figure 33 in the Appendix.

<sup>209</sup> See figure 34 in the Appendix.

The fund supports projects that promote economic diversification, job creation, and the transition to sustainable energy, including investments in SMEs, startups, research, and worker retraining (Filipović et al, 2022)<sup>210</sup>.

Member States will devise and submit territorial transition plans, which require approval by the European Commission, outlining their use of the funds to address socio-economic challenges.

The implementation of these projects is monitored and evaluated to ensure they contribute effectively to a fair and sustainable transition.

The socio-economic consequences will become even more pronounced if existing economic aid packages are reduced.

It must be made emphatically clear that allowing, or worse, causing, inequality between Member States and regions poses a serious risk to the unity of the EU itself and for sustainable development (Sarangi, 2023)<sup>211</sup>.

This underscores the need to carefully consider the socio-economic dimension of the Green Deal. Ensuring equitable development across all regions is crucial for maintaining EU unity and achieving sustainable development goals (Sarangi, 2023)<sup>212</sup>.

On a broader scale, CBAM could have profound implications for social equality between nations. As observed in the cases of Morocco, Mozambique and Chile, developing countries, which often have higher carbon intensities, due to less advanced technologies and a reliance on fossil fuels, could face significant economic challenges.

The increased costs of exporting goods to the EU might reduce their competitive edge, leading to economic hardship and potentially stalling development efforts (Magacho et al, 2022)<sup>213</sup>.

This scenario underscores the importance of providing financial and technical support to help developing countries transition to greener technologies. Such support would not only promote global social equality, but also foster international cooperation in combating climate change.

While the ultimate objective is to create a healthier environment, the transition period to more sustainable practices might bring job losses in carbon-intensive sectors and increased costs for consumers (Filipović et al., 2022)<sup>214</sup>.

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<sup>210</sup> FILIPOVIĆ S., LIOR N., RADOVANOVIĆ M., *The green deal ...*, already quoted, Fig. 6.

<sup>211</sup> SARANGI U., *Implications of Carbon-Border Adjustment Mechanism (CBAM) ...*, 603 - 620.

<sup>212</sup> SARANGI U., *Implications of Carbon-Border Adjustment Mechanism (CBAM) ...*, 603 - 620.

<sup>213</sup> MAGACHO G., ESPAGNE É., GODIN A., already quoted, 2022.

<sup>214</sup> FILIPOVIĆ S., LIOR N., RADOVANOVIĆ M., *The green deal...*, already quoted, Fig 6.



## 3.2. Implementing the CBAM Sustainability: Road Map.

### 3.2.1. Climate Objectives and Free Trade.

In the wake of extensive discussions on the Carbon Border Adjustment Mechanism (CBAM), it becomes necessary to consider how climate objectives and sustainable policies impact international trade.

Tariffs, by their very nature, contradict the principles of free trade, which advocate for the unrestricted exchange of goods and services across international borders.

Free trade presumes eliminated barriers such as tariffs, quotas, and subsidies, fostering an environment where market forces drive efficiency and innovation.

Environmental protection, however, forces international prices to internalize additional costs imposed on imported goods, creating a price disparity that protects domestic industries from foreign competition (Keen et al, 2021)<sup>215</sup>.

Without a CBAM, foreign supply does not account for the social cost of carbon emissions.

When carbon is priced at the border through a CBAM, domestic supply reflects this cost.

The welfare gains from implementing a CBAM includes the difference in social surplus between imports and domestic production for all imports replaced by domestic production<sup>216</sup>.

Without a CBAM, imported goods are competitively priced because their production costs exclude climate-related expenses. However, this scenario is suboptimal as the climate cost should be incorporated into the overall production cost.

The CBAM accomplishes this by reducing the competitiveness of foreign products, as their production costs now account for the climate impact. To accurately assess the effects of CBAM on exports of foreign countries, it is beneficial to examine a specific example. Let's consider a scenario where the EU imposes carbon tariffs on China due to its relatively more carbon-intensive production systems.

After the tariffs imposed, the export prices of the sectors subjected to taxation in China decrease, to maintain international competitiveness, triggering spillover effects across other sectors, except for crude oil and natural gas extraction<sup>217</sup>. This last two sectors in China are generally not exposed, because of great domestic demand (Zhu et al., 2024)<sup>218</sup>.

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<sup>215</sup> KEEN M., PARRY I., ROAF J., *Working Paper Border Carbon Adjustments: Rationale, Design and Impact*, IMF-Fiscal Affairs Department, 2021, Washington D.C., 1-42.

<sup>216</sup> See Figure 13 in the Appendix.

<sup>217</sup> See Figure 35 in the Appendix.

<sup>218</sup> ZHU J., YUHUAN Z., LU Z., *The Impact of the EU Carbon Border Adjustment Mechanism on China's Exports to the EU*, in *Energies*, vol. 17, no. 2, 2024, article 509, 1-18.

This adjustment in export prices is more pronounced when carbon emissions calculations shift from direct carbon emissions to embodied carbon emissions, encompassing energy production and transportation emissions (Zhu et al., 2024)<sup>219</sup>.

With the expansion of taxation to all sectors, agriculture, forestry, animal husbandry, and fisheries emerge as the most impacted sectors, replacing non-metallic mineral products.

Simulation outcomes regarding China's export volume to the EU reveal that most taxed sectors encounter both export transfer and export inhibition effects<sup>220</sup>.

Conversely, for non-taxed sectors, the growth rate of exports to the EU surpasses that of other countries or regions.

Regarding trade value, the EU CBAM not only diminishes China's total export value but also notably reduces the EU's total exports, with the latter experiencing a more substantial decline<sup>221</sup>.

The impact on export value escalates notably with both the broadening of the taxation scope and adopting embodied carbon emissions as the calculation category, with the latter exerting a more pronounced effect on China's exports (Zhu et al., 2024)<sup>222</sup>.

The implementation of the EU Carbon Border Adjustment Mechanism (CBAM) significantly impacts the terms of trade between the EU and China. Notably, the implementation of the EU CBAM tilts the terms of trade in favor of the EU while adversely affecting the terms of trade for China.

By internalizing the social cost of carbon emissions, CBAM alters the competitive landscape, making foreign products less competitive compared to domestically produced goods. (Sarangi, 2023)<sup>223</sup>.

Consequently, while the EU benefits from improved terms of trade due to CBAM, China experiences a deterioration in its terms of trade.

This shift occurs because CBAM reduces China's total export value and significantly decreases the EU's total exports<sup>224</sup>, particularly with the expansion of the taxation scope and changes in carbon emission calculations. (Zhu et al., 2024)<sup>225</sup>

As a result, the EU gains a more favorable position in trade negotiations and exchanges, while China faces challenges in maintaining its export competitiveness in the EU market.

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<sup>219</sup> ZHU J., YUHUAN Z., LU Z., *The Impact of the EU Carbon Border Adjustment Mechanism on China's Exports to the EU*. *Energies*, vol. 17, no. 2, 2024, article 509, 1-18.

<sup>220</sup> See Figure 36 in the Appendix.

<sup>221</sup> See Figure 37 in the Appendix.

<sup>222</sup> ZHU J., YUHUAN Z., LU Z., *The Impact of ...*, already quoted, 1-18.

<sup>223</sup> SARANGI U., already quoted, 2023.

<sup>224</sup> Because of greater internal demand.

<sup>225</sup> ZHU JINGZHI., YUHUAN ZHAO., LU ZHENG., *The Impact of the EU Carbon Border Adjustment Mechanism on China's Exports to the EU*. *Energies*, vol. 17, no. 2, 2024, article 509, 1-18.

By artificially altering the competitive landscape, tariffs distort market dynamics, restrict consumer choices, and can provoke retaliatory measures from trading partners, ultimately undermining the global economic integration that free trade seeks to achieve.

Considering what has been said, to implement CBAM successfully it is necessary to investigate the possible strategies that countries might implement to circumvent the new tariffs.

First, the CBAM might incentivize third countries to engage in resource shuffling. This means that more carbon-intensive products could be redirected to regions with less stringent climate policies, while less carbon-intensive products are sent to regions implementing the CBAM (Sarangi, 2023)<sup>226</sup>.

It has been noted that the EU represents the main trade partner of CBAM covered products for various countries, however it cannot be excluded that producers will be able to redirect their carbon intensive exports to other countries.

In this sense the Union would be able to decarbonize only its internal production, failing to stimulate a global revolution. (Sarangi, 2023)<sup>227</sup>

Additionally, using certified verified measures in the CBAM calculation to track the carbon intensities of goods could lead to manipulation of emissions data. Default values might encourage companies to provide verified data only when actual emissions are lower than these defaults.

It will be necessary to establish a complex system of certifications that should be provided and verified by international customs across the Union and possibly the world.

The associated bureaucratic and logistical prices could constitute an excessive obstacle to many producers, especially in developing countries.

Lastly, if major trading partners outside the EU/EFTA were to consider the mechanism illegitimate, they might retaliate with reciprocal tariffs. (Overland, Sabyrbekov, 2022)<sup>228</sup>.

If these partners are unwilling to adopt the same system as the EU/EFTA, they might, for example, introduce counter-tariffs based on other principles, such as emissions per capita, likely triggering trade disputes (Baršauskaitė, Tipping, 2023)<sup>229</sup>.

The implementation of the EU Carbon Border Adjustment Mechanism (CBAM) significantly impacts international trade dynamics.

While CBAM aims at addressing the internalization of carbon costs and promote sustainability, its effects extend beyond trade, influencing terms of trade and global economic integration.

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<sup>226</sup> SARANGI U., already quoted, 2023.

<sup>227</sup> SARANGI U., already quoted, 2023.

<sup>228</sup> OVERLAND I., SBYRBEKOV R., *Know your opponent: Which countries might fight the European carbon border adjustment mechanism?* in Energy Policy, 2022, 169, 1 – 12, already quoted.

<sup>229</sup> BARŠAUSKAITĖ I., TIPPING A., *Border Carbon Adjustments: Priorities for international cooperation*. IISD, Winnipeg, 2023, 1-10, already quoted.

Challenges such as resource shuffling, data manipulation, and potential trade disputes with non-EU/EFTA trading partners underscore the complexity of a sustainable implementation.

As discussions continue and policies evolve, it becomes imperative to balance environmental objectives with trade considerations to foster a sustainable and equitable global trading system.

### 3.2.2. CBAM, the Mattei Plan and the European Union's goals.

At the end of January 2024, Italy hosted an Africa summit, where the Prime Minister, Giorgia Meloni, unveiled the “Mattei Plan”, an innovative approach to reimagining the relationship between Africa and Italy, and more broadly, between Africa and Europe<sup>230</sup>.

The plan includes a comprehensive energy and social plan for the continent, aiming to foster sustainable development and mutual growth (Italian Government, 2024)<sup>231</sup>.

Highlighting the importance of the summit, Prime Minister Meloni underlined that: “*This is, in fact, the first time that the Italy-Africa Conference is being held as a Summit with the participation of Heads of State and Governments, having been held only at ministerial level in the past. This choice also reiterates the key importance Italy attributes to its relations with African countries*” (Presidency of the Council of Ministers, 2024)<sup>232</sup>.

Initially, the Mattei Plan will focus on nine pilot projects in Algeria, the Democratic Republic of Congo, Egypt, Ethiopia, Ivory Coast, Kenya, Morocco, Mozambique, and Tunisia (Fattibene, Manservisi, 2024)<sup>233</sup>.

These projects will target five critical areas: education and training, agriculture, health, energy, and water. The Mattei Plan begins with an initial funding of 5.5 billion euros, sourced from grants, credits, and guarantees<sup>234</sup>.

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<sup>230</sup> In fact, the summit also included the President of the EU Commission, Mrs. Ursula Von der Leyen and the President of the EU Council, Mr. Charles Michel, who support the Mattei Plan as well.

<sup>231</sup> ITALIAN GOVERNMENT., *Legge n. 2/2024, n. 161*, containing: “*Disposizioni urgenti per il Piano Mattei*” in G.U. n. 10, on January 13, 2024.

<sup>232</sup> PRESIDENCY OF THE COUNCIL OF MINISTERS, *President Meloni's Opening Address at the Italia-Africa Summit*, January 29, 2024 in <https://www.governo.it/en/articolo/president-meloni-s-opening-address-italia-africa-summit/24861>.

<sup>233</sup> FATTIBENE D., MANSERVISI S., *The Mattei Plan for Africa: A Turning Point for Italy's Development Cooperation Policy?* in IAI Commentaries, 2024, 10, 1 – 6.

<sup>234</sup> Three billion euros will come from the National Climate Fund, managed by the Public Development Bank - Cassa Depositi e Prestiti (CDP), under the Ministry of Environment, while the remaining 2.5 billion euros will be drawn from the Development cooperation budget. The plan's execution will be overseen by a Steering Committee based at the Prime Minister's Office, coordinating with key players in the national cooperation system, including ministries, CDP, the Italian Development Cooperation Agency (AICS), the Italian Trade Agency, the Italian Export Credit Agency, local authorities, civil society organizations, and the private sector.

The Plan aims at attracting public and private investments into significant African programs, such as the Comprehensive Africa Agricultural Development Programme, the Programme for Infrastructure Development in Africa, and the African Continental Free Trade Area.

Additionally, the Mattei Plan could pave the way for new funding mechanisms. It could enhance the role of CDP as the Italian Development Bank, encouraging private sector investments in a manner similarly to Development banks in France, Germany, and the Netherlands (Fattibene, Manservisi, 2024)<sup>235</sup>.

It may also facilitate the creation of multilateral funds within Development banks, particularly the African Development Bank (AfDB) in partnership with the United Arab Emirates and support ongoing negotiations at the G7 level.

The plan seeks to establish a new partnership model with African countries through an incremental approach, where goals and targets are collaboratively designed with local partners.

This approach will be synergized with ongoing European initiatives such as the Team Europe Initiatives<sup>236</sup> and the Global Gateway<sup>237</sup>, and will involve cooperation with international partners such as the members of the G7 and the Gulf States.

The plan recalls the legacy of Enrico Mattei and his renowned non-exploitative approach to Africa, rooted in the belief that there are numerous unseen opportunities in the relationship between the Old Continent and Africa.

Beyond Italy, the Mattei Plan has generated significant anticipation in Africa, and in the EU, for its innovative and integrated approach to development and international partnerships. According to the Italian Government, it has received a warm reception from key African and European leaders, with 21 African Heads of State and Government, various Foreign Ministers, and high-level representatives from the European Union, World Bank, IMF, and OECD attending the 2024 summit in Rome (Presidency of the Council of Ministers, 2024)<sup>238</sup>.

To increase the impact of the European investments, the President of the African Development Bank (AfDB), Mr. Akinwumi Adesina, has suggested leveraging the plan to unlock part of the IMF

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<sup>235</sup> FATTIBENE D., MANSERVISI S., already quoted.

<sup>236</sup> See [https://capacity4dev.europa.eu/resources/team-europe-tracker\\_en](https://capacity4dev.europa.eu/resources/team-europe-tracker_en). The Team Europe Initiative is a collaborative effort by the EU and its Member States to tackle global challenges, particularly in development cooperation. By pooling resources and expertise, it aims at maximizing the impact of assistance in partner countries, focusing on poverty reduction, sustainable development, climate change, and security.

<sup>237</sup> See the European Commission website at [https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/stronger-europe-world/global-gateway\\_it](https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/stronger-europe-world/global-gateway_it).

The Global Gateway is an EU initiative to enhance global connectivity through sustainable, high-quality infrastructure projects. It focuses on digital, energy, transport, health, and education sectors, promoting investments aligned with EU values. Aiming to mobilize up to €300 billion by 2027, the initiative emphasizes transparency, good governance, and environmental sustainability, offering an alternative to other global infrastructure efforts.

<sup>238</sup> PRESIDENCY OF THE COUNCIL OF MINISTERS, *President Meloni's Opening Address at the Italia-Africa Summit*, already quoted.

Special Drawing Rights via multilateral development banks such as the AfDB or the Inter-American Development Bank. (Fattibene, Manservisi, 2024)<sup>239</sup>.

The project received the support of German Chancellor Olaf Scholz. Chancellor Scholz addressed Africa's concerns about the upcoming Carbon Border Adjustment Mechanism (CBAM) at the EU's external borders by inviting the continent to join his proposed "climate club"<sup>240</sup>.

Through a climate club Africa would enter a strong partnership with the Union to advance and develop its productive systems and environmental policies to greener standards. As a result of the greener policies Africa would then face lower tariffs under CBAM.

In this sense a European version of the Mattei Plan could avoid the predicted loss of trade induced by CBAM between developing countries in Africa and Europe and lead the two continents closer together.

The details of the Mattei Plan are still largely unknown, leading to concerns about its true extent and impact (Mezran, Pavia., 2023)<sup>241</sup>. Relevantly, the implementation of the Mattei Plan needs to address several critical elements.

First, as underlined by Moussa Faki, Chair of the African Union Commission, establishing thorough and dedicated dialogues with African countries and organizations like the African Union is essential to identify and co-design joint programs and projects. (Fattibene, Manservisi., 2024)<sup>242</sup>. Furthermore, it has been suggested that the Mattei Plan should enhance Italian participation in EU tools like EFSD+ to reduce private investment risks.

Given high expectations, the Plan needs to deliver concrete, long-term results with adequate funding and its Steering Committee must include all Italian entities involved and independent experts to avoid excessively centralized governance.

Italian Embassies and AICS local offices may be particularly important in promoting the Plan, collaborating with EU delegations and connecting Italian and African companies (Fattibene, Manservisi, 2024)<sup>243</sup>.

Clearly, it cannot be expected that Italy will be able to manage and implement a bi-continental project alone. The positive remarks of political leaders of the Union highlighted the European interest for the plan and unveiled what the Europeans goals might be in the future.

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<sup>239</sup> FATTIBENE D., MANSERVISI S., already quoted.

<sup>240</sup> KURMAYER N. J., Scholz's master plan for Africa to bypass the EU's CO2-tariff, in Euractive, 22 February 2022, available in <https://www.euractiv.com/section/energy-environment/news/scholzs-master-plan-for-africa-to-bypass-the-eus-co2-tariff/>

<sup>241</sup> MEZRAN KARIM., PAVIA ALISSA. *Giorgia Meloni's Foreign Policy and the Mattei Plan for Africa: Balancing Development and Migration Concerns*. Istituto Affari Internazionali COMMENTARIES 23 | 36, 2023, 1-6.

<sup>242</sup> FATTIBENE D., MANSERVISI S., already quoted.

<sup>243</sup> FATTIBENE D., MANSERVISI S., already quoted.

The Mattei Plan aims at shielding African countries from the adverse impacts of the Carbon Border Adjustment Mechanism (CBAM), by supporting their development. The initiative could foster sustainable development, enabling African nations to meet climate standards, while promoting economic growth.

Therefore, the Italian proposal may represent the beginning of a broader transformation of the relationship between the two continents.

### **3.3. What are the Benefits for the Developing Countries?**

Provided that the African continent will receive the necessary support, (Pöhl, 2023)<sup>244</sup>, the green transition toward more sustainable industries presents a significant opportunity for developing countries.

The shift would not only align the continent with global environmental goals but also offers a multitude of economic, social, and environmental benefits.

Central to this transition is the Carbon Border Adjustment Mechanism (CBAM), which could exclude African countries from trade with the European Union. By embracing sustainable practices, these nations can shield themselves from tariffs.

One of the most profound advantages of the green transition for developing countries is the economic uplift it can provide. Traditionally, these countries have relied heavily on industries that are carbon-intensive, making them vulnerable to the impending CBAM tariffs imposed by developed nations.

By shifting to greener industries, developing countries can avoid these tariffs, making their exports more competitive on the global market. This competitive edge can protect and stimulate trade and investment, fostering economic growth (Mezran, Pavia, 2023)<sup>245</sup>.

Developing countries possess abundant natural resources, including lithium, cobalt, and renewable energy sources like wind, solar, and water. These resources are vital in the production of renewable energy and of modern technologies (Pöhl, 2023)<sup>246</sup>.

Through investments in solar, wind, and hydroelectric power, these nations can leverage their natural wealth to generate clean energy. This transition not only decreases reliance on fossil fuels, but also establishes relevant opportunities for exports.

Resources for the African effort towards sustainability can only come from abroad.

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<sup>244</sup> PÖHL D., *Gli impatti del CBAM sui paesi in via di sviluppo*, Equilibri Magazine, 2023, 1-7 already quoted.

<sup>245</sup> MEZRAN K., PAVIA A., *Giorgia Meloni's Foreign Policy and the Mattei Plan for Africa: Balancing Development and Migration Concerns*, in IAI Commentaries, 2023/36, 1 – 6, already quoted.

<sup>246</sup> PÖHL D., already quoted.

It has also been noted that “*The European Union might consider deploying CBAM flanking policies capable of narrowing, and eventually eliminating, the gaps between developed and developing countries projected by the model. [...] the European Union could [use] the revenue generated by the CBAM to accelerate the diffusion [...] of cleaner production technologies in developing countries in the CBAM’s targeted sectors.*” (UNCTAD, 2021)<sup>247</sup>.

In this sense, the demand for cleaner energy from developed European countries could provide the economic resources needed for progress.

Germany poised to become the largest hydrogen importer in the EU, and Egypt, with its ambitious hydrogen strategy, is establishing a collaboration to enhance renewable hydrogen production with the idea of exporting the product to German decarbonizing industries (Gritz, Wolff, 2024)<sup>248</sup>.

Many nations within the Africa Green Hydrogen Alliance (AGHA)<sup>249</sup>, notably Morocco and South Africa, face circumstances akin to Egypt’s, characterized by significant renewable energy potential alongside challenging investment climates.

While the Carbon Border Adjustment Mechanism (CBAM) incentivizes decarbonization, it may encounter resistance in emerging markets over concerns that it may undercut the competitiveness of locally intensive emission-based production. (Gritz, Wolff, 2024)<sup>250</sup>.

European-African partnerships offer a viable approach to mitigating CBAM-related concerns while addressing apprehensions regarding potentially exploitative partnership paradigms. However, substantial financing costs present a significant barrier to capital-intensive green projects, especially in the emerging economies.

A comprehensive approach should integrate and finance industrial development together with energy production, so to offer a more promising partnership strategy than one focusing solely on exporting energy to the EU (Gritz, Wolff, 2024)<sup>251</sup>.

The environmental benefits of a green transition are clearly substantial. Developing countries often suffer the most from the impacts of climate change, such as extreme weather events, rising sea levels, and degraded natural resources.

By adopting sustainable industrial practices, these nations can significantly reduce their greenhouse gas emissions, contributing to global efforts to mitigate climate change. This shift not

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<sup>247</sup> UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT (UNCTAD), *A European Union Carbon Border Adjustment Mechanism*, Geneva, 2021, already quoted, p. 24.

<sup>248</sup> GRITZ A., WOLFF G. B., *CBAM, Hydrogen Partnerships and Egypt’s Industry: Potential for Synergies*, in *Intereconomics*, vol.59, no.2, 2024, 92-97.

<sup>249</sup> More information at: <https://gh2.org/agma>

Six prominent African nations, namely Egypt, Kenya, Mauritania, Morocco, Namibia, and South Africa, have established the Africa Green Hydrogen Alliance with the aim of enhancing cooperation and accelerating the advancement of green hydrogen initiatives across the continent.

<sup>250</sup> See again GRITZ A., WOLFF G. B., already quoted, 2024.

<sup>251</sup> GRITZ A., WOLFF G. B., already quoted, 2024.



only helps in preserving their own ecosystems but also enhances their resilience to climate-related disasters.

The CBAM is designed to ensure that imported goods into the European Union are subject to the same carbon costs as goods produced within the EU. For developing countries, this presents both a challenge and an opportunity.

Those that continue to rely on carbon-intensive industries will face higher tariffs, making their products less competitive. However, by transitioning to greener industries, these countries can avoid these tariffs and maintain their competitive edge in the European market.

The support from mechanisms like the Mattei Plan is vital to capitalize the positive possible outcomes. Such plans can provide the necessary funding, technology transfer, and capacity building to help developing countries adopt sustainable practices.

By integrating green projects into their economic strategies, African countries adhering to the Plan can align with international climate standards and benefit from preferential trade terms.

### **3.4. International Taxation and Tax Policy Implications.**

#### *3.4.1. Geopolitical Implications of CBAM.*

The extent to which CBAM will be welcomed or rejected by the international community depends on a multitude of factors beyond environmental concerns.

Criticism from the EU's main trading partners towards the Carbon Border Adjustment Mechanism (CBAM) revolves around several key concerns<sup>252</sup>.

One major issue is the perception of CBAM as a protectionist measure, with critics arguing that it acts as a trade barrier under the pretext of climate action. This raises fears about its potential impact on the competitiveness of domestic industries in these partner countries (Munzur et al, 2023)<sup>253</sup>.

Additionally, there are apprehensions regarding the revenue generated by CBAM, with concerns that it could be interpreted as income for the EU budget. Under this light, the mechanism would essentially serve to redirect funds from less affluent countries into the EU, through environmental tariffs (Munzur et al, 2023)<sup>254</sup>.

Furthermore, the plan was criticized for the unilateral nature of the decision-making process, as the EU did not consult with third country trading partners.

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<sup>252</sup> See Table 16 in the Appendix.

<sup>253</sup> MUNZUR A., KOCH K., WINTER J., *Geopolitical Implications of the European Union Carbon Border Adjustment*, Chapter 9 of the volume of Simões Joao, "Challenging the Paradigm of Energy Geopolitics: Security, Resources and Pathways in Light of Global Challenges", New York, 2023.

<sup>254</sup> MUNZUR A., KOCH K., WINTER J., already quoted.

Going more in depth in the political implications of the mechanism, it could be mentioned that countries such as Russia, China, and Turkey have all presented similar negative observations about the CBAM (Munzur et al, 2023)<sup>255</sup>.

These diverse perspectives reflect the differing global goals on decarbonization and understandings of protectionism between Europe and other countries.

Russia, for instance, sees CBAM as contradicting WTO principles such as “*national treatment*” and “*most-favored nation status*,” which could lead to trade disputes. (Benson et al, 2023)<sup>256</sup>.

The energetic dependence of the Union on Russia has long been presented as a challenge for the Union and the recent events in Ukraine have prompted the search for alternative sources of energy (European Commission, 2023)<sup>257</sup>.

Hence, it may be assumed that even if Russia adopted more sustainable policies, trade with the Union could still be blocked by political consideration beyond the green transition (Kirkegaard, 2023)<sup>258</sup>.

Moreover, it has been noted that “[...] *it is unlikely that Russia will be pressured into adopting emissions reduction measures that align with the EU’s current ETS. [...] it remains to be seen how negotiations between Russia and the EU will evolve over the CBAM and if the EU have the ability to leverage environmental policy reforms within Russia.*” (Munzur et al, 2023)<sup>259</sup>.

The influence of the European Union on the Russian system has changed relevantly in the last years, from the relative failure of the Crimean sanctions to the invasion of Ukraine, the relationship between the two entities has been increasingly complex.

In other words, the future response to CBAM of the Russian Federation will likely be influenced by multiple political factors beyond environmental policies. For these reasons it has been noted that: “*Russia’s most likely geopolitical response [to the Green Deal] will be to seek diversification of its energy customer base*” (Leonard et al, 2021)<sup>260</sup>.

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<sup>255</sup> MUNZUR A., KOCH K., WINTER J., *Geopolitical Implications of the European Union Carbon Border Adjustment...*, already quoted.

<sup>256</sup> BENSON E., MAJKUT J., REINSCH W. A., STEINBERG F., *Analyzing the European Union’s Carbon Border Adjustment Mechanism*, Center for Strategic and International Studies (CSIS), Washington D.C., 2023, 1-9, already quoted.

<sup>257</sup> EUROPEAN COMMISSION, *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of The Regions, A Green Deal Industrial Plan for the Net-Zero Age*. Brussels, 2023, p. 6.

<sup>258</sup> KIRKEGAARD J. F., *Russia’s invasion of Ukraine has cemented the European Union’s commitment to carbon pricing*, Policy Brief, Peterson Institute for International Economics, 2023, 1-20, already quoted.

<sup>259</sup> MUNZUR A., KOCH K., WINTER J., already quoted, p. 15.

<sup>260</sup> LEONARD M., PISANI-FERRY J., SHAPIRO J., TAGLIAPIETRA S., WOLFF G. B., *The geopolitics of the European green deal*, Policy contribution no. 04, European Council on Foreign Relations, 2021, already quoted, p. 11.

China, on the other hand, has highlighted the importance of multilateralism in addressing climate change and has emphasized the need for developed nations to support developing countries in financing and building greener solutions (Munzur et al, 2023)<sup>261</sup>.

The EU's CBAM presents a significant challenge to China, due to their extensive trade relationship. In 2020, the EU accounted for 14% of China's total trade, with the EU as the largest import source and second-largest export market, particularly in sectors like iron and steel.

Markedly, China has established a national Emissions Trading System (ETS), which commenced operations in 2021, overseeing the regulation of over 2.200 power facilities and addressing around 40% of the country's CO2 emissions.

Nevertheless, the limited scope of Chinese environmental policies would still subject Chinese exports toward Europe to a relatively high tariff<sup>262</sup>.

To meet the environmental demands of the European Union, China would have to advance the breadth of its environmental agenda many years ahead of its scheduled goals<sup>263</sup>.

At the Leaders' Summit on Climate Change, in April 2021, the Chinese President, Xi Jinping, emphasized the importance of multilateralism and compliance with international law in addressing climate change. He called on developed nations to increase their climate efforts while supporting, not forcing, developing countries in financing, technology, and capacity building.

Following the EU's announcement of the CBAM proposal, Liu Youbin - a spokesperson for the Chinese Ministry of Ecology and Environment - criticized it as a unilateral action that violates WTO rules and undermines global trust (Munzur et al, 2023)<sup>264</sup>.

China intends to transition to greener practices. Specifically: "*China [...] has an interest in pursuing a more sustainable and efficient path to prosperity. The effects of climate change on Chinese agriculture, water and food security are considerable and will grow*", however, the Chinese industrial and economic needs do not align with the European aspirations (Leonard et al, 2021)<sup>265</sup>.

In the coming future, the People's Republic will still value economic growth over sustainability, such posture will drive in the next decades a generally negative approach to any unilateral initiative designed on different timeframes.

China still relies on 3000 coal plants - more than the United States, the European Union, Russia, India and Japan combined - and the People's Republic still plans to build 2000 more in the near

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<sup>261</sup> MUNZUR A., KOCH K., WINTER J., *Geopolitical Implications ...*, already quoted.

<sup>262</sup> See Figure 15 in the Appendix.

<sup>263</sup> See Figure 31 in the Appendix on the different timeframes between major economies.

<sup>264</sup> MUNZUR A., KOCH K., WINTER J., already quoted.

<sup>265</sup> LEONARD M., PISANI-FERRY J., SHAPIRO J., TAGLIAPIETRA S., WOLFF G. B., *The geopolitics of the European green deal ...*, already quoted, p. 16.

future as well as rapidly decommission all these plants after the year 2040, to reach net zero in 2060 (Leonard et al, 2021)<sup>266</sup>.

Exemplarily, the 13th BRICS<sup>267</sup> summit resulted in the New Delhi Declaration (BRICS, 2021)<sup>268</sup>, where state leaders emphasized the need to avoid unilateral and protectionist measures contrary to WTO rules.

The free trade structure of the global economy, built and protected by the WTO, naturally rejects tariffs. Developing countries still consider the opportunity of exporting their relatively cheaper goods to the wealthiest countries as an essential activity for economic growth and for the fulfillment of their aspirations.

The development of new forms of environmental protectionism counters this tendency and places sustainability concerns over economic priorities. It also relies on international trade management to advance domestic policy goals<sup>269</sup>.

While the Union works on the development of a comprehensive system of tariffs, the rest of the world still relies on free trade. In the long term, this difference may lead to either the abandonment of green policies or to a new tendency in international taxation policies: the use of international tax law to support and advance domestic policy goals.

### 3.4.2. European Policy Objectives.

The geopolitical dimension of the plan is twofold. On one hand, it is essential to anticipate and address international opposition and the economic powers adverse to the mechanism. On the other hand, the objective is to build a new European international influence<sup>270</sup>.

The European Union (EU) has consistently sought to expand its relatively weak influence on the global stage through the distinctive use of its normative power. The concept of “normative power” involves promoting and spreading specific norms and values to shape the policies and practices of other nations (Mostefa, 2023)<sup>271</sup>.

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<sup>266</sup> LEONARD M., PISANI-FERRY J., SHAPIRO J., TAGLIAPIETRA S., WOLFF G. B., *The geopolitics ...*, already quoted, p. 16.

<sup>267</sup> BRICS is an alliance of five emerging economies (Brazil, Russia, India, China, and South Africa), collaborating on economic, social, educational, and other policy-related issues.

<sup>268</sup> BRICS, *New Delhi Declaration*, 2023. Available at: [http://brics2022.mfa.gov.cn/eng/hywj/ODS/202203/t20220308\\_10649499.html](http://brics2022.mfa.gov.cn/eng/hywj/ODS/202203/t20220308_10649499.html)

<sup>269</sup> Notably the CBAM represents an expansion of the Union domestic environmental policies.

<sup>270</sup> See Figure 39 in the Appendix.

<sup>271</sup> OUKI M., *Italy and Its North African Gas Interconnections: A Potential Mediterranean Gas 'Hub'?* OIES Energy Comment, Oxford Institute for Energy Studies, 2023, 1-7

Among the various norms the EU seeks to diffuse, key environmental and social standards stand out: climate neutrality, zero pollution, a circular economy, and a just transition both within and outside the EU.

These goals form the backbone of the EU's strategy to assert its influence internationally through normative means (Mostefa, 2023)<sup>272</sup>.

The EU's reputation as a "global climate leader" is central to its normative influence. Over the past two decades, the EU has spearheaded numerous initiatives aimed at mitigating climate change, including the ambitious target of transforming Europe into the first climate neutral continent.

This leadership role is not just about setting an example, but also about actively working to ensure that other countries follow suit.

It has also been noted that EU's initiatives have been pivotal in maintaining momentum for global climate efforts, reinforcing the EU's position as a key player in climate diplomacy (Leonard et al, 2021)<sup>273</sup>.

The differing objectives of the EU and BRICS countries, along with the robust European backing of the Mattei Plan, reflect an emerging international dynamic.

The EU is attempting to establish a sphere of influence in growing economies, particularly in Africa, based on principles fundamentally different from those employed by BRICS nations (Goldthau et al, 2023)<sup>274</sup>.

By influencing neighboring countries to adopt greener practices and policies the Union would align them to the EU industrial needs, building stronger trade connections and influence.

These actions would foster the need for greener technologies and promote a global platform on the economics of climate action. Such a platform would allow the Union to export its "know-how" in terms of green technologies (Mostefa, 2023)<sup>275</sup>.

Remarkably, the last two Italian governments, first under Prime Minister Draghi and then under Prime Minister Meloni, have focused on building a stronger energy trade relationships with its southern Mediterranean gas suppliers. Italy stands at a pivotal juncture to significantly boost its energy trade relations with Algeria, positioning itself as a principal energy bridge between North Africa and Europe.

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<sup>272</sup> OUKI M., *Italy and Its North African ...*, already quoted.

<sup>273</sup> See again LEONARD M., PISANI-FERRY J., SHAPIRO J., TAGLIAPIETRA S., WOLFF G. B., *The geopolitics ...*, already quoted.

<sup>274</sup> GOLDTHAU A. C., YOUNGS R., *The EU Energy Crisis and a New Geopolitics of Climate Transition*, in *Journal of Common Market Studies*, 2023, Vol. 61, Annual Review, 115 – 124.

<sup>275</sup> OUKI M., *Italy and Its North African ...*, already quoted.

The backbone of Italy's natural gas network includes two critical pipelines connecting North Africa to southern Italy<sup>276</sup>: the Trans-Mediterranean (“TransMed”) and Greenstream pipelines. The TransMed pipeline, operational since 1983, connects Algeria's Hassi R'mel gas fields to Sicily through Tunisia, boasting an annual capacity of 33 billion cubic meters (bcm) (Tahchi, 2024)<sup>277</sup>.

The Greenstream pipeline, active since 2004, links Libya's Wafa and Bahr Essalam fields to Sicily, with an annual capacity of 8 bcm. Libya's proposal to double this capacity, despite its current underutilization, reflects the growing significance of these conduits in the region's energy dynamics.

In the light of recent geopolitical shifts, particularly the reduction of Russian gas supplies to Europe, Italy is exploring further expansions and new projects to enhance its energy links with Algeria. Prime Minister Giorgia Meloni's visits to Algeria brought renewed attention to the previously shelved Gazoduc Algerie Sardaigne Italie (“GALSI” in French) project.

Initially abandoned, due to low gas demand, this pipeline is now being reconsidered with a revised focus on transporting both methane and hydrogen, addressing contemporary energy needs and climate goals (Tahchi, 2024)<sup>278</sup>.

With an annual design capacity of 8 bcm, the GALSI pipeline could significantly bolster Italy's energy security and diversify its energy sources.

Eni - Italy's energy giant - has shown its commitment through significant investments in Libya and Algeria<sup>279</sup>.

Once realized, the new energy plans could boost North Africa's annual gas exports to Italy from over 40 bcm to 60 bcm, covering 80% of Italy's gas consumption or over 10% of Europe's total gas usage in 2021<sup>280</sup>. Strengthening energy ties with Algeria offers multiple benefits for Italy, as a “hub” for the Northern Europe and for the Union as consumer (Mostefa, 2023)<sup>281</sup>.

Lastly, incorporating hydrogen into these energy projects aligns with the EU's Green Deal objectives, promoting cleaner energy solutions and reinforcing Italy's role in the global energy transition.

Thus, the partnership between Algeria and Italy (and consequently through Italy between North African countries and the European Union as a whole) within the context of the Mattei Plan, showcases Europe's increasing focus on Africa. Together with Germany's projects in Egypt (Gritz,

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<sup>276</sup> For a complete overview of Italian gas pipelines see Figure 42 in the Appendix.

<sup>277</sup> TAHCHI B., *Algerian Gas to Strengthen Energy Security of the European Union: Policy, Capacity and Strategy*. Energy Reports, vol. 11, 2024, 3600-3613.

<sup>278</sup> TAHCHI B., *Algerian Gas...*, already quoted, 2024, p. 3610.

<sup>279</sup> It should be underlined that Algeria already boasts one of the most advanced internal gas distribution networks. See Figure 40 in the Appendix.

<sup>280</sup> See figure 39 in the Appendix: Algeria directed 88% of its natural gas exports to the European Union in 2021.

<sup>281</sup> See again OUKI M., already quoted.

Wolff, 2024)<sup>282</sup> and Morocco's new investments in renewables, this alliance highlights a wider commitment based on new principles of environmental sustainability and cooperation.

These initiatives seek to aid African economies in their transition, minimizing CBAM's impact, while fostering a new sphere of influence for the Union.

### **3.5. Towards a New Frontier of International Taxation?**

#### *3.5.1. Tariffs and Domestic Policy.*

Tariffs, as a component of trade strategies, exert a significant influence on domestic policy, particularly in the realms of industrial production, employment, and innovation (Känzig, Konradt, 2023; Einhorn, 2021)<sup>283</sup>.

Levies imposed on imports are mainly designed to protect domestic industries, generate revenue, and address trade imbalances. However, their impact on domestic policy is complex and multifaceted (Goldthau et al, 2023)<sup>284</sup>.

Firstly, tariffs can shape industrial production by altering the competitiveness of domestic industries. When tariffs are high, imported goods become more expensive relative to domestically produced ones, incentivizing consumers to purchase locally manufactured products.

This, in turn, can stimulate industrial output as domestic producers strive to meet increased demand. Conversely, reduced tariffs or tariff-free trade agreements may expose domestic industries to greater competition from foreign counterparts, potentially leading to declines in production if they cannot compete effectively (Hufbauer et al, 2022)<sup>285</sup>.

Secondly, tariffs have implications for employment levels within a country. Protective tariffs can safeguard domestic jobs by shielding industries from foreign competition and maintaining demand for domestically produced goods (Fallmann et al, 2022)<sup>286</sup>.

However, excessive tariffs or retaliatory measures from trading partners can disrupt global supply chains, leading to job losses in sectors reliant on international trade (Lee-Makiyama, 2021)<sup>287</sup>.

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<sup>282</sup> GRITZ ALEXANDRA., WOLFF GUNTRAM B., *Already quoted.* 2024

<sup>283</sup> KÄNZIG D. R., KONRADT M., *Climate Policy and the Economy: Evidence from Europe's Carbon Pricing Initiatives*, NBER WP Series 31260, 2023, 1-50, Cambridge MA – U.S.A.; *International customs law — Tariffs — Most-favoured-nation treatment (MFN) — Specific trade agreements — Goods*, in Max Planck Encyclopedias of International Law [MPIL], 2014, updated 2021, 2 – 27, para. 63 – 64.

<sup>284</sup> GOLDTHAU A. C., YOUNGS R., *The EU Energy Crisis and a New Geopolitics of Climate Transition*, in *Journal of Common Market Studies*, 2023, Vol. 61, Annual Review, 115 – 124.

<sup>285</sup> HUFBAUER G. C., SCHOTT J. J., HOGAN M., KIM J., *EU Carbon Border Adjustment Mechanism Faces Many Challenges*, Peterson Institute for International Economics, 2022, 1-22, already quoted.

<sup>286</sup> FALLMANN H., RITCHIE A., CHEN Y., *The EU's proposed Carbon Border Adjustment Mechanism (CBAM) and its implications for Asia*, *Asia Society*, 2022, 1-22.

<sup>287</sup> LEE-MAKIYAMA H., *The EU Green Deal ...*, already quoted.

Moreover, tariffs can also affect the composition of jobs within the economy, as industries facing increased competition may prioritize efficiency and automation over labor-intensive production methods.

Lastly, tariffs can influence innovation by shaping the incentives for domestic industries to invest in research and development (R&D). Protective tariffs may reduce the urgency for domestic firms to innovate, as they face less pressure from foreign competitors (Gómez, 2021)<sup>288</sup>.

Conversely, exposure to international competition due to lower tariffs can drive firms to innovate and remain competitive in the global market. Additionally, tariffs on imported inputs or technologies can hinder innovation by raising the cost of acquiring essential resources or knowledge from abroad.

Environmental policy and tariffs are intricately connected, as trade measures can be employed to advance environmental objectives or mitigate environmental harm.

While tariffs traditionally aim at regulating trade flows and protect domestic industries, CBAM introduces an environmental dimension, by targeting the carbon footprint of imported goods.

By levying tariffs based on the embedded carbon content of products, CBAM seeks to create a level playing field for domestic producers subject to carbon pricing mechanisms. In turn, CBAM would stimulate stronger industrial production inside the Union (Balachandar et al, 2023)<sup>289</sup>.

The impact on employment remains uncertain. While protectionist measures aimed at bolstering industrial production could theoretically lead to increased employment, there are concerns that the transition advocated by the Union could negatively affect carbon-intensive industries.

Therefore, the employment effects of fully implementing the Green Deal hinge on how the Union manages its repercussions.

As already noted, ensuring equitable development across all regions depends on the set of related policies that the Union will implement, such as the Just Transition Mechanism (Sarangi, 2023)<sup>290</sup>.

Tariffs can significantly influence internal innovation within a country's economy. When tariffs are imposed on certain imported goods, it creates a competitive advantage for domestic industries producing similar products.

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<sup>288</sup> GÓMEZ J. F., *The European Green Deal and the Energy transition: challenges and opportunities for industrial companies*. Boletín de Estudios Económicos, Issue 76, 2021, 191-211, already quoted.

<sup>289</sup> BALACHANDAR V., BREKENRIDGE A., GATZEN C., PEICHERT P., *Carbon Border Taxes: help or harm to European industry?* in Frontier Economics, 10 September 2023, available at: <https://www.frontier-economics.com/es/es/noticias-e-informacion/publicaciones/article-i7771-carbon-border-taxes-help-or-harm-to-european-industry/#>, already quoted, 2023.

<sup>290</sup> SARANGI U., *Implications of Carbon-Border Adjustment Mechanism (CBAM) ...*, already quoted, 2023.



Excessive protectionism through tariffs may also stifle innovation by shielding domestic industries from global competition, reducing the incentive for them to innovate and adapt to changing market demands.

Nevertheless, it should be considered that industrial competition inside the European common market - the largest on the planet - can still adequately motivate research and development (Känzig, Konradt, 2023)<sup>291</sup>.

Moreover, the protectionist measures were devised specifically because European companies already adhere to higher technological standards than foreign producers (Bianchi et al., 2020)<sup>292</sup>.

It can be observed that CBAM will support domestic production, the effects on employment remain ambiguous and dependent on multiple factors.

### 3.5.2. Indirect Taxation and Spillover effects on Trade.

Indirect taxes are critical tools for governments to generate revenue and influence economic activities. Spillover effects occur when the impact of a tax policy extends beyond the borders of the implementing country.

In international trade, indirect taxes can create significant spillover effects. For instance, if a country imposes a high VAT rate on imported goods, it may discourage imports, impacting foreign exporters.

The introduction of CBAM has significant spillover effects on international trade. What should be noted are the long-term implications of the approval of new tariffs (Goldthau et al, 2023)<sup>293</sup>.

Since the creation of the World Trade Organization in 1995, the average tariffs<sup>294</sup> imposed across the globe have diminished by 59,38%<sup>295</sup>, from an average 6,4% to 2,6% (World Bank, 2021)<sup>296</sup>.

Relevantly the European Union has always maintained average tariffs well below the world average; as of 2021 the EU imposed an average tariff of 1,4% across all sectors<sup>297</sup>.

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<sup>291</sup> KÄNZIG D. R., KONRADT M., *Climate Policy and the Economy ...*, already quoted.

<sup>292</sup> BIANCHI M., COLANTONI L., FRANZA L., ANTONUCCI R., FAVAZZA A., *Green Deal Watch: A green recovery from the COVID-19 crisis?* in Istituto Affari Internazionali (IAI), Issue no. 1, 2020, 1 – 31.

<sup>293</sup> GOLDTHAU A. C., YOUNGS R., *The EU Energy Crisis and a New Geopolitics of Climate Transition*, in Journal of Common Market Studies, 2023, Vol. 61, Annual Review, 115 – 124, already quoted.

<sup>294</sup> Calculated as "Tariff rate, applied, weighted mean, all products (%)"; this metric represents the average tariff rate a country imposes on all its imports. It accounts for the actual tariffs applied and weights them by the value of each product's imports, providing a more accurate measure of overall trade protection.

<sup>295</sup> See Figure 43 in the Appendix.

<sup>296</sup> WORLD BANK., Tariff rate, applied, weighted mean, all products (%), 2024. Available at: <https://data.worldbank.org/indicator/TM.TAX.MRCH.WM.AR.ZS>

<sup>297</sup> See Figure 44 in the Appendix.

With CBAM, the average increase will depend on multiple factors, particularly the country of origin and the type of product imported. For example, new tariffs could increase the cost of steel exported to the EU from China<sup>298</sup> by 49% (Belletti et al, 2023)<sup>299</sup>.

When CBAM will be applied to all products the actual rate of tariffs imposed by the EU could increase to four or even six times the average imposed as of 2021 (Xiaobei et al, 2022)<sup>300</sup>.

Beyond the clear effects on global trade what should be noted is that the transformation would represent a new trend in international taxation structures.

As already seen, the EU's CBAM would prompt other major economies to establish their own Carbon Border Adjustment (CBA) systems and so new tariffs. Such a cascade effect would open a new frontier for international taxation, an era of increasing tariffs after more than 30 years of falling rates.

The actions of the Union are not isolated. During the Trump administration, the United States implemented tariffs seven times higher than the global average<sup>301</sup>, but these were subsequently reduced, following the 2020 election, won by the Democratic Party and President Biden.

However, in 2024, the Biden administration raised tariffs on selected Chinese exports (United States Trade Representative, 2024)<sup>302</sup>, reaching as high as 100% for electric vehicles.

The emerging green dynamics will require sustainable materials and innovative industries, prompting global adaptation and change.

Western nations are compelled to cultivate and safeguard their pertinent industries to help them meet the new standards required for a more sustainable economy.

In this view, the Green Deal of the European Union emerges as a strategic initiative aligned not only with the present needs of the Union, but also with the broader global trends of reshaping trade connections through tariffs (Colli, 2020)<sup>303</sup>.

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<sup>298</sup> It should also be underlined that China has consistently imposed tariffs above world average. See Figure 46 in the Appendix

<sup>299</sup> BELLETTI E., HAN N., PÉREZ I., *Playing by new rules: how the CBAM will change the world*, Wood Mackenzie, 2023, 1-13. See Figure 47 in the Appendix.

<sup>300</sup> XIAOBEI H., ZHAI F., JUN M., *The Global Impact of a Carbon Border Adjustment Mechanism. A Quantitative Assessment*, Boston University – Global Development Policy Center, Task Force on Climate, Development and International Monetary Fund, 11 March 2022, also available at <https://www.bu.edu/gdp/2022/03/11/the-global-impact-of-a-carbon-border-adjustment-mechanism-a-quantitative-assessment>, already quoted, p. 5.

<sup>301</sup> See Figure 45 in the Appendix.

<sup>302</sup> UNITED STATES TRADE REPRESENTATIVE - Executive Office of the President, *Four-Year Review of Actions Taken in the Section 301 Investigation: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation*, 2024, 1-187.

<sup>303</sup> COLLI F., *The end of 'business as usual'? COVID-19 and the European Green Deal*, Egmont Institute European Policy Brief no. 60, 2020, 1-5.

Italy - through the Mattei Plan - Germany -through new agreements with African partners - and more generally the European Union - with the Green Deal - envision a new frontier for international taxation.

In this regard, it has been noted “*The [...] change in the paradigm informing EU energy policy relates to the role of state intervention. Whilst decades of market integration sought to liberalize European energy markets and enhance their functioning, the 2022 events saw the return to a deliberately interventionist model [...]*”. (Goldthau et al, 2023)<sup>304</sup>.

No longer a system of low tariffs and free trade, but a more complex web of tariffs aimed at supporting sustainable development and the birth of greener economies. In this sense, the effects of indirect taxation on international commerce will be paramount (Goldthau et al, 2023)<sup>305</sup>.

The lowering of the tariffs over the last decades has driven new economic connections, benefiting especially developing countries in East-Southeast Asia. The new tendencies of international taxation may reinforce tariffs to support sustainable development in Western countries.

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<sup>304</sup> GOLDTHAU A. C., YOUNGS R., *The EU Energy Crisis and a New Geopolitics of Climate Transition*, in *Journal of Common Market Studies*, 2023, Vol. 61, Annual Review, p. 120.

<sup>305</sup> GOLDTHAU A. C., YOUNGS R., already quoted, 2023.

## CONCLUSIONS

Since the establishment of the World Trade Organization (WTO) in 1995, major developed countries, including the European Union (EU), have supported a pronounced global trend toward lowering tariffs, inspired by the principles and benefits of free trade and driven by the proliferation of free trade agreements.

This movement led to a significant reduction in average tariffs worldwide, impacting both wealthy and developing countries. Regional trade agreements, such as NAFTA (now USMCA), flourished. Developing economies were incentivized to abandon protectionist measures and embrace free trade with wealthier nations. This shift facilitated economic growth and championed comparative advantages, restructuring global industries and boosting global GDP.

However, the European Green Deal's environmental provisions, particularly the Carbon Border Adjustment Mechanism (CBAM), counters this trend by imposing tariffs on carbon-intensive imports, and on every good produced abroad, starting from 2026.

Today, the world faces the unprecedented challenge of climate change, which threatens both economic structures and life itself. The EU's environmental policies aim at transforming Europe into the first climate-neutral continent and constitute the most advanced and ambitious climate project active globally.

Nevertheless, for the plan to be successful it is necessary to prevent carbon leakage, where emissions-intensive industries would be simply transferred outside the EU. Hence, the European Green Deal designed and implemented the Carbon Border Adjustment Mechanism.

This mechanism ensures that imports face similar environmental costs as domestic products, leveling the competitive field for EU industries and protecting European producers, subjects to the world's strictest environmental regulations.

The CBAM not only safeguards advanced and environmentally sustainable domestic industries but also incentivizes other countries to adopt greener policies. By accounting for the carbon footprint of imports, the EU encourages global producers to reduce emissions, aligning the world with its climate goals.

If countries decide to align and impose stricter environmental policies, they will be induced to adopt similar carbon border adjustment strategies to avoid carbon leakage, supporting the international adoption of carbon taxes and a global revolution in trade doctrines.

Concurrently, the United States has begun imposing substantial tariffs on polluting industries, notably targeting China, indicating a broader shift toward using tariffs for environmental and industrial policies. The pursuit of a green economy by developed countries needs the protection of

their advanced, environmentally sustainable industries, reflecting a significant evolution in trade policy where environmental considerations increasingly integrate with, or surpass, economic objectives.

In this scenario, indirect taxation can serve as a crucial instrument in the fiscal policies of developing countries, given their relatively underdeveloped tax collection systems.

Enhancing tax capacity, the policies, institutions, and technical capabilities to collect tax revenue, is vital for government functionality. Since the 2008 global financial crisis, progress in mobilizing tax revenue has stagnated, despite earlier gains.

The average tax-to-GDP ratio in emerging markets and developing economies increased by 3.5 to 5 percentage points since the early 1990s, primarily driven by consumption taxes (IMF, 2024)<sup>306</sup>. Recent economic shocks have posed challenges to sustaining this progress, especially in fragile economies with institutional hurdles.

Indirect taxes, such as value-added tax (VAT) and excise duties, have demonstrated significant potential in these regions. Research indicates that developing economies have untapped tax revenue potential of up to 9 percent of GDP, with low-income countries and emerging markets showing higher potential<sup>307</sup>.

In the context of a global shift toward protectionist measures, developing countries can leverage indirect taxes to access new resources, supporting even more the adoption of more tariffs worldwide.

The green transition may have initiated an international trend of using tariffs not only as economic instruments, but also as tools for environmental policy, potentially leading to more widespread implementation of tariffs globally.

In this context, the Italian Mattei Plan, designed to foster stronger cooperation and economic projects with African countries to aid their transition to greener standards, reflects a broader European trend of seeking stronger ties with the youngest continent on the planet.

As Enrico Mattei famously stated, “*a bright mind sees opportunities where no one else does*,”: the new European projects in Africa, particularly in North Africa, are seizing opportunities that other countries have yet to fully recognize and capitalize on.

These projects aim to support the production of clean energy, some of which would be exported to Europe, thus aiding the energy transition on both continents.

More broadly, these renewed EU initiatives would support the development of more sustainable industries in Africa and promote the export of green technology developed in Europe.

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<sup>306</sup> INTERNATIONAL MONETARY FUND, *Fiscal Monitor: Fiscal Policy in the Great Election Year*, Washington D.C., April 2024.

<sup>307</sup> See Figure 48, in the Appendix.

Thus, the Green Deal stimulates two major global transformations: enhancing the international influence of the EU particularly in Africa, and supporting the global shift from free trade and lower tariffs to protectionist measures with environmental objectives. And this seems to open a new frontier for international taxation.

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## APPENDIX

**Table 1 - Comparison main production indicators across EU, USA, China.**

Key real economy characteristics of the euro area and other major economic areas in 2022					
	Unit	Euro area	United States	Japan	China
Population <sup>1</sup>	millions	348.5	333.6	124.9	1,411.8
GDP (share of world GDP in PPP)	%	12.0	15.5	3.5	18.5
GDP per capita <sup>2</sup>	€ thousands	38.7	52.0	31.7	14.5
Value added by economic activity					
Agriculture, fishing, forestry	% of total	1.8	1.0 <sup>*</sup> )	1.0	7.7
Industry (including constructions)	% of total	25.6	18.5 <sup>*</sup> )	27.1	39.5
Services (including non-market services)	% of total	72.6	80.5 <sup>*</sup> )	71.9	52.8
Unemployment rate (share of the labour force)	%	6.7	3.6	2.6	5.5
Labour force participation rate <sup>3</sup>	%	74.5	74.0	80.7	-
Employment rate <sup>4</sup>	%	69.4	71.3	78.5	-
General government <sup>5</sup>					
Surplus (+) or deficit (-)	% of GDP	-3.6	-4.2	-4.2	-7.5
Gross debt <sup>6</sup>	% of GDP	90.9	110.7	228.2	77.0
Revenue	% of GDP	46.9	35.0	39.4	25.9
of which direct taxes	% of GDP	13.5	14.4	11.7	-
of which indirect taxes	% of GDP	12.9	7.0	9.4	-
of which net social contributions	% of GDP	14.8	6.6	13.9	-
Expenditure <sup>7</sup>	% of GDP	50.5	39.2	43.6	33.4
of which final consumption	% of GDP	21.5	13.9	21.7	-
of which social benefits	% of GDP	22.8	15.3	22.4	-
External <sup>8</sup>					
Exports of goods	% of GDP	21.9	8.1	17.6	18.1 <sup>*</sup> )
Exports of goods and services	% of GDP	31.3	11.7	21.6	20.0 <sup>*</sup> )
Import of goods	% of GDP	22.5	12.7	20.5	14.9 <sup>*</sup> )
Import of goods and services	% of GDP	30.7	15.4	25.4	17.4 <sup>*</sup> )
Exports (share of world exports, including intra-euro area trade)	%	23.8	8.4	3.0	14.6
Exports (share of world exports, excluding intra-euro area trade)	%	13.9	9.5	3.4	16.6
Current account balance	% of GDP	-0.5	-3.8	1.9	1.8 <sup>*</sup> )

*(go to the next page)*



Unless otherwise indicated, euro area data include Croatia. Sources: For the euro area: ECB, Eurostat, national data and ECB calculations; for the United States, Japan and China: BIS, IMF, OECD, Reuters, World Bank and national sources.

\*) 2021 figures

\*\* ) 2020 figures

Notes:

1. Euro data, US and Japan: annual average; China: end of the year data.
2. Data for US, Japan and China are converted into euro at OECD purchasing power parities (PPPs).
3. Ratio of the labour force to the working age population (aged 15 to 64). US: the proportion of the civilian non-institutional population (aged 16 to 64) either at work or actively seeking work. Annual average.
4. Ratio of persons employed to the working age population (aged 15 to 64). US: the proportion of the civilian non-institutional population (aged 16 to 64) at work. Annual average.
5. General government data for China are not directly comparable with the other major economic areas.
6. General government debt consists of deposits, debt securities and loans outstanding at nominal value and is consolidated within the general government sector, except for Japan and China. In addition, Chinese data follow a different methodology and are not directly comparable. Year-end.
7. European definition also for US and JP.
8. Euro area: based on extra-euro area transactions.

**Note:** Excerpt from European Central Bank - *Key real economy characteristics of the euro area and other major economic areas in 2022*. At <https://www.ecb.europa.eu/mopo/eaec/html/index.en.html>

**Table 2 - The Key Features of the EU CBAM**

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<p>Table 1  <b>Key features of the EU carbon border adjustment mechanism (CBAM)</b></p>		
Feature	Description	
Entry into force	January 1, 2023 (transition period for 3 years)	
Covered goods	Imported goods in sectors including iron and steel, aluminum, fertilizers, electricity, and cement (based on combined nomenclature ("CN") codes listed in Annex I of the proposal)	
Declaration	Who	Importer authorized by competent authority designated by each member state
	What	<ul style="list-style-type: none"> <li>Total quantity of each type of goods imported during the calendar year preceding the declaration</li> <li>Total embedded emissions expressed in tons of CO<sub>2</sub>e emissions per megawatt-hour of electricity or per ton of each type of goods (to be verified by accredited verifier)</li> <li>Total number of CBAM certificates corresponding to the total embedded emissions to be surrendered</li> </ul>
	When	By May 31 of each year
Embedded emissions	Direct emissions released during the production of goods (Goods other than electricity determined based on actual emissions in accordance with the methods set out in Annex III. If data is not available, default value to be used; for electricity, default values to be used as a standard approach. Further detailed rules to be determined by the implementing act)	
Certificate	Definition	A certificate in electronic format corresponding to one ton of embedded emissions in goods
	Sales	Competent authority to sell certificates to authorized declarants
	Price	Average closing prices of EU ETS allowances calculated on a weekly basis
	Surrender	Submit to the competent authority the number of certificates that corresponds to the embedded emissions declared
	Reduction	<ul style="list-style-type: none"> <li>Carbon price paid in the country of origin reduces the number of CBAM certificates to be surrendered</li> <li>Also, a reduction for EU ETS allowances allocated free of charge to like domestic product</li> </ul>
Penalty	€100 per each certificate not surrendered	
Exclusion	Third countries or territories fully integrated into or linked to the EU ETS through future agreements	
Transitional period (January 2023 to December 2025)	Submit a report each quarter containing information on total quantity of each type of good, actual total embedded emissions (direct and indirect), carbon price for the embedded emissions in the imported goods incurred in country of origin	
<p>Source: Authors' summary of the <a href="#">Proposal for Regulation of the European Parliament and of the Council Establishing a Carbon Border Adjustment Mechanism</a>.</p>		

**Note:** Excerpt from Hufbauer G. C., Schott J. J., Hogan M., Kim J., *EU Carbon Border Adjustment Mechanism Faces Many Challenges*. Peterson Institute for International Economics, 2022, at p. 4, Table 1.0.

**Table 3 – Leakage and global emissions with different mitigation policies in place**

Does the country have a binding long-term cap on overall CO <sub>2</sub> emissions in levels terms?		Foreign country (no change in mitigation policy)	
		Yes	No
Domestic country (imposing carbon price)	Yes	Leakage does not affect global emissions	Leakage “doubly” increases global emissions (foreign emissions rise but domestic do not fall)
	No	Leakage reduces global emissions (domestic emissions fall but foreign do not rise)	Leakage increases* global emissions (domestic emissions fall and foreign rise)

\* Except for the case mentioned in the text that foreign emissions intensity is lower than domestic intensity after carbon pricing, in which case leakage will reduce global emissions here. Leakage is assumed to be positive for this table.

**Note:** Excerpt from Keen M., Parry I., Roaf J., - *Working Paper Border Carbon Adjustments: Rationale, Design and Impact*. IMF Fiscal Affairs Department, 2021, 1-42, Table 2.1.

**Table 4 – Gradual replacement of ETS with the CBAM**

	2026	2027	2028	2029	2030	2031	2032	2033	2034
<b>CBAM (%)</b>	2.5	5	10	22.5	48.5	61	73.5	86	100
<b>Free Allowance (%)</b>	97.5	95	90	77.5	51.5	39	26.5	14	0

Source: European Parliament, “Climate change: Deal on a more ambitious Emissions Trading System (ETS),” Press release, December 18, 2022, <https://www.europarl.europa.eu/news/en/press-room/20221212IPR64527/climate-change-deal-on-a-more-ambitious-emissions-trading-system-ets>.

**Note:** Excerpt from Benson E., Majkut J., Reinsch W. A., Steinberg F., - *Analyzing the European Union’s Carbon Border Adjustment Mechanism*. Center for Strategic and International Studies (CSIS), 2023, 1-9, Table 1.

**Table 5 – Global GHG emissions covered by the initial version of the CBAM**

	Share of Global Greenhouse Gas Emissions
Iron and Steel	7.2%
Chemicals and Petrochemicals	3.6% (energy-related), 2.2% (direct)
Nonferrous Metals	0.7%
Cement	3.0%

Source: Hannah Ritchie, Max Roser, and Pablo Rosado, “Emissions by Sector,” Our World in Data, 2020, <https://ourworldindata.org/emissions-by-sector>.

**Note:** Excerpt from Benson E., Majkut J., Reinsch W. A., Steinberg F., - *Analyzing the European Union’s Carbon Border Adjustment Mechanism*. Center for Strategic and International Studies (CSIS), 2023, 1-9, Table 2.

**Table 6 – Percentage variations in International Trade of the EU between 2002 and 2021**

2002		2021	
• Rest of World	31.1%	• Rest of World	31.4%
• China*	7.8%	• China*	22.3%
• United States	14.7%	• United States	11%
• Russia	6.5%	• Russia	7.7%
• United Kingdom **	17.9%	• United Kingdom **	6.9%
• Switzerland	6%	• Switzerland	5.8%
• Türkiye	2.2%	• Türkiye	3.7%
• Norway	4.2%	• Norway	3.5%
• Japan	6.4%	• Japan	2.9%
• South Korea	2.1%	• South Korea	2.6%
• India	1.1%	• India	2.2%

**Note:** Excerpt from MCEVOY O., *International Trade of the EU: largest goods import partners by trade share 2002-2021*, Online publication, Statista, 2024.

**Table 7 – CBAM exposure index****Aggregate relative CBAM exposure index**

Country	CBAM products exports to the EU (% of total CBAM products exports to world)	Trade weighted average *relative* potential carbon embodied payment per dollar of exports of covered goods to EU	CBAM products exports to the EU (% of GDP)	Aggregate relative CBAM exposure index
Albania	58,7%	(0,04)	0,7%	(0,02)
Argentina	2,2%	0,05	0,0%	0,00
Australia	1,4%	0,00	0,0%	0,00
Azerbaijan	15,9%	0,01	0,1%	0,00
Bahrain	14,1%	0,00	1,2%	0,00
Belarus	50,2%	0,06	1,4%	0,03
Brazil	11,5%	0,02	0,1%	0,00
Cambodia	19,2%	(0,01)	0,0%	(0,00)
Cameroon	93,4%	0,00	0,2%	0,00
Canada	2,6%	0,01	0,0%	0,00
Chile	21,7%	(0,02)	0,1%	(0,00)
China	8,6%	0,03	0,0%	0,00
Colombia	10,4%	(0,11)	0,0%	(0,01)
Costa Rica	0,9%	0,01	0,0%	0,00
Egypt, Arab Rep.	37,8%	0,05	0,3%	0,02
Georgia	34,8%	0,13	0,3%	0,05
Ghana	35,4%	(0,00)	0,1%	(0,00)
Hong Kong, China	4,9%	0,07	0,0%	0,00
India	18,9%	0,16	0,1%	0,03
Indonesia	6,2%	0,03	0,0%	0,00
Iran, Islamic Rep.	5,2%	0,08	0,0%	0,00
Israel	31,1%	(0,01)	0,0%	(0,00)
Japan	2,0%	(0,00)	0,0%	(0,00)
Jordan	24,6%	(0,02)	0,2%	(0,01)
Kazakhstan	13,7%	0,04	0,2%	0,01
Korea, Rep.	10,1%	0,00	0,2%	0,00
Kuwait	3,3%	0,01	0,0%	0,00
Malaysia	5,5%	0,01	0,1%	0,00
Mauritius	1,7%	(0,04)	0,0%	(0,00)
Mexico	1,9%	0,02	0,0%	0,00
Morocco	15,0%	(0,02)	0,3%	(0,00)
Mozambique	73,7%	0,00	6,9%	0,00
New Zealand	4,5%	0,00	0,0%	0,00
Oman	2,8%	0,06	0,1%	0,00
Pakistan	1,2%	0,12	0,0%	0,00
Peru	1,1%	0,08	0,0%	0,00

Philippines	1,6%	0,01	0,0%	0,00
Qatar	0,8%	0,00	0,0%	0,00
Russian Federation	31,4%	0,06	0,7%	0,02
Saudi Arabia	2,4%	0,03	0,0%	0,00
Senegal	1,1%	(0,01)	0,0%	(0,00)
Singapore	1,0%	0,01	0,0%	0,00
South Africa	16,5%	0,04	0,2%	0,01
Sri Lanka	2,8%	(0,00)	0,0%	(0,00)
Taiwan	12,2%	(0,01)	0,2%	(0,00)
Tajikistan	17,7%	0,00	0,1%	0,00
Thailand	3,9%	0,01	0,0%	0,00
Trinidad and Tobago	11,5%	0,26	1,0%	0,03
Tunisia	43,3%	0,01	0,5%	0,00
Turkey	43,5%	0,01	0,8%	0,00
Ukraine	37,1%	0,14	2,4%	0,05
United Arab Emirates	14,5%	0,00	0,3%	0,00
United Kingdom	68,9%	(0,00)	0,2%	(0,00)
United States	9,7%	0,00	0,0%	0,00
Venezuela	44,5%	0,03	0,2%	0,01
Vietnam	5,5%	0,08	0,1%	0,00
Zimbabwe	87,0%	0,10	0,4%	0,09
EU	0,726502997		0,010532	

**Note:** The Table reproduces the World Bank Relative CBAM Exposure Index – Aggregate, dated June, 15 2023 in <https://www.worldbank.org/en/data/interactive/2023/06/15/relative-cbam-exposure-index#4>.

**Table 8 - Share of total exports exposed to CBAM in Africa.**

Country	Share of Total Exports Exposed to CBAM
<b>Mozambique</b>	<b>18.91%</b>
<b>Egypt</b>	<b>6.31%</b>
<b>Morocco</b>	<b>4.36%</b>
<b>Algeria</b>	<b>3.70%</b>
<b>Tunisia</b>	<b>2.95%</b>

**Note:** Excerpt from BAKER P., BOODHOO BEEHARRY T. Z., LOAN L., QUILES P., RIA R., *Designing an African response to Carbon Border Adjustment Mechanisms*. African Economic Conference: Supporting Climate Smart Development in Africa, 2022, 1-38. Table 4.

**Table 9 – Mozambique and Morocco for trade connections with the EU.**

	Quota di esportazioni nei settori CBAM		Esportazioni totali verso l'UE		Esportazioni verso l'UE in tutti i settori CBAM		Esportazioni dei prodotti CBAM verso l'UE espresse come quota del PIL
	Mio USD	%	Mio USD	%	Mio USD	%	%
Mozambico	966	19	1,570	30	879.2	56	5.5
Marocco	1,594	4.4	18,900	64	504	2.8	0.3

Note: Excerpt from PÖHL D., *Gli impatti del CBAM sui paesi in via di sviluppo*. 2023. 1-7. Table 1

**Table 10 – Variation in CO2 emissions in millions of MtCO2**

Economy	Base 44	CBAM 44	Base 88	CBAM 88
Argentina	0,39	0	0,7	-0,01
Australia/New Zealand	0,39	-1,33	0,69	-2,26
Belarus	0,66	-0,79	1,25	-1,41
Brazil	1,4	-0,38	2,59	-0,71
Canada	0,39	-0,05	0,75	-0,13
Chile	0,24	0,02	0,43	0,04
China	6,37	-6,08	12,13	-10,17
Colombia	0,22	0,01	0,38	0,01
Egypt	0,23	-0,34	0,43	-0,61
India	3,56	-5,11	6,57	-7,81
Indonesia	0,8	0,18	1,45	0,3
Israel	0,71	-0,72	1,32	-1,2
Japan	3,57	1,3	6,49	2,26
Kazakhstan	0,63	-0,83	1,22	-1,24
Republic of Korea (the)	1,52	0,52	2,73	0,88
Malaysia	0,68	0,16	1,22	0,27
Mexico	0,48	-0,13	0,9	-0,23
Morocco	0,44	0,02	0,77	0,03
Mozambique	0,01	0,01	0,02	0,03
Norway	-4,64	-0,02	-8,21	-0,06
Peru	0,16	0,05	0,29	0,09
Russian Federation	5,37	-6,43	10,05	-11,5
Saudi Arabia	1,29	-0,68	2,42	-1,13
Serbia/Bosnia and Herzegovina	1,95	-3,57	3,64	-6,12
Singapore	0,26	0,04	0,48	0,06
South Africa	1,64	-2,04	2,93	-2,7
Switzerland	-3,14	0,03	-5,66	0,03
Taiwan (Province of China)	0,67	0,21	1,21	0,35
Thailand	0,37	-0,36	0,72	-0,58
Turkey	1,28	-1,01	2,32	-1,73

Ukraine	0,73	-3,07	1,37	-5,23
United Arab Emirates	0,21	-0,04	0,4	-0,08
United Kingdom	-58,6	0,24	-96,53	0,17
United States of America	11,22	1,38	20,22	2,18
Uruguay	0,03	0	0,07	0,01
Asia LDC	0,25	0,06	0,44	0,1
Central, East and South (CES) Africa	0,16	0	0,29	-0,01
CES Africa LDCs	0,18	0,08	0,33	0,15

Assumptions of BASE 44 and BASE 88: The European Union imposes a domestic carbon price of \$44 per tonne of carbon emissions from fossil fuel combustion and industrial processes.

- No other countries impose carbon prices to production.

Assumptions of CBAM 44: In addition to domestic carbon price of \$44 per tonne of carbon emissions, a CBA is imposed on European Union's imports of electricity and products from energy intensive industries of \$44 per tonne of embedded carbon emissions.

- Least Developed Countries and Small Island Developing States are exempt.
- No export rebate.

Assumptions of CBAM 88: Price of \$88 per tonne in the European Union's and CBA equivalent.

**Note:** Excerpt from UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT (UNCTAD). *A European Union Carbon Border Adjustment Mechanism: Implications for developing countries*. 2021, 1-31. Annex, first table.

**Table 11 – Variation in Real income in millions of US dollars**

Economy	Base 44	CBAM 44	Base 88	CBAM 88
Argentina	141,04	-39,55	268,12	-75,49
Australia/New Zealand	532,71	-788,02	1 107,58	-1 349,26
Belarus	174,58	-109,71	322,69	-199,24
Brazil	1 186,13	-444,3	2 308,68	-786,53
Canada	-9,32	-434,95	82,2	-851,53
Chile	120,9	63,26	225,82	119,81
China	3 938,92	-372,1	7 338,89	-752,13
Colombia	-296,53	-59,27	-497,76	-100,15
Egypt	-118,87	-218,97	-211,82	-391,09
India	1 508,22	-1 046,73	2 814,92	-1 675,53
Indonesia	133,44	-65,62	289,1	-117,8
Israel	319,64	-25,41	605,87	-65,39
Japan	3 248,99	1 547,83	6 009,81	2 758,56
Kazakhstan	-630,33	-207,11	-1 189,78	-351,99
Republic of Korea (the)	1 238,55	698,1	2 278,74	1 230,6
Malaysia	-139,64	-62,19	-239,75	-120,29
Mexico	-25,96	-33,35	-40,68	-53,42
Morocco	-8,46	23,22	-14,16	40,64
Mozambique	6,83	33,99	13,87	64,13



Norway	-2 268,34	-257,3	-4 382,6	-456,74
Peru	30,14			178,37
Switzerland	-790,72			-836,68
Taiwan (Province of China)	255,94			279,18
Thailand	252,17			85,47
Turkey	665,37			-748,89
Ukraine	299,22			-2 022,6
United Arab Emirates	-554,85			-513,6
United Kingdom	-7 215,54			44,11
United States of America	3 641,79			1 923,54
Uruguay	58,73			9,63
AsiaLDC	21,16			151,58
CES Africa	-532,34			-183,79
CES Africa LDCs	-18,92			126,59
EU_27	-4 2572,49			7 178,66
Rest of Central America	151,84			85,21
Rest of Central Asia	-380,36			-607,97
Rest of East Asia	-62,3			-179,58
Rest of Latin America	-381,38			-325,9
Rest of MENA	-2 312,13			-1 860,67
Rest of North Africa	-892,97			-709,82

Assumptions of BASE 44 and BASE 88: The European Union imposes a domestic carbon price of \$44 per tonne of carbon emissions from fossil fuel combustion and industrial processes.

- No other countries impose carbon prices to production.








Assumptions of CBAM 44: In addition to domestic carbon price of \$44 per tonne of carbon emissions, a CBA is imposed on European Union's imports of electricity and products from energy intensive industries of \$44 per tonne of embedded carbon emissions.

- Least Developed Countries and Small Island Developing States are exempt.
- No export rebate.

Assumptions of CBAM 88: Price of \$88 per tonne in the European Union's and CBA equivalent.

**Note:** Excerpt from UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT (UNCTAD). *A European Union Carbon Border Adjustment Mechanism: Implications for developing countries*. 2021, 1-31. Annex, third table.

**Table 12 – Change in exports after CBAM in percent for energy intensive products.**

	 Paper Products	 Petroleum, Coal Prod.	 Chemicals, Fertilizers	 Cement, Glass	 Steel, ferrous metals	 Aluminium	 Electricity
<b>Base 44</b>							
European Union	-0,21	-5,60	-1,30	-1,48	-1,08	-0,33	-3,79
Other	0,37	-0,73	0,96	1,35	1,23	0,77	11,02
Developed	-0,02	-3,04	-0,48	-0,69	-0,09	0,11	-0,89
Developing	0,35	-0,35	0,94	1,32	1,09	0,72	10,09
LDC	0,87	0,72	0,75	1,48	1,13	0,63	3,69
SIDS	0,54	-0,30	1,37	1,39	1,70	1,14	18,13
<b>CBAM 44</b>							
European Union	0,38	1,14	1,97	4,46	2,71	1,86	4,23
Other	-0,62	-0,67	-1,45	-4,62	-1,90	-1,09	-14,30
Developed	0,12	-0,10	0,68	2,48	0,71	0,60	-0,31
Developing	-0,78	-0,52	-1,35	-5,29	-1,68	-0,85	-11,22
LDC	-0,75	-0,00	0,59	0,48	-0,43	1,64	-1,71
SIDS	0,00	0,10	0,72	0,46	0,86	1,53	3,07
<b>Base 88</b>							
European Union	-0,39	-10,46	-2,40	-2,76	-1,95	-0,45	-6,20
Other	0,64	-1,36	1,79	2,51	2,27	1,38	20,88
Developed	-0,06	-5,66	-0,89	-1,28	-0,13	0,29	-0,83
Developing	0,62	-0,63	1,76	2,46	2,04	1,30	18,88
LDC	0,96	1,50	1,47	2,71	2,11	1,12	6,43
SIDS	1,09	-0,53	2,53	2,78	3,15	2,04	35,23
<b>CBAM 88</b>							
European Union	0,75	2,32	3,74	7,72	5,08	3,66	7,63
Other	-1,19	-1,23	-2,63	-7,47	-3,37	-2,03	-22,03
Developed	0,25	-0,15	1,30	4,15	1,37	1,17	-0,46
Developing	-1,52	-0,93	-2,44	-8,35	-2,95	-1,51	-16,57
LDC	-0,76	-0,07	1,05	0,86	-0,85	3,13	-2,84
SIDS	0,00	0,20	1,26	0,45	1,65	3,00	5,36

**Note:** Excerpt from UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT (UNCTAD). *A European Union Carbon Border Adjustment Mechanism: Implications for developing countries*. 2021, 1-31. Table 5.

**Table 13 – Change in Real income after CBAM, millions of US\$**

Group	Base 44	CBAM 44	Base 88	CBAM 88
European Union	-52 847	4 591	-111 046	5 929
Other	2 652	-7 973	6 578	-14 200
<b>Total</b>	<b>-50 195</b>	<b>-3 382</b>	<b>-104 467</b>	<b>-8 271</b>
<b>Development Classification</b>				
Developed	-51 370	2 485	-107 070	1 937
Developing	1 175	-5 867	2 603	-10 208
<b>Total</b>	<b>-50 195</b>	<b>-3 381</b>	<b>-104 467</b>	<b>-8 270</b>
<b>Vulnerable Groups</b>				
LDCs	16	332	39	628
SIDS	25	76	61	151

Source: UNCTAD based on GTAP simulation.

**Note:** Excerpt from UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT (UNCTAD). *A European Union Carbon Border Adjustment Mechanism: Implications for developing countries*. 2021, 1-31. Table 6.

**Table 14 – Change in CO2 emissions after CBAM, millions of MtCO2**

Group	Base 44	CBAM 44	Base 88	CBAM 88
European Union	-434	9	-704	13
Other economies	58	-36	106	-59
<b>Total</b>	<b>-376</b>	<b>-27</b>	<b>-598</b>	<b>-45</b>
<b>Development Classification</b>				
Developed	-409	-4	-658	-10
Developing	33	-22	61	-35
<b>Total</b>	<b>-376</b>	<b>-27</b>	<b>-598</b>	<b>-45</b>
<b>Vulnerable Groups</b>				
LDCs	0.6	0.2	1.0	0.4
SIDS	0.5	0.2	0.9	0.4

**Note:** Excerpt from UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT (UNCTAD). *A European Union Carbon Border Adjustment Mechanism: Implications for developing countries*. 2021, 1-31. Table 4.

**Table 15 – Percentage of CBAM products in total imports from Chile for EU countries**

EU Country	Value of total imports from Chile	Value of CBAM products as percentage of total value of imports
Austria	13.328.885 USD	9%
Belgium	946.646.286 USD	79%
Bulgaria	175.075.674 USD	98%
Croatia	1.524.686 USD	>1%
Cyprus	12.121.802 USD	1%
Czech Republic	18.341.065 USD	>1%
Denmark	186.779.138 USD	4%
Estonia	8.072.792 USD	>1%
Finland	55.001.841 USD	49%
France	1.221.005.441 USD	3%
Germany	1.134.567.420 USD	41%
Greece	54.230.972 USD	2%
Hungary	9.985.993 USD	>1%
Ireland	67.929.588 USD	2%
Italy	896.408.089 USD	13%
Latvia	13.351.643 USD	>1%
Lithuania	44.927.861 USD	30%
Luxembourg	25.921.320 USD	1%
Malta	7.683.427 USD	>1%
Netherlands	1.795.842.475 USD	38%
Poland	117.329.655 USD	12%
Portugal	55.494.861 USD	>1%

Romania	10.037.590 USD	>1%
Slovakia	1.519.889 USD	>1%
Slovenia	2.251.406 USD	>1%
Spain	1.455.584.483 USD	36%
Sweden	126.949.977 USD	>1%
<b>Total:</b>	<b>8.457.914.258 USD</b>	<b>33%</b>

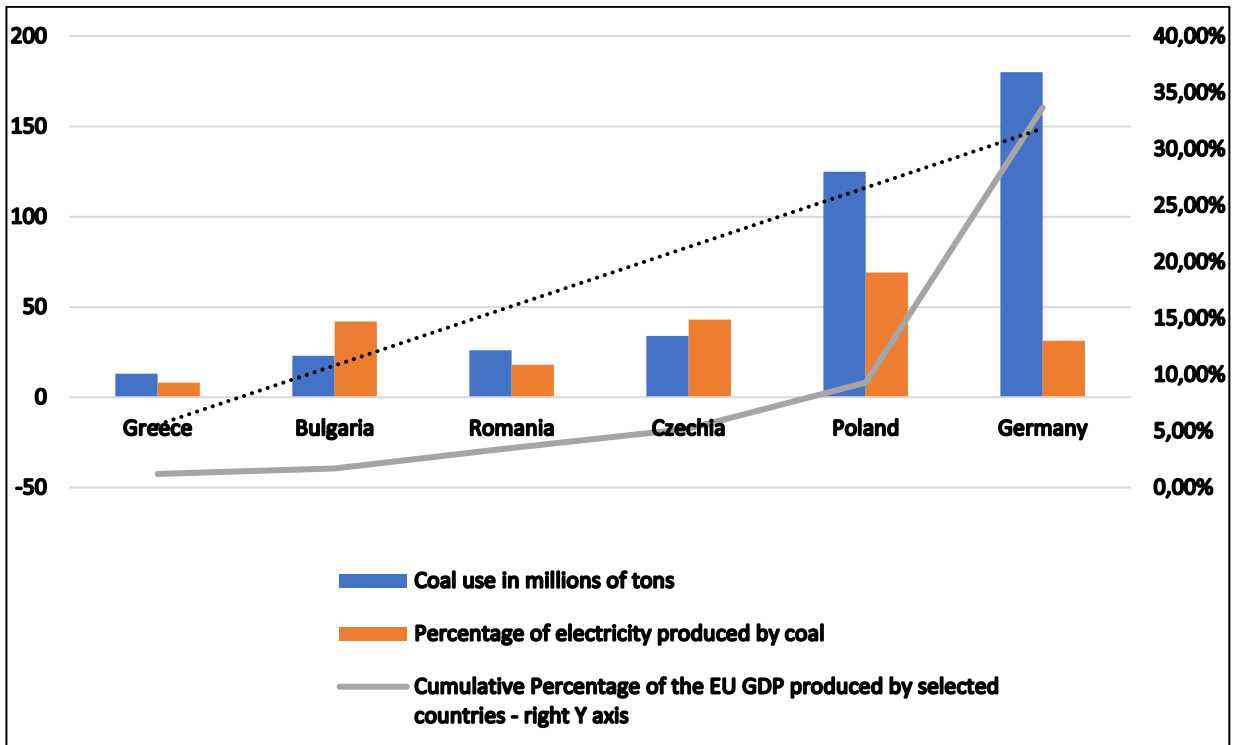
**Note:** Table drawn up by the author on data from Dirección Nacional de Aduanas, Gobierno de Chile, *Base de Datos Dinámicas de Exportaciones* available at <https://www.aduana.cl/base-de-datos-dinamicas-de-exportaciones/aduana/2020-11-19/151830.html>

**Table 16 – Geopolitics of CBAM, criticism of trade partners.**

<b>Protectionism</b>	<b>Revenue Generator</b>	<b>Unilateral decision-making</b>
<ul style="list-style-type: none"> <li>Allegedly protectionist and a trade barrier under a climate pretext.</li> <li>Competitiveness of domestic industry.</li> </ul>	<ul style="list-style-type: none"> <li>CBAM revenues could be seen as income for the overall EU budget.</li> <li>Funds from less affluent countries redirected into the EU.</li> </ul>	<ul style="list-style-type: none"> <li>The EU failed to consult with third country trading partners.</li> <li>Accusation of acting on a unilateral basis.</li> </ul>

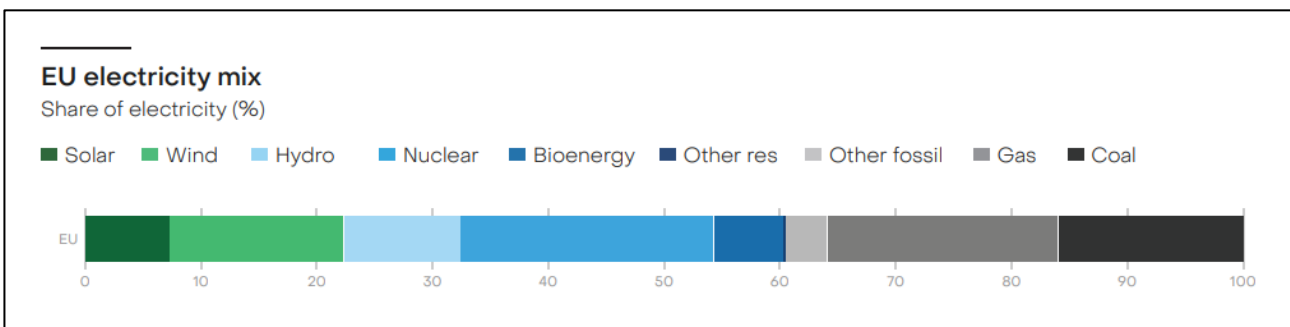
**Note:** Excerpt from MUNZUR A., KOCH K., WINTER J., *Geopolitical Implications of the European Union Carbon Border Adjustment*, Chapter 9 of the volume of Simões Joao, “Challenging the Paradigm of Energy Geopolitics: Security, Resources and Pathways in Light of Global Challenges”, New York, 2023, Table 1.3.

**Figure 1 - Coal use, electricity production and cumulative percentage of EU GDP**



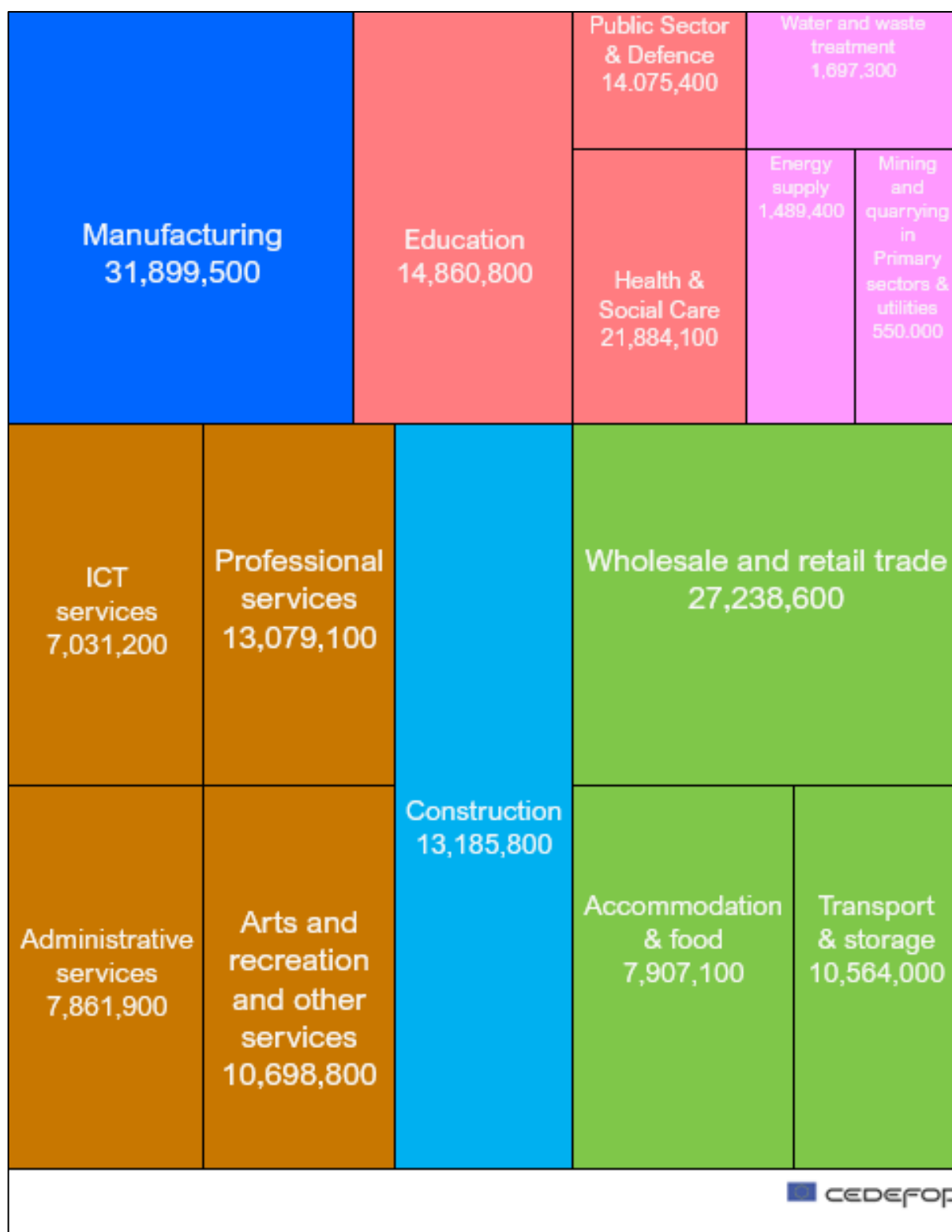
**Note:** Graph drawn up by the author on Eurostat - *Complete energy balances. Total, main fuel families. 2022.*, International Energy Agency – *Coal Analysis and forecast to 2025. 2022.*, International Monetary Fund (IMF), *Dataset European Union. 2024.* In <https://www.imf.org/external/datamapper/profile/EU>

**Figure 2 - Energy mix of the European Union in 2022**



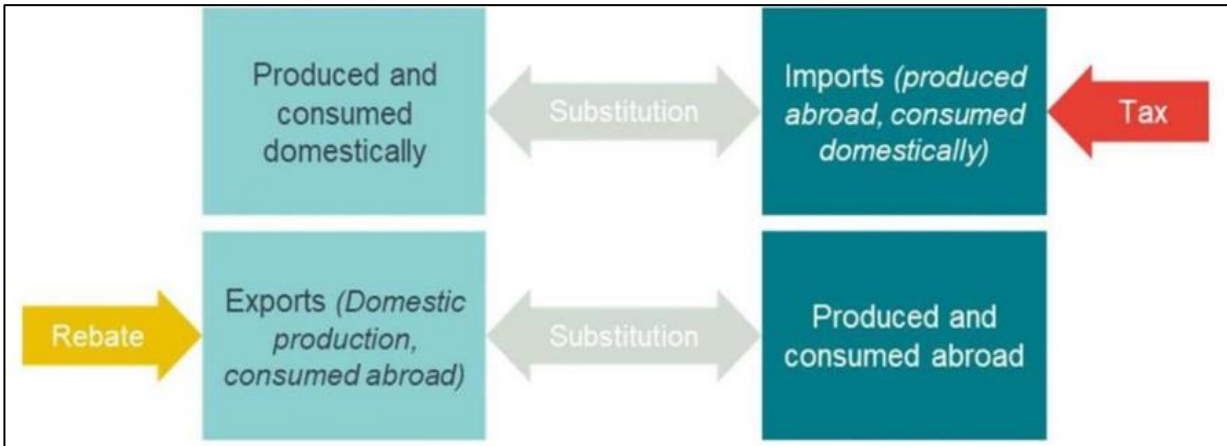
**Note:** Excerpt from *European Electricity Review*. Ember climate, 2023, p. 46.

**Figure 3 - Employment distribution in the European Union**



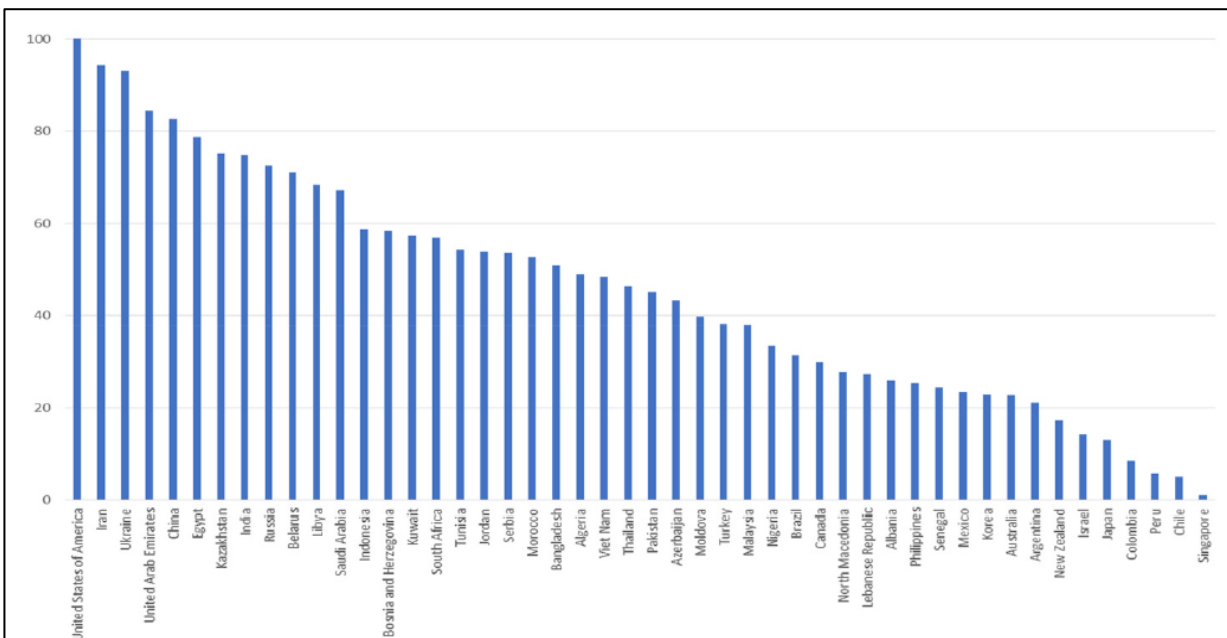
**Note:** Excerpt from European Centre for the Development of Vocational Training - Employment in EU in 2021 across sectors, 2022. At: <https://www.cedefop.europa.eu/en/tools/skills-intelligence/sector-employment-occupations?year=2021country=EU#1>

**Figure 4 - The Mechanism of Border Tax Adjustment**



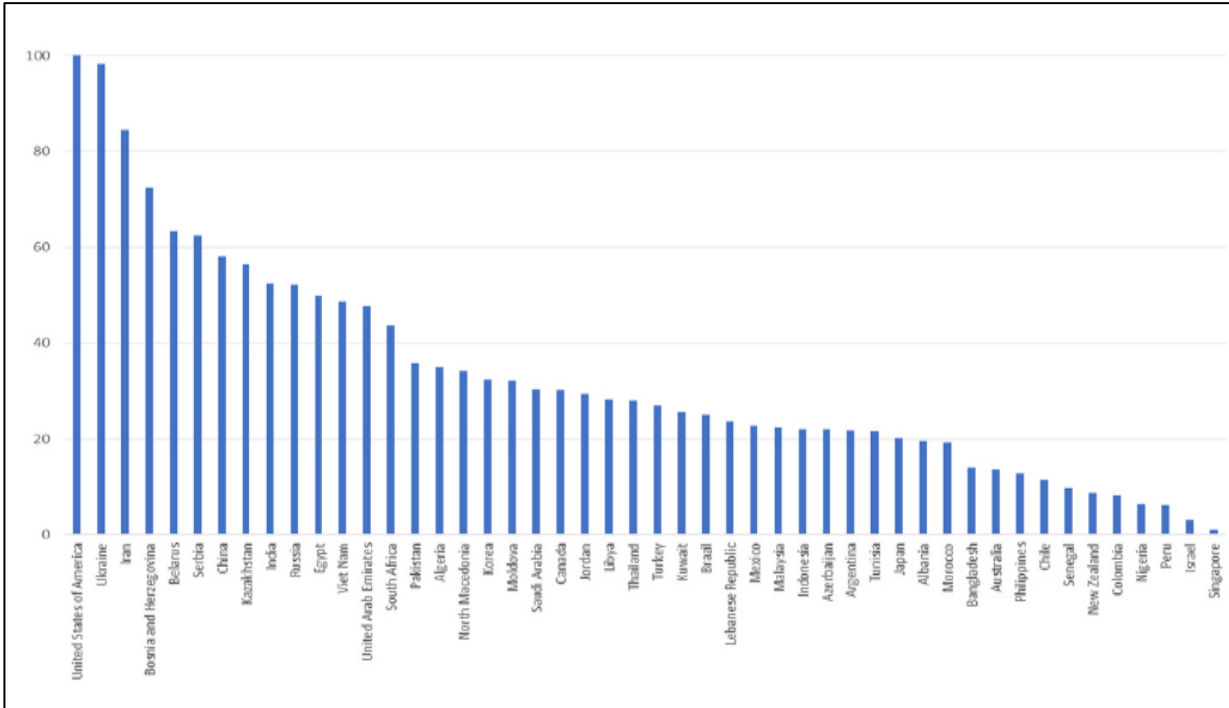
**Note:** Excerpt from Gatzert C. et al, Carbon Border Taxes: help or harm to European industry? in Frontier Economics, 10 September 2023, Figure 1.

**Figure 5 - CBAM Opposition Index with innovation capacity/patent applications dimension omitted.**



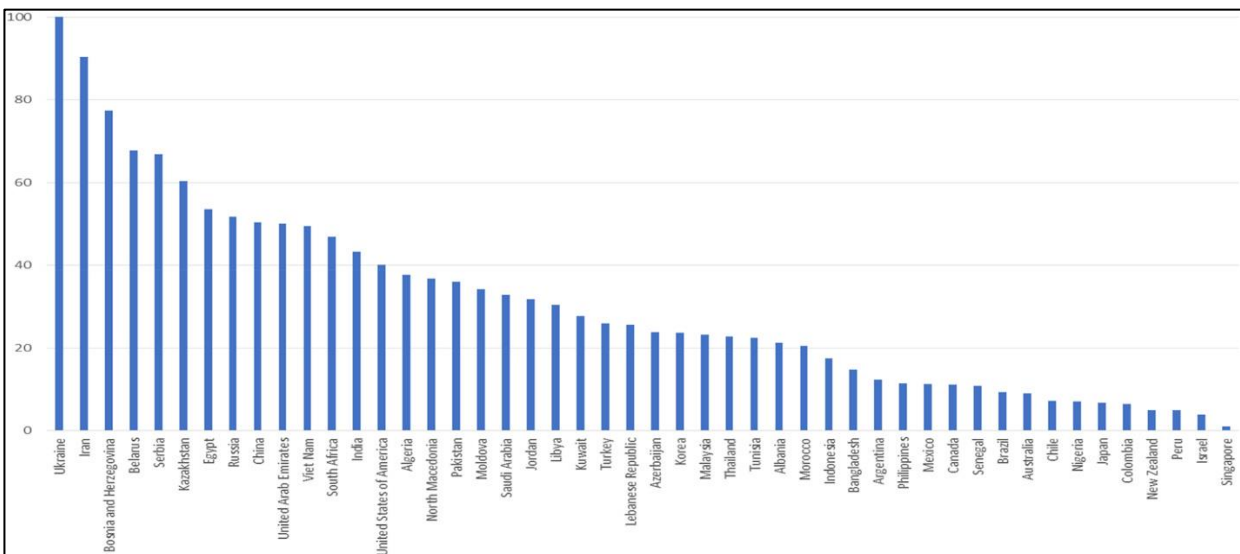
**Note:** Excerpt from Overland I., Sabyrbekov R., Know your opponent: Which countries might fight the European carbon border adjustment mechanism? in Energy Policy, n° 2022, 169, 1 – 12, Fig. 7

**Figure 6 - Index based on trade, carbon intensity and WTO appeals dimensions only.**



**Note:** Excerpt from Overland I., Sabyrbekov R., *Know your opponent: Which countries might fight the European carbon border adjustment mechanism?* in *Energy Policy*, n° 2022, 169, 1 – 12, Fig. 8

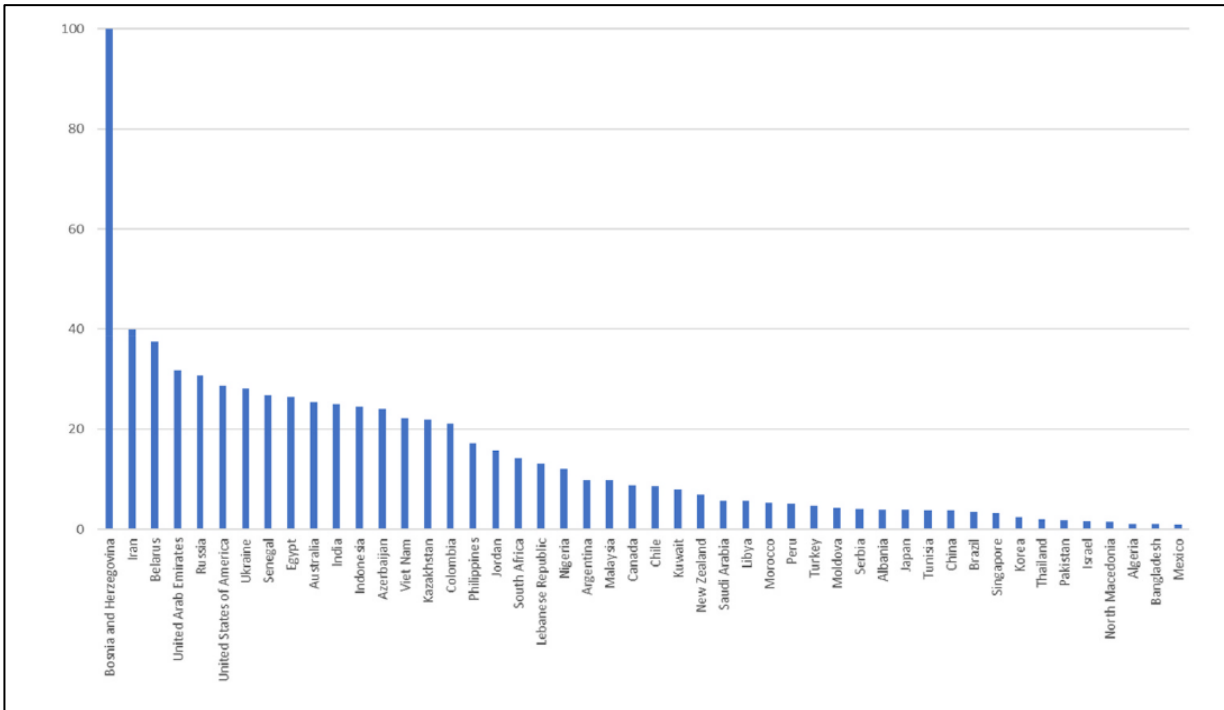
**Figure 7 - Index based on the trade and carbon intensity dimensions only**



**Note:** Excerpt from Overland I., Sabyrbekov R., *Know your opponent: Which countries might fight the European carbon border adjustment mechanism?* in *Energy Policy*, n° 2022, 169, 1 – 12, Fig. 9

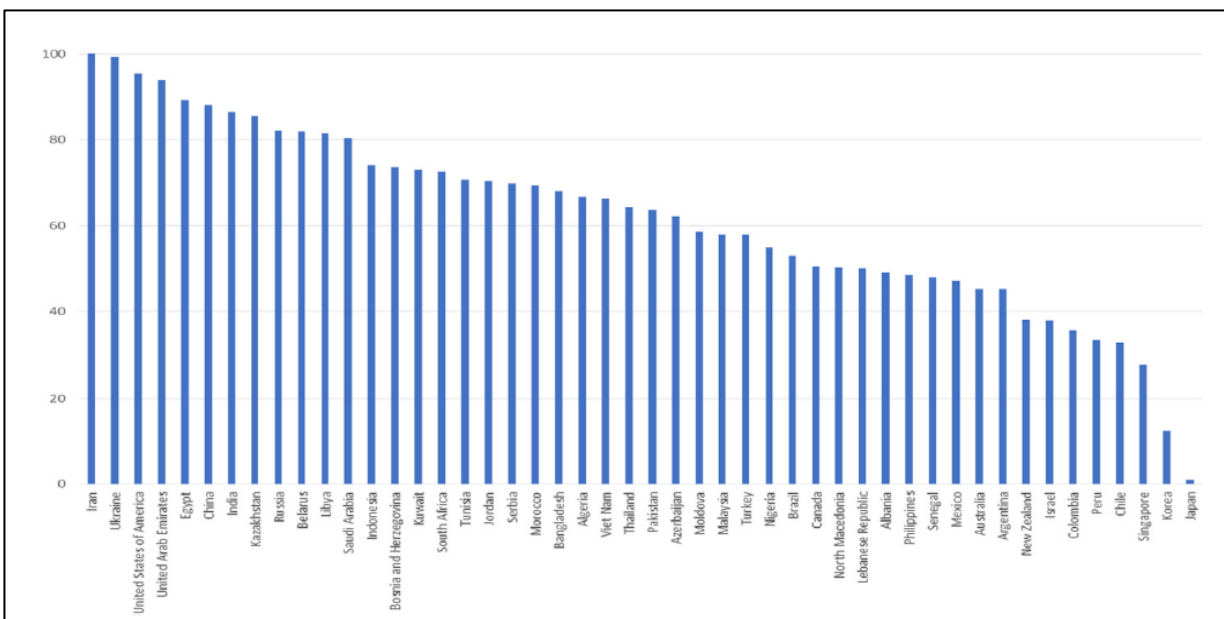


**Figure 8 – Index with Trade and WTO disputes dimensions only**



**Note:** Excerpt from Overland I., Sabyrbekov R., *Know your opponent: Which countries might fight the European carbon border adjustment mechanism?* in *Energy Policy*, n° 2022, 169, 1 – 12, Fig. 10

**Figure 9 - CBAM Opposition Index, main version with all dimensions.**



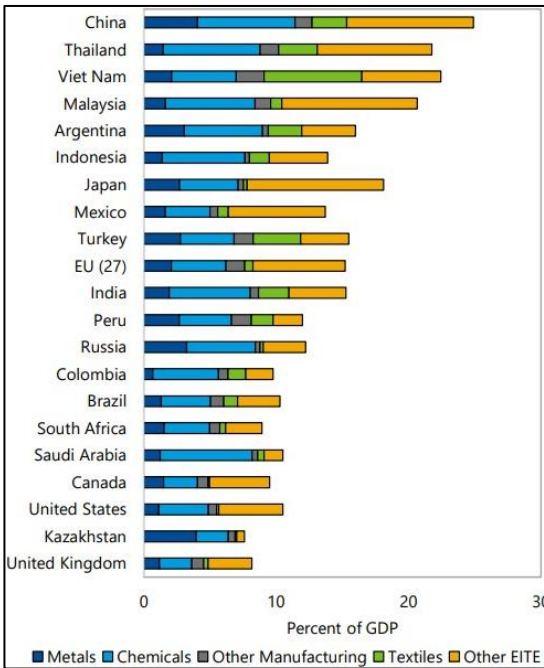
**Note:** Excerpt from Overland I., Sabyrbekov R., *Know your opponent: Which countries might fight the European carbon border adjustment mechanism?* in *Energy Policy*, n° 2022, 169, 1 – 12, Fig. 6.

**Figure 10 - CBAM Opposition Index plotted on the world map**



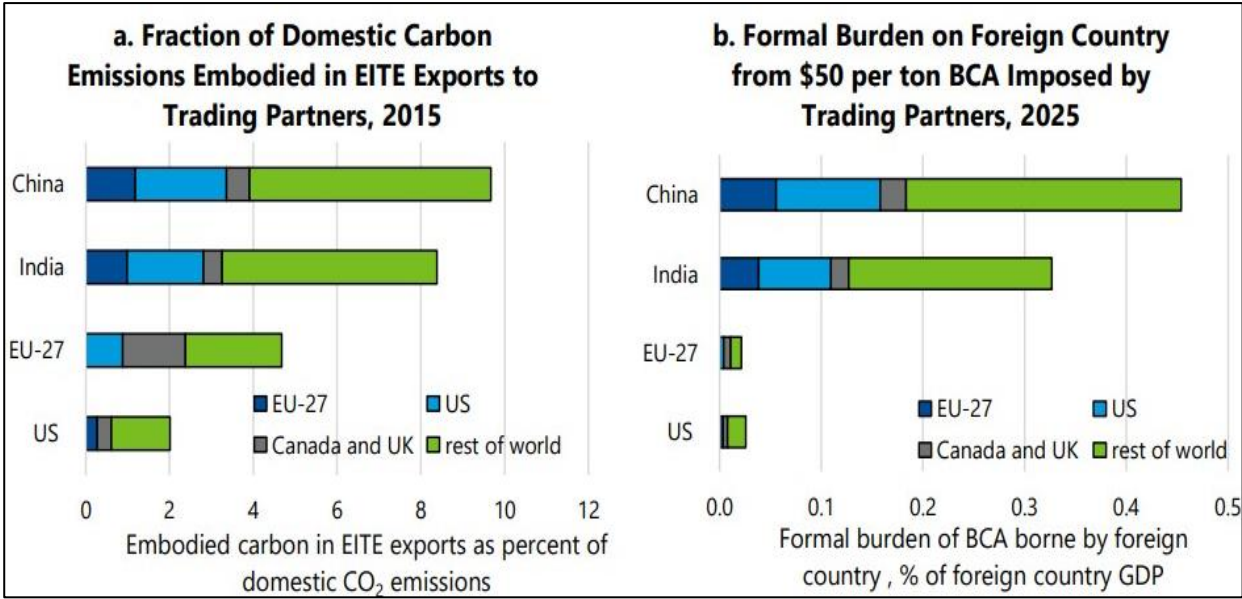
**Note:** Excerpt from Overland I., Sabyrbekov R., *Know your opponent: Which countries might fight the European carbon border adjustment mechanism?* in *Energy Policy*, n° 2022, 169, 1 – 12, Fig. 5.

**Figure 11 - Value added of Emissions Intensive Trade Exposed Industries (EITEs) as a percentage of GDP**



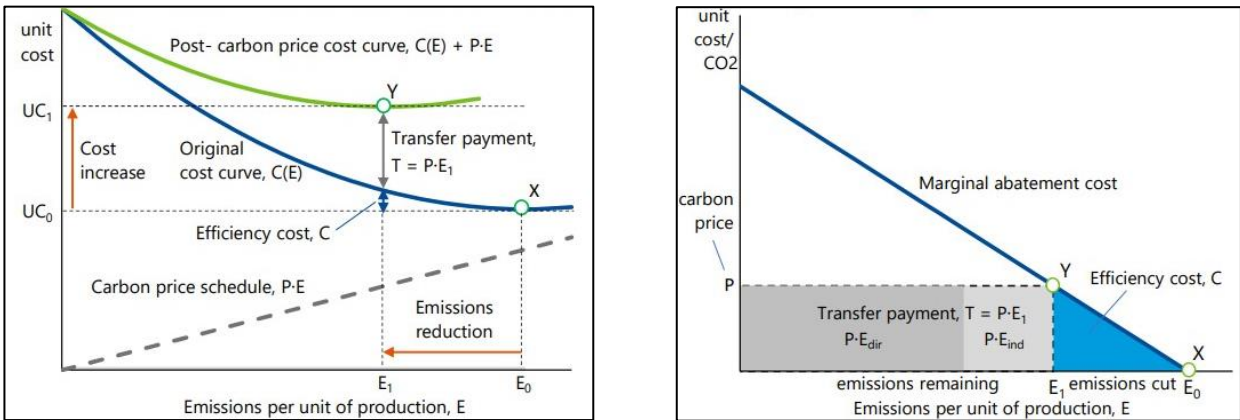
**Note:** Excerpt from Keen M., Parry I., Roaf J., *Working Paper Border Carbon Adjustments: Rationale, Design and Impact*. IMF Fiscal Affairs Department, 2021, 1- 42, Fig. 3.

**Figure 12 – Importance of Emissions Intensive Trade Exposed industries (EITEs) in China, India, EU-27 and United States**



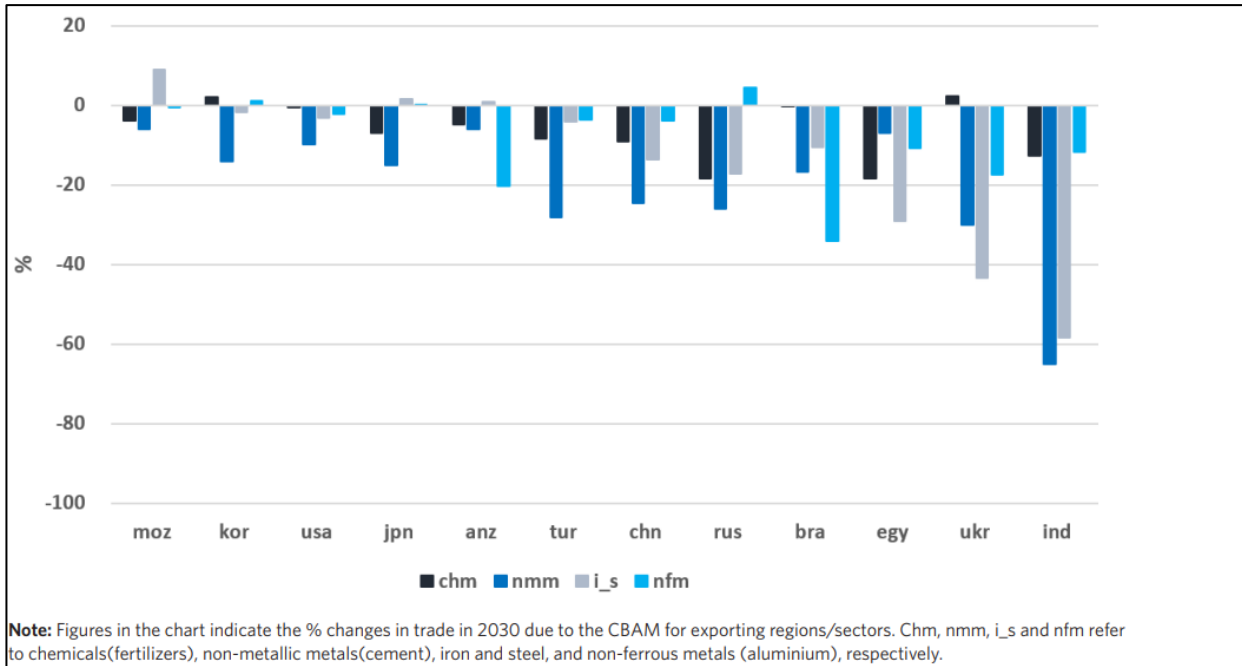
**Note:** Excerpt from Keen M., Parry Ian., Roaf James., *Working Paper Border Carbon Adjustments: Rationale, Design and Impact*. IMF Fiscal Affairs Department, 2021, 1- 42, Fig. 9.

**Figure 13 – Effects of carbon pricing on firm costs and on market prices**



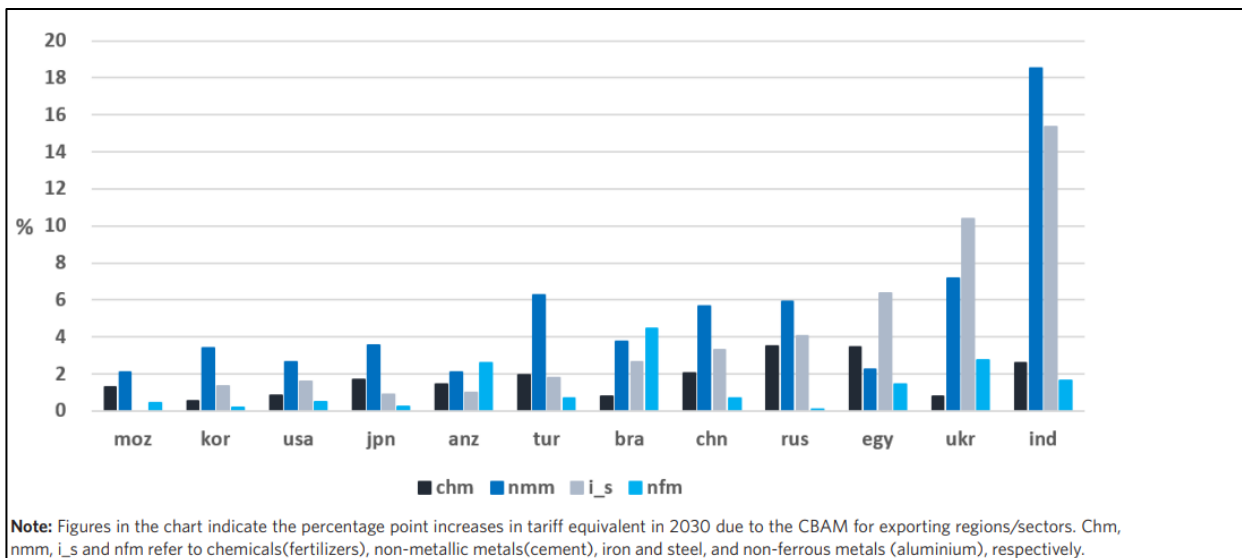
**Note:** Excerpt from Keen M., Parry Ian., Roaf James., - *Working Paper Border Carbon Adjustments: Rationale, Design and Impact*. IMF Fiscal Affairs Department, 2021, 1 - 42, Fig. 4 and 5.

**Figure 14 – Decrease in exports of initial CBAM products to the EU**



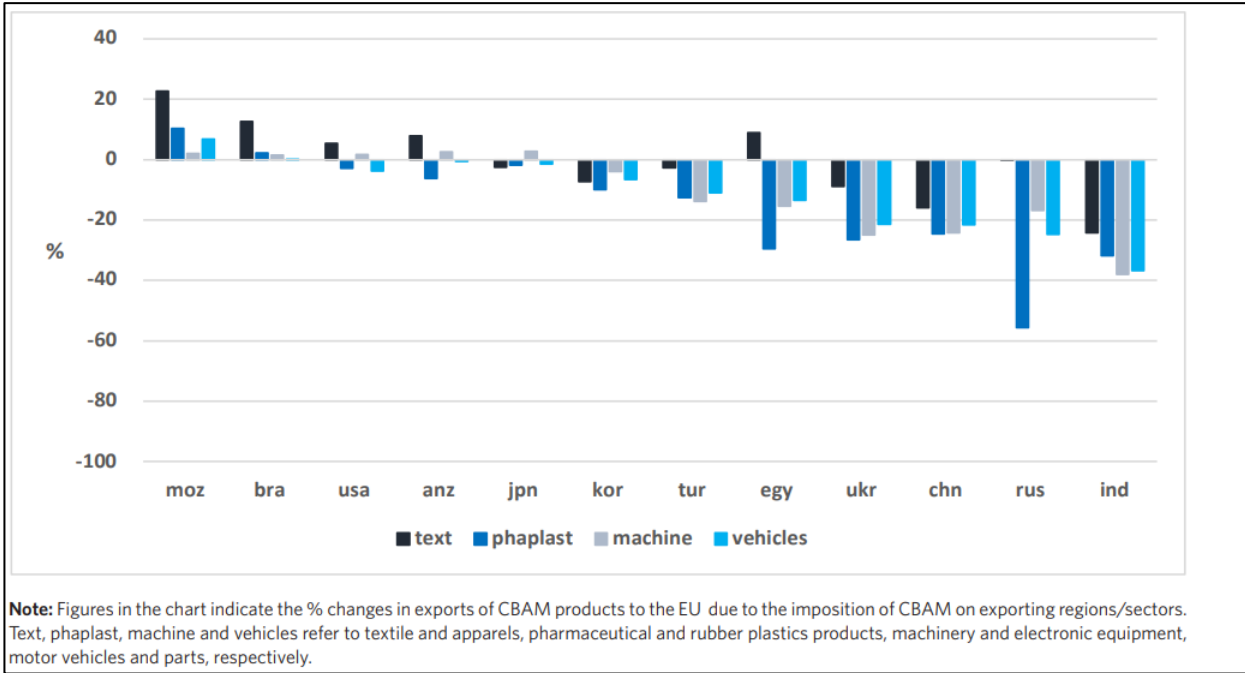
**Note:** Excerpt from Xiaobei H., Zhai F., Jun M., *The Global Impact of a Carbon Border Adjustment Mechanism: A Quantitative Assessment*, Boston University – Global Development Policy Center, Task Force on Climate, Development and International Monetary Fund, 11 March 2022, 1- 20, Fig. 4.

**Figure 15 – Tariffs equivalent of initial CBAM**



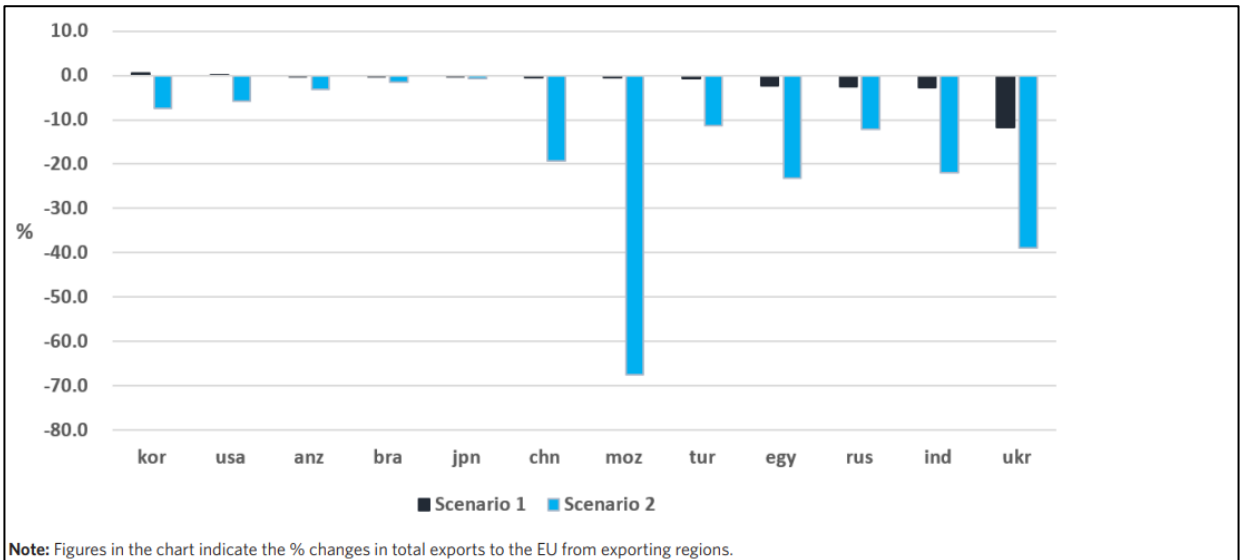
**Note:** Excerpt from Xiaobei H., Zhai F., Jun M., *The Global Impact of a Carbon Border Adjustment Mechanism: A Quantitative Assessment*, Boston University – Global Development Policy Center, Task Force on Climate, Development and International Monetary Fund, 11 March 2022, 1- 20, Fig. 3.

**Figure 16 – CBAM impact on exports of selected products**



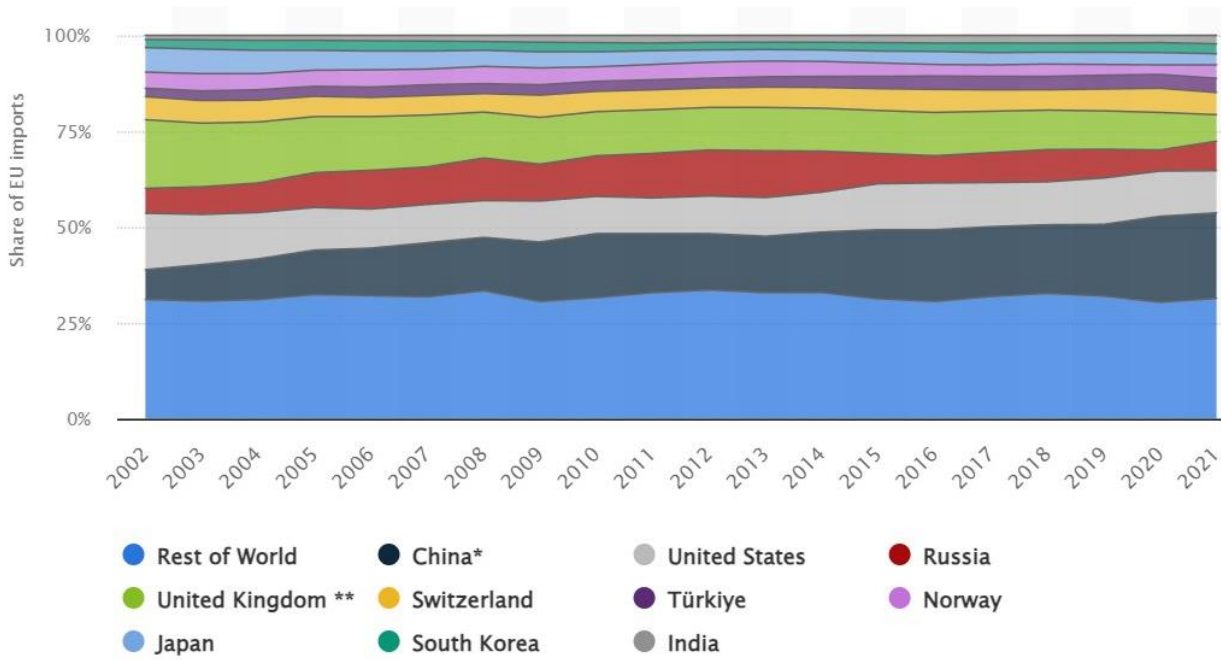
**Note:** Excerpt from Xiaobei H., Zhai F., Jun M., *The Global Impact of a Carbon Border Adjustment Mechanism: A Quantitative Assessment*, Boston University – Global Development Policy Center, Task Force on Climate, Development and International Monetary Fund, 11 March 2022, 1- 20, Fig. 6.

**Figure 17 – Change in exports to the EU after partial and total application of CBAM**



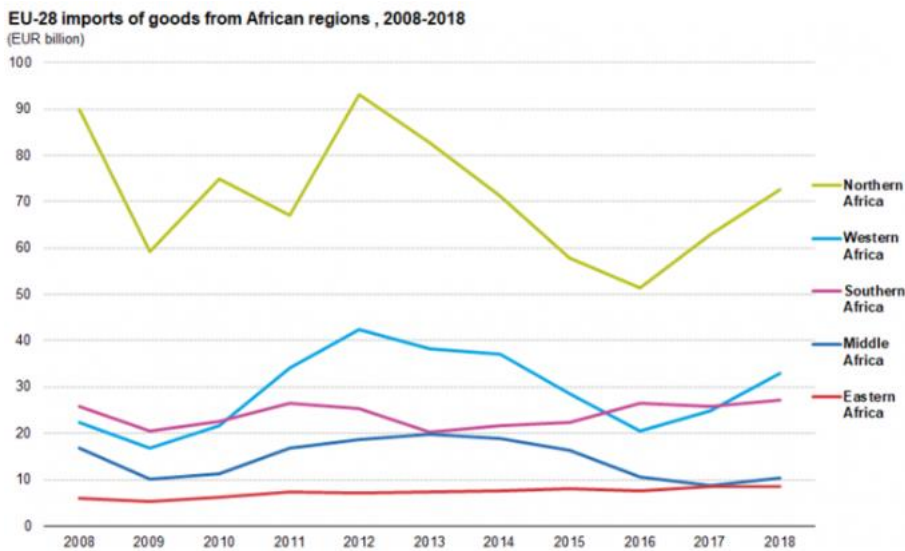
**Note:** Excerpt from Xiaobei H., Zhai F., Jun M., *The Global Impact of a Carbon Border Adjustment Mechanism: A Quantitative Assessment*, Boston University – Global Development Policy Center, Task Force on Climate, Development and International Monetary Fund, 11 March 2022, 1- 20, Fig. 7.

**Figure 18 – International trade of the European Union between 2002 and 2021**



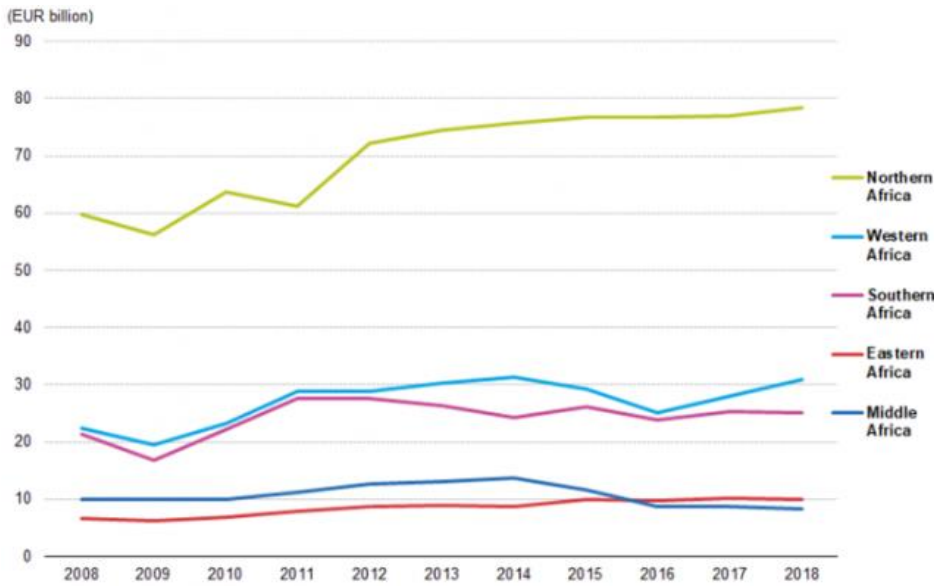
**Note:** Excerpt from MCEVOY O., *International Trade of the EU: largest goods import partners by trade share 2002-2021*, Online publication, Statista, 2024.

**Figure 19 – Imports of the EU from African countries between 2008 and 2018**



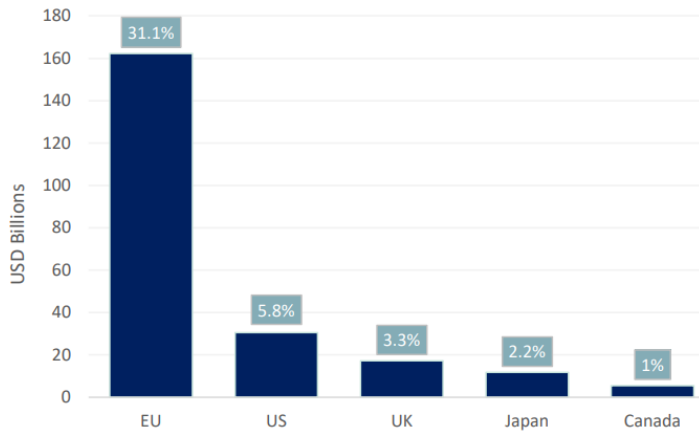
**Note:** Excerpt from EUROSTAT. *International trade in goods – a statistical picture*, Online Publications Series 2023. Fig. 6.

**Figure 20 – Exports of the EU to African countries between 2008 and 2018**



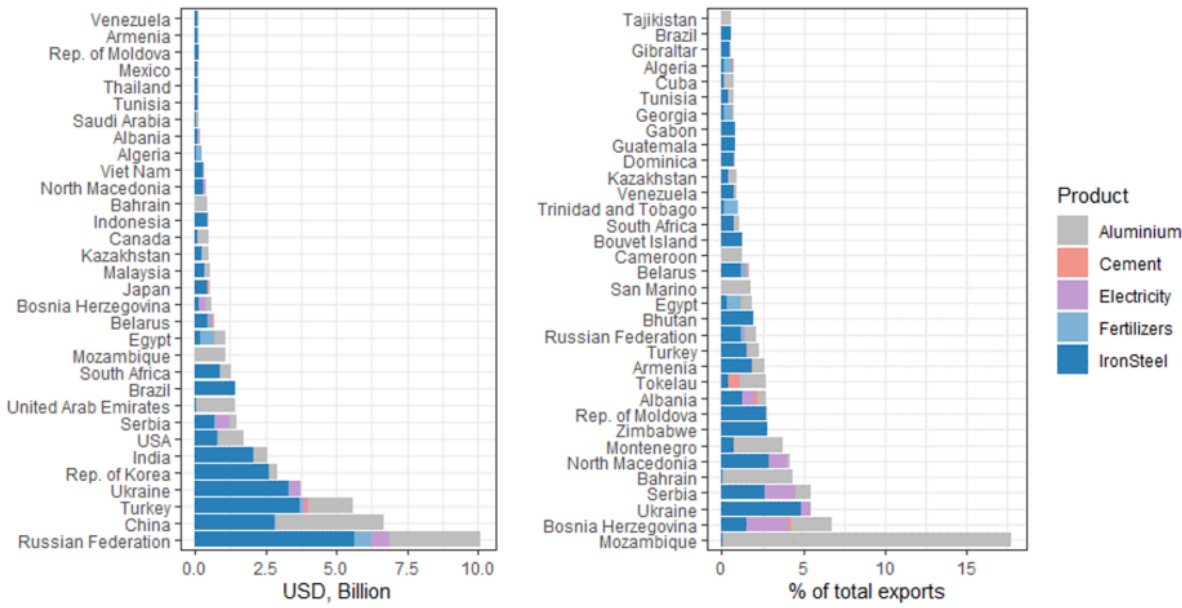
**Note:** Excerpt from EUROSTAT. *International trade in goods – a statistical picture*, Online Publications Series 2023. Fig. 5.

**Figure 21 - Total African Export to the EU compared with other Western Countries**



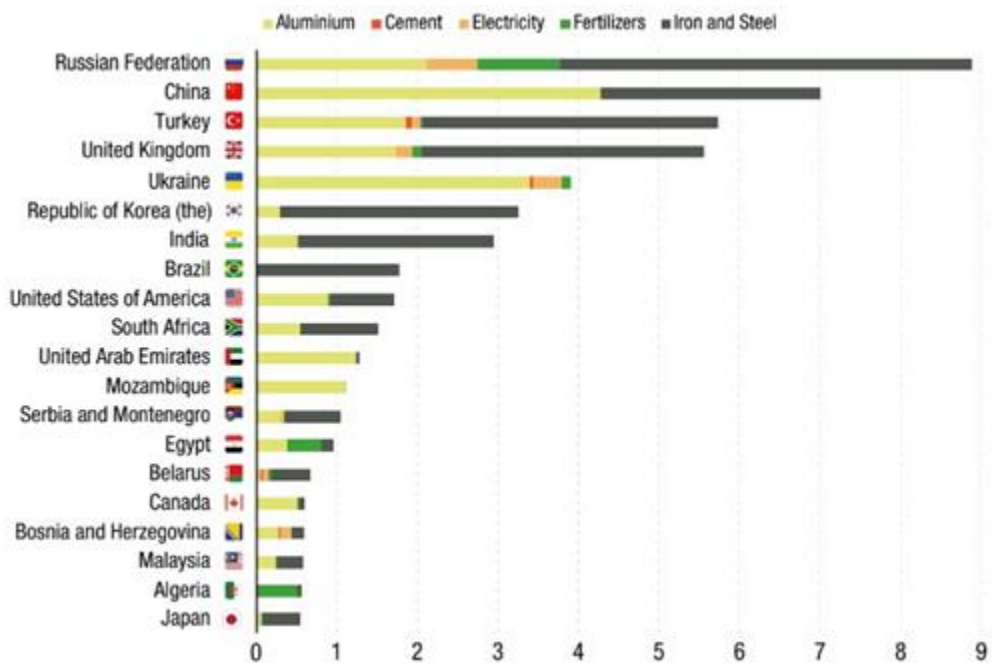
**Note:** Excerpt from BAKER P., BOODHOO BEEHARRY T. Z., LOAN L., QUILES P., RIA R., *Designing an African response to Carbon Border Adjustment Mechanisms*. African Economic Conference: Supporting Climate Smart Development in Africa, 2022, 1-38. Figure 1.

**Figure 22 – Estimation of exports of CBAM covered products, by total value and % of total exports.**



**Note:** Excerpt from ESPAGNE É., GODIN A., MAGACHO G., *Impacts of CBAM on EU trade partners: consequences for developing countries*. AFD Research Papers, 2022, 1-20. Figure 1.

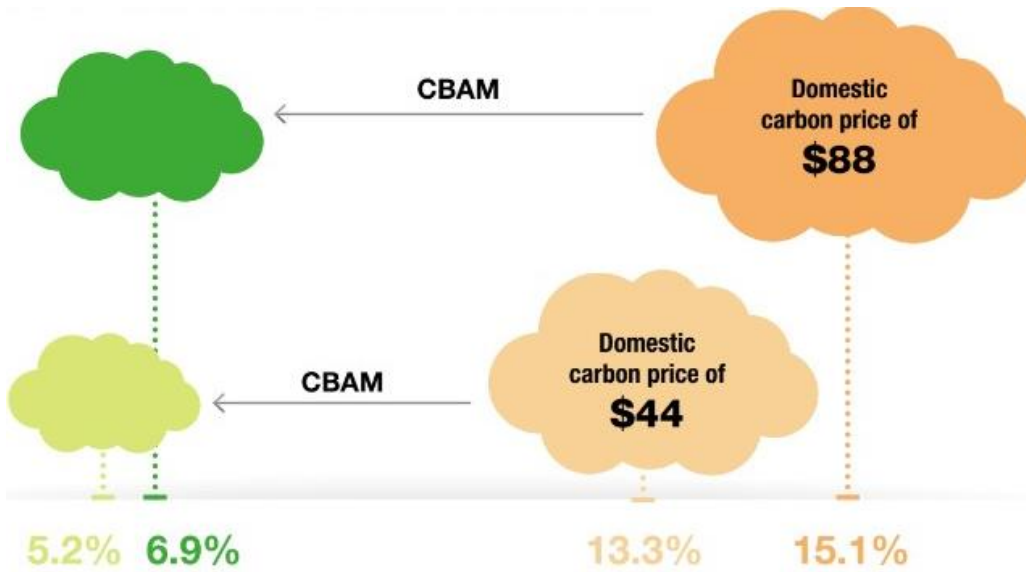
**Figure 23 – Exports to the EU of 2019 in sectors considered by the initial version of CBAM. Expressed in billions of US dollars.**



**Note:** Excerpt from UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT (UNCTAD). *A European Union Carbon Border Adjustment Mechanism: Implications for developing countries*. 2021, 1-31. Figure 2

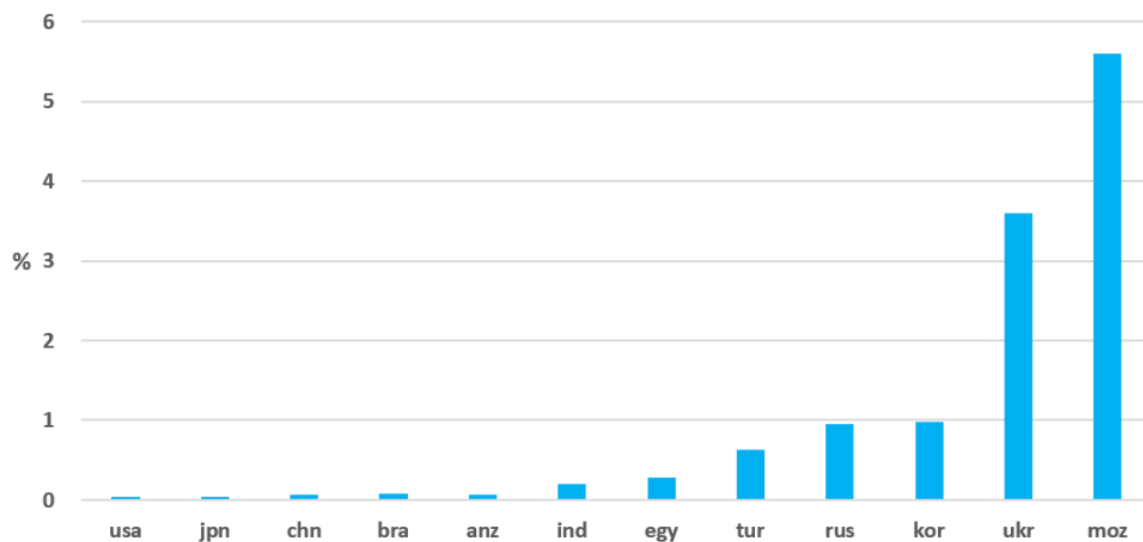


**Figure 24 – Effects of CBAM on carbon leakage.**



**Note:** Excerpt from UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT (UNCTAD). *A European Union Carbon Border Adjustment Mechanism: Implications for developing countries*. 2021, 1-31. Figure 3

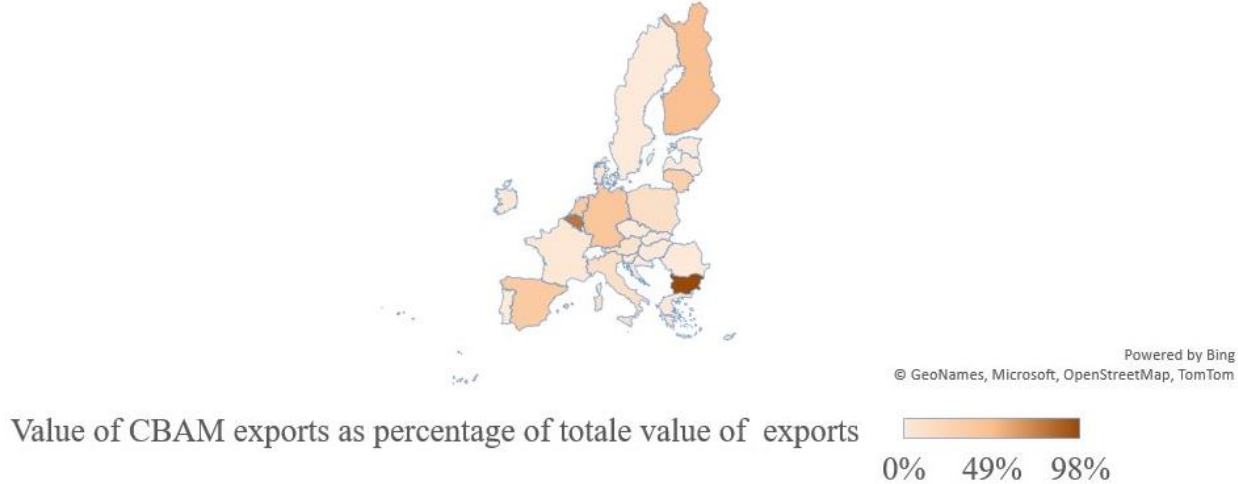
**Figure 25 – Exports of CBAM products as a % of GDP exporting country**



**Note:** Excerpt from Xiaobei H., Zhai F., Jun M., *The Global Impact of a Carbon Border Adjustment Mechanism: A Quantitative Assessment*, Boston University – Global Development Policy Center, Task Force on Climate, Development and International Monetary Fund, 11 March 2022, 1- 20, Fig. 1.

**Figure 26 – Percentage of CBAM products in imports from Chile for EU countries, plotted on Europe’s map.**

Percentage of CBAM products in imports from Chile



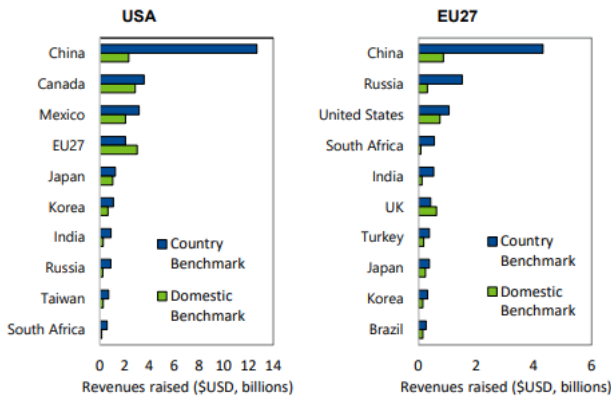
**Note:** Graph drawn up by the author on data from Dirección Nacional de Aduanas, Gobierno de Chile, *Base de Datos Dinámicas de Exportaciones* available at <https://www.aduana.cl/base-de-datos-dinamicas-de-exportaciones/aduana/2020-11-19/151830.html>

**Figure 27 – Importance of CBAM covered industries for wages and employment by country**



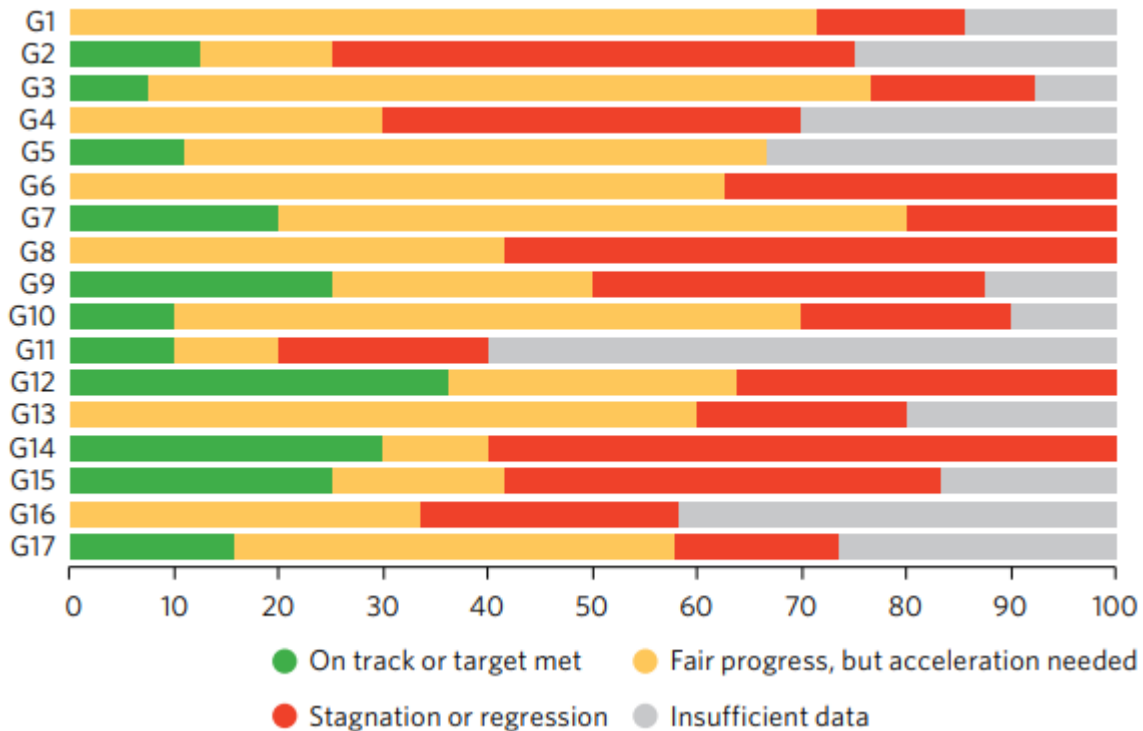
**Note:** Excerpt from MAGACHO G., ESPAGNE É., GODIN A., *Impacts of CBAM on EU trade partners: consequences for developing countries*. AFD Research Papers, 2022. Figure 5.

**Figure 28 – Potential revenues from tariffs on energy-intensive imports, carbon price of 50\$ per tonne.**



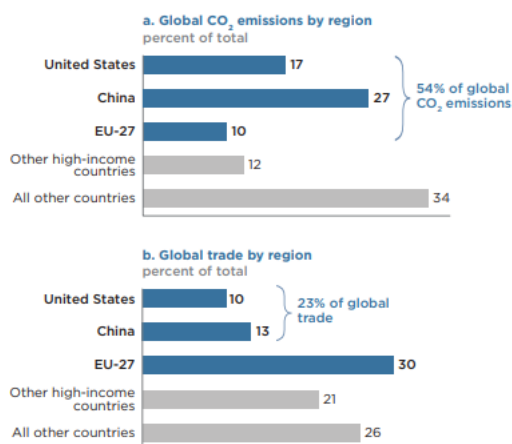
**Note:** Excerpt from Keen M., Parry Ian., Roaf James., *Working Paper Border Carbon Adjustments: Rationale, Design and Impact*. IMF Fiscal Affairs Department, 2021, 1- 42, Fig. 11.

**Figure 29 – Registered progress for SDGs based on targets**



**Note:** Excerpt from UNITED NATIONS., *The Sustainable Development Goals Report 2023: Special Edition*. United Nations, 2023, 1-80. Fig. A

**Figure 30 – Emission and global trade by block**



Note: Global trade refers to exports valued at freight on board (fob). Base data are for 2014.  
Source: Authors' calculations using GTAP v10 data.

**Note:** Excerpt from DEVARAJAN S., GO D. S., ROBINSON S., THIERFELDER K., *How Carbon Tariffs and Climate Clubs Can Slow Global Warming*, 22-14 WP, Peterson Institute of International Economics, Washington D.C., 2022, 1 – 45, Fig 2.

**Figure 31 – Emissions reduction plans in EU, China and USA**

	2030	2035	2050	2060
EU GHG with respect to 1990	-55%		-100%	
EU ETS with respect to 2005	-65%			
EU ESR with respect to 2005	-40%			
China CO <sub>2</sub>				-100%
USA GHG with respect to 2005	-50%		-100%	
USA CO <sub>2</sub> from electricity generation		-100%		

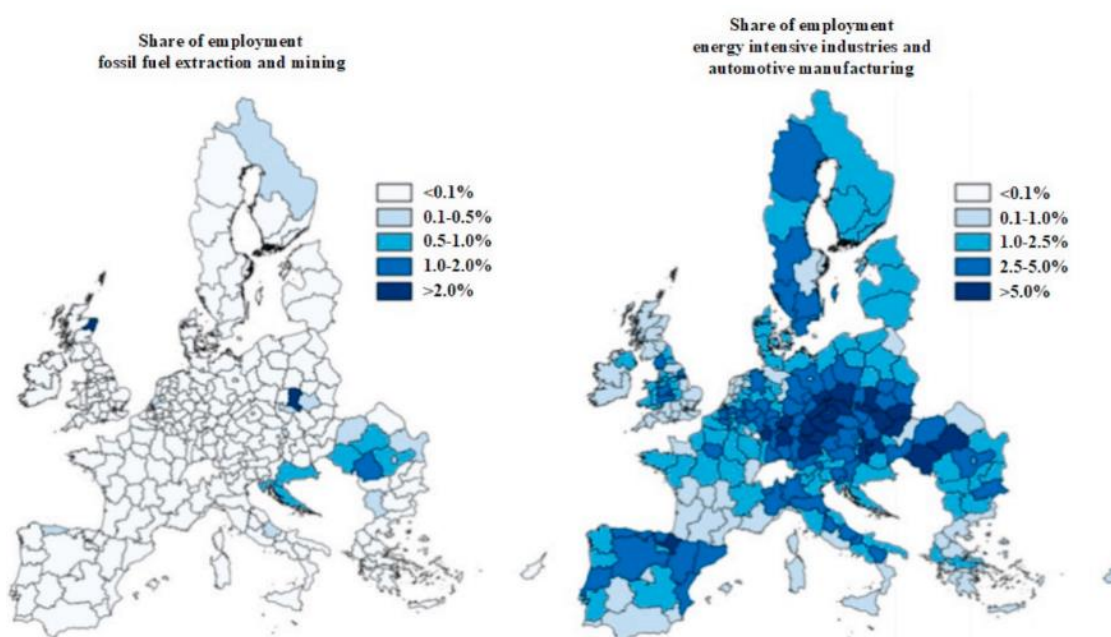
**Note:** Excerpt from PERDANA S., VIELLE M., *Carbon Border Adjustment Mechanism in the Transition to Net-Zero Emissions: Collective Implementation and Distributional Impacts*. Environmental Economics and Policy Studies, vol. 25, 2023, pp. 299–329. Table 3.

**Figure 32 – Estimated carbon taxes in EU, China and USA over time.**

	2025	2030	2040
EU ETS price	50	77	131
EU ESR price	149	776	3353
USA ETS price	56	161	275
USA carbon tax	43	170	1080
Chinese carbon tax	10	25	132

**Note:** Excerpt from PERDANA S., VIELLE M., *Carbon Border Adjustment Mechanism in the Transition to Net-Zero Emissions: Collective Implementation and Distributional Impacts*. Environmental Economics and Policy Studies, vol. 25, 2023, pp. 299–329. Table 4.

**Figure 33 – Employment in fossil fuels and mining and energy intensive industries**



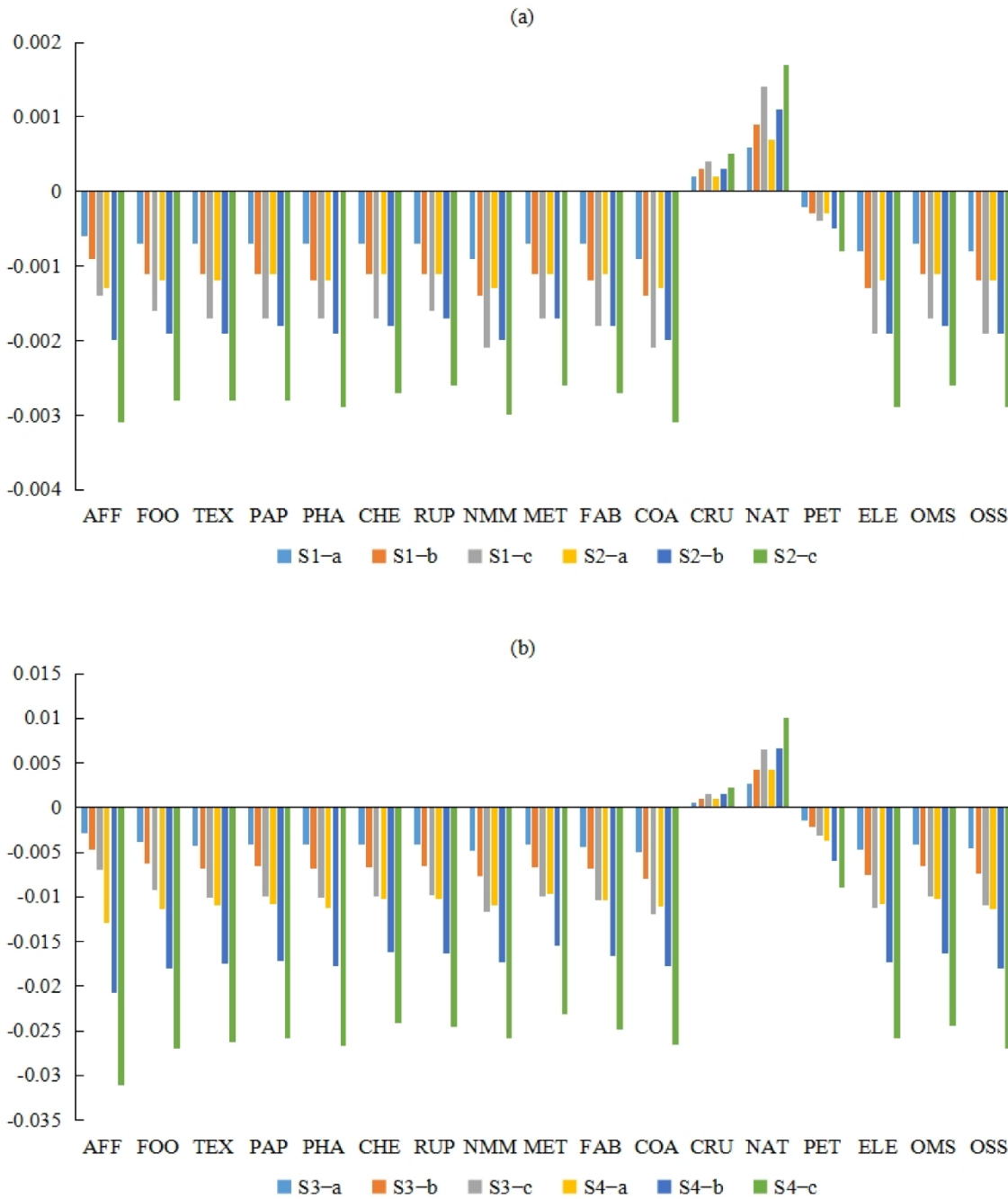
**Note:** Excerpt from FILIPOVIĆ S., LIOR N., RADOVANOVIĆ M., *The green deal – just transition and sustainable development goals Nexus* Renewable and Sustainable Energy Reviews, Elsevier, vol. 168 (C). 2022. 1-12. Fig 6.

**Figure 34 – The just transition mechanism**



**Note:** Excerpt from FILIPOVIĆ S., LIOR N., RADOVANOVIĆ M., *The green deal – just transition and sustainable development goals Nexus* Renewable and Sustainable Energy Reviews, Elsevier, vol. 168(C). 2022. 1-12. Fig. 7.

**Figure 35 – Shifts in export prices across diverse Chinese sectors (in %).**

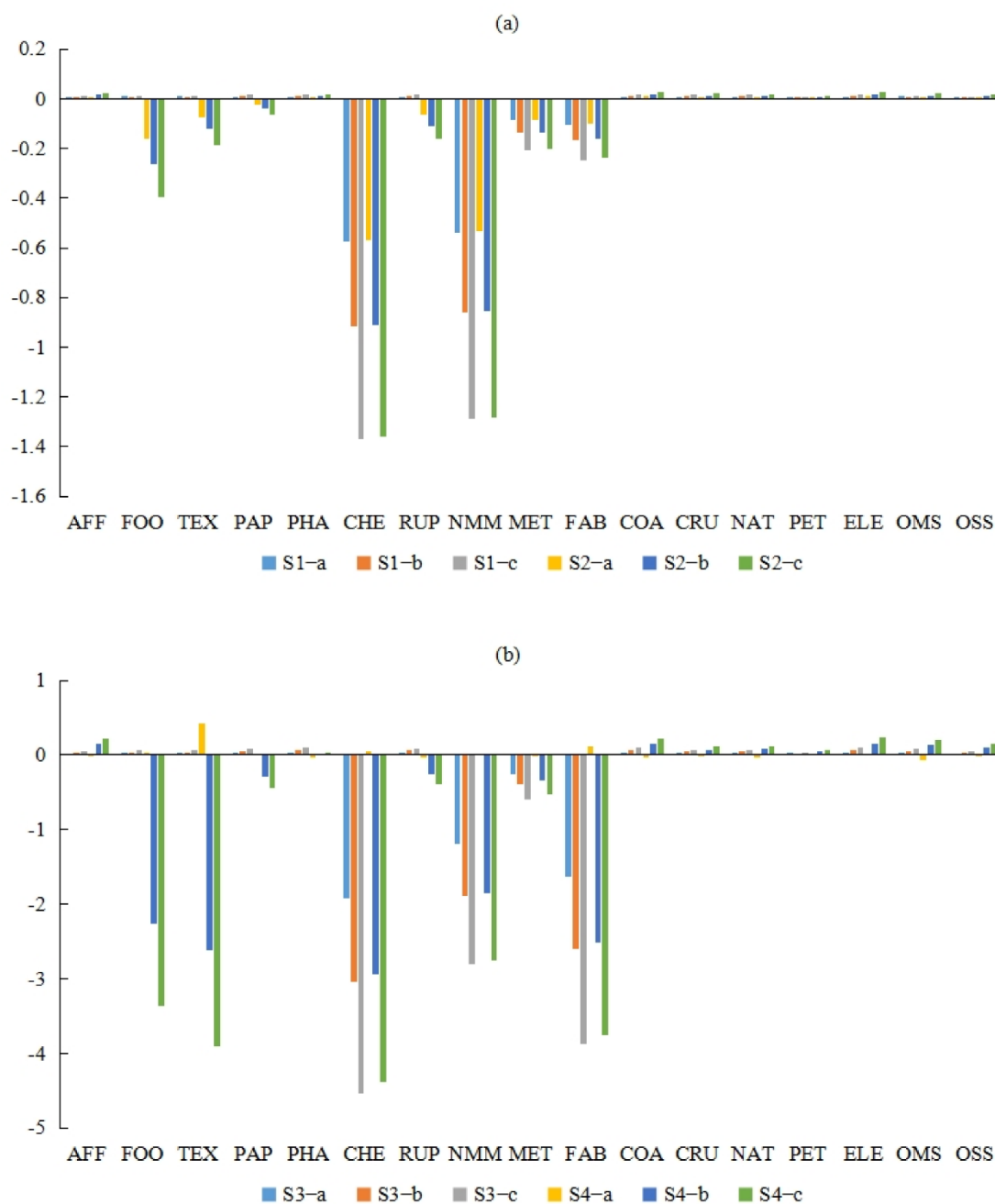


**Note:** (a) Alterations in China's export prices across sectors under Scenarios 1 and 2; Scenario 1 focuses solely on sectors included in the Carbon Border Adjustment Mechanism (CBAM) and accounts for direct carbon emissions. Scenario 2 expands the scope to include sectors with high carbon leakage risk alongside those covered by the CBAM.

(b) Shifts in China's export prices across sectors under Scenarios 3 and 4. Scenario 3 involves considering embodied carbon emissions as the calculation category. In Scenario 4, the scope of potentially taxed sectors is widened further. In this scenario, agriculture, forestry, animal husbandry, and fishery (AFF) emerge as the most affected sector, followed by food products (FOO) and other service sectors (OSS). Notably, regardless of the simulation scenario, the export prices of crude oil (CRU) and natural gas extraction (NAT) increase both, with the latter experiencing a more significant increase compared to the former.

Excerpt from ZHU J., YUHUAN Z., LU Z., *The Impact of the EU Carbon Border Adjustment Mechanism on China's Exports to the EU*, in *Energies*, vol. 17, no. 2, 2024, article 509, 1-18, Fig. 4.

**Figure 36 – Shifts in export volumes to the EU across diverse Chinese sectors (in %).**



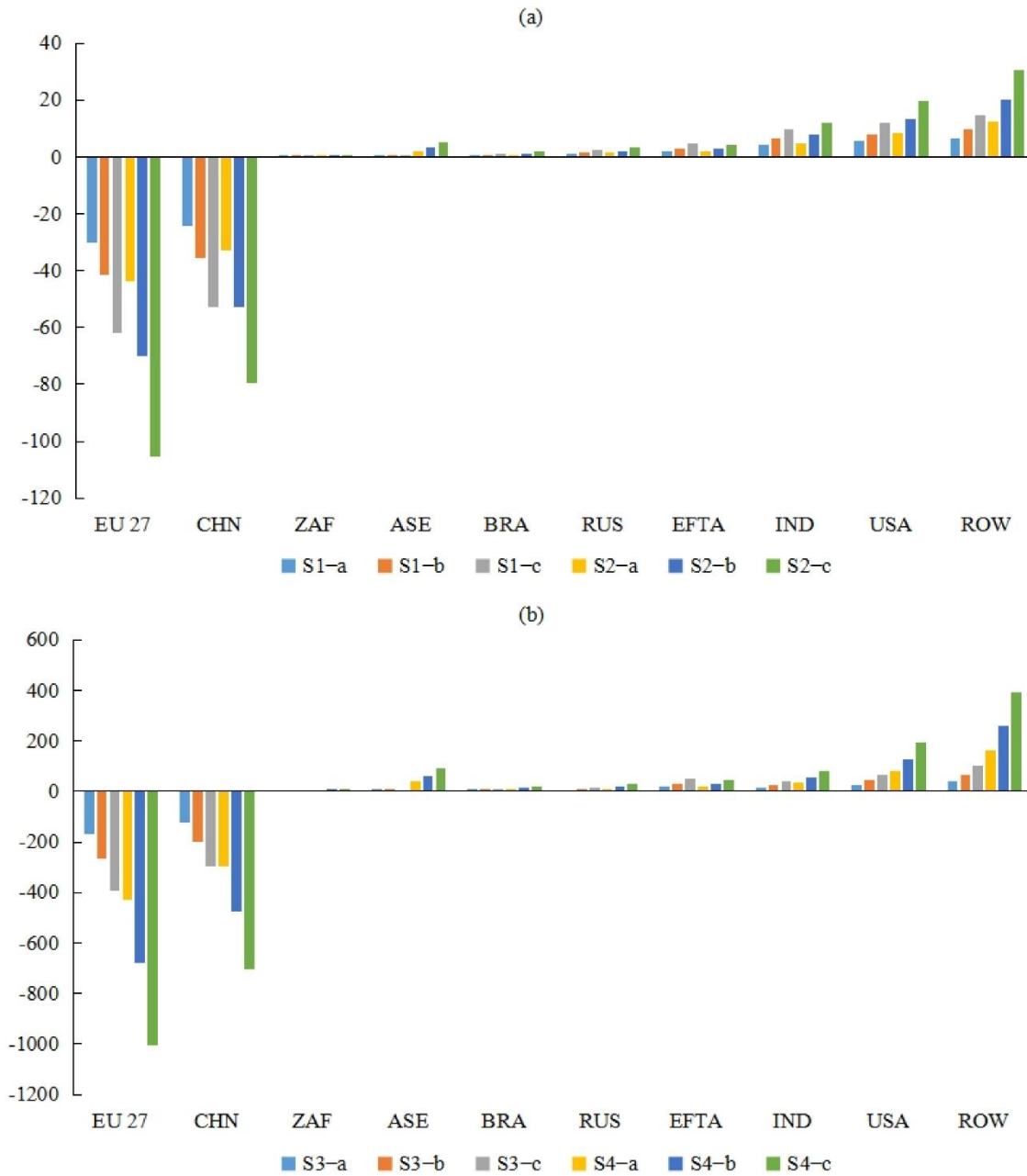
**Note:** (a) Alterations in China’s export prices across sectors under Scenarios 1 and 2; Scenario 1 focuses solely on sectors included in the Carbon Border Adjustment Mechanism (CBAM) and accounts for direct carbon emissions. Scenario 2 expands the scope to include sectors with high carbon leakage risk alongside those covered by the CBAM.

(b) Shifts in China's export prices across sectors under Scenarios 3 and 4. Scenario 3 involves considering embodied carbon emissions as the calculation category. In Scenario 4, the scope of potentially taxed sectors is widened further. In this scenario, agriculture, forestry, animal husbandry, and fishery (AFF) emerge as the most affected sector, followed by food products (FOO) and other service sectors (OSS). Notably, regardless of the simulation scenario, the export prices of crude oil (CRU) and natural gas extraction (NAT) increase both, with the latter experiencing a more significant increase compared to the former.

Excerpt from ZHU J., YUHUAN Z., LU Z., *The Impact of the EU Carbon Border Adjustment Mechanism on China's Exports to the EU*. *Energies*, vol. 17, no. 2, 2024, article 509, 1-18. Fig. 5.



**Figure 37 – Shifts in export value across countries (regions) in USD million**

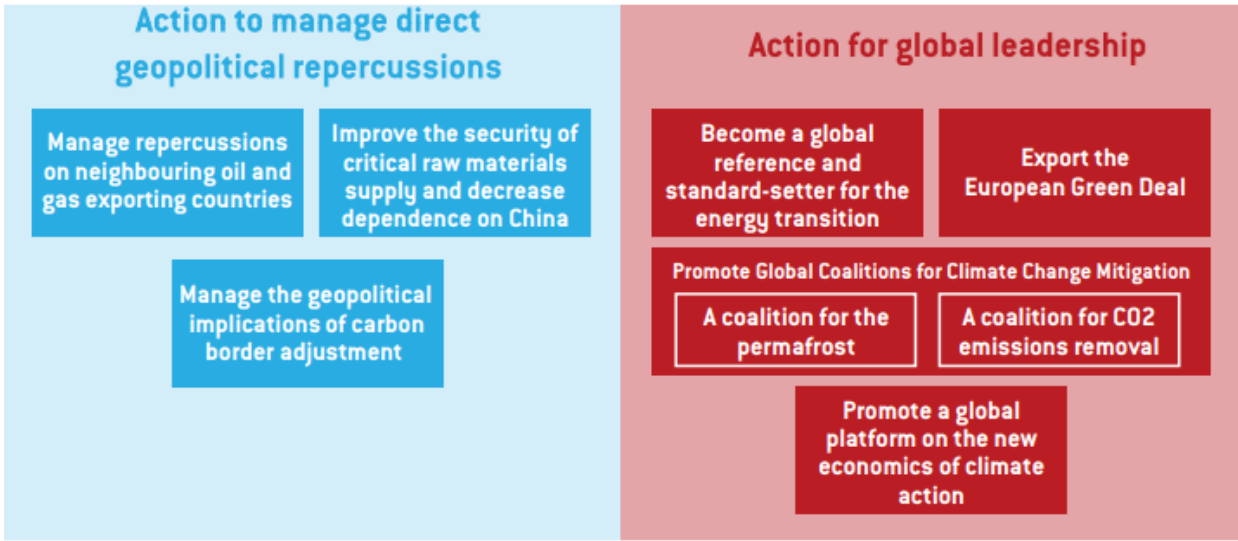


**Note:** (a) Alterations in China's export prices across sectors under Scenarios 1 and 2; Scenario 1 focuses solely on sectors included in the Carbon Border Adjustment Mechanism (CBAM) and accounts for direct carbon emissions. Scenario 2 expands the scope to include sectors with high carbon leakage risk alongside those covered by the CBAM.

(b) Shifts in China's export prices across sectors under Scenarios 3 and 4. Scenario 3 involves considering embodied carbon emissions as the calculation category. In Scenario 4, the scope of potentially taxed sectors is widened further. In this scenario, agriculture, forestry, animal husbandry, and fishery (AFF) emerge as the most affected sector, followed by food products (FOO) and other service sectors (OSS). Notably, regardless of the simulation scenario, the export prices of crude oil (CRU) and natural gas extraction (NAT) increase both, with the latter experiencing a more significant increase compared to the former.

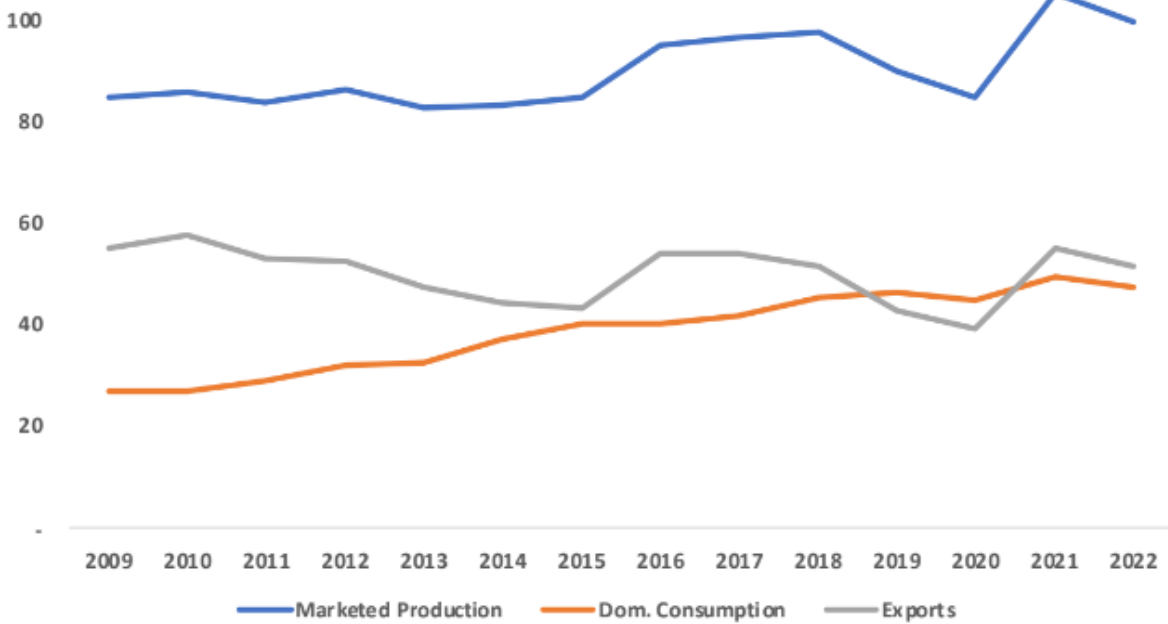
Excerpt from ZHU J., YUHUAN Z., LU Z., *The Impact of the EU Carbon Border Adjustment Mechanism on China's Exports to the EU*. Energies, vol. 17, no. 2, 2024, article 509, Fig. 6.

**Figure 38 – Foreign policy dimension of CBAM.**



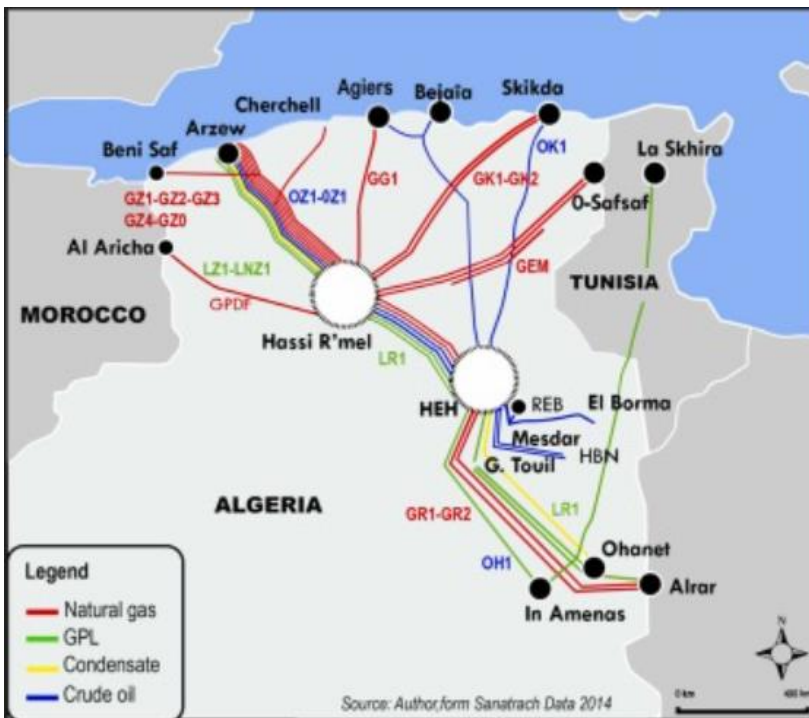
**Note:** Excerpt from LEONARD M., PISANI-FERRY J., SHAPIRO J., TAGLIAPIETRA S., WOLFF G. B., *The geopolitics of the European green deal*, Policy contribution no. 04, European Council on Foreign Relations, 2021, 1 – 23, Figure 9.

**Figure 39 – Algeria gas production, consumption and exports in billion cubic meters between 2009 and 2022.**



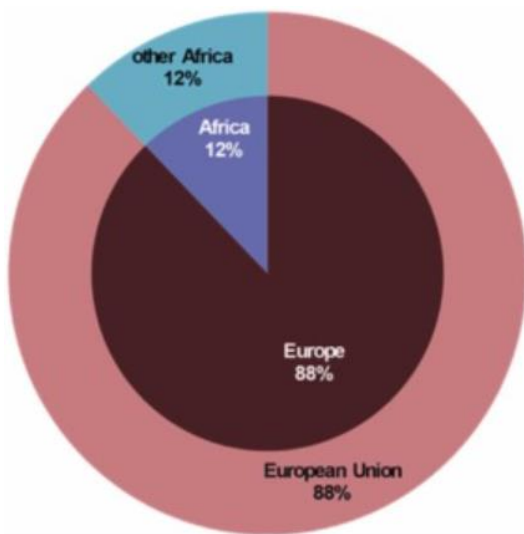
**Note:** Excerpt from OUKI M., *Italy and Its North African Gas Interconnections: A Potential Mediterranean Gas ‘Hub’?* OIES Energy Comment, Oxford Institute for Energy Studies, 2023. 1-7, Figure 1.

**Figure 40 – Algeria’s internal pipeline network**



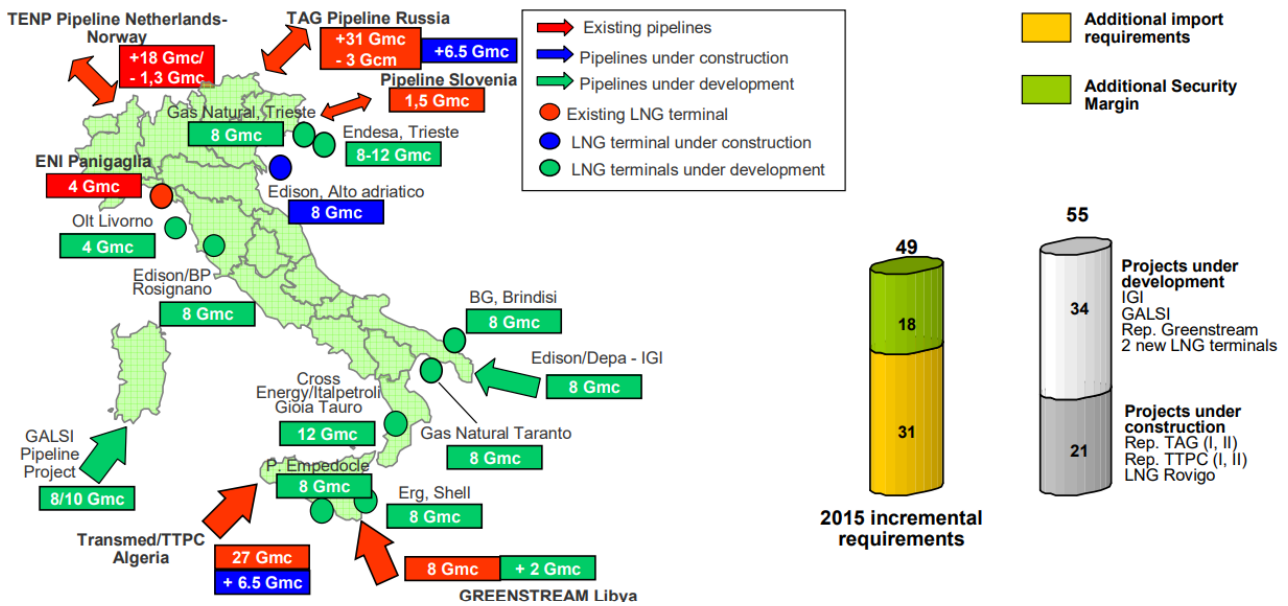
**Note:** Excerpt from TAHCHI B., *Algerian Gas to Strengthen Energy Security of the European Union: Policy, Capacity and Strategy*. Energy Reports, vol. 11, 2024, 3600-3613, Fig. 4.

**Figure 41 – Algeria’s natural gas exports in 2021.**



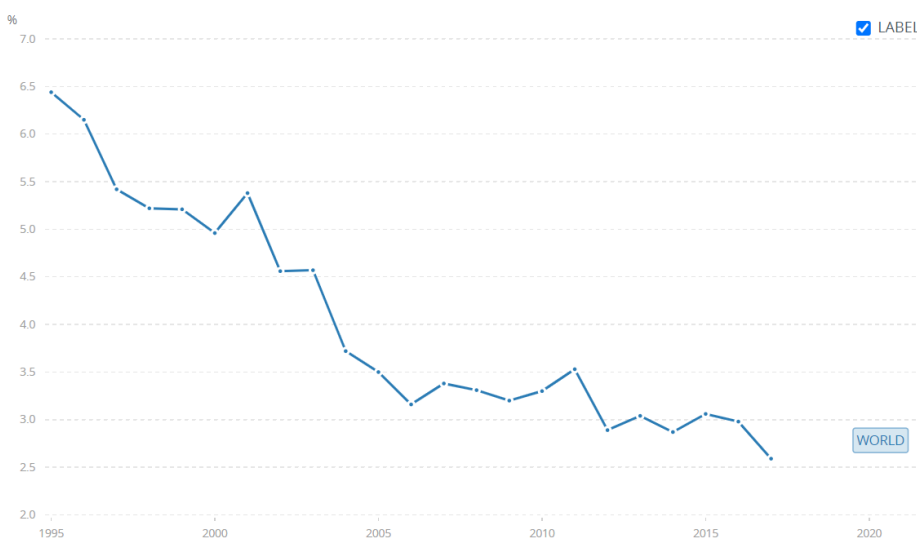
**Note:** Excerpt from TAHCHI B., *Algerian Gas to Strengthen Energy Security of the European Union: Policy, Capacity and Strategy*. Energy Reports, vol. 11, 2024, 3600-3613, Fig. 5.

**Figure 42 – Italy gas pipelines networks. Predicted use in 2007 for 2015.**



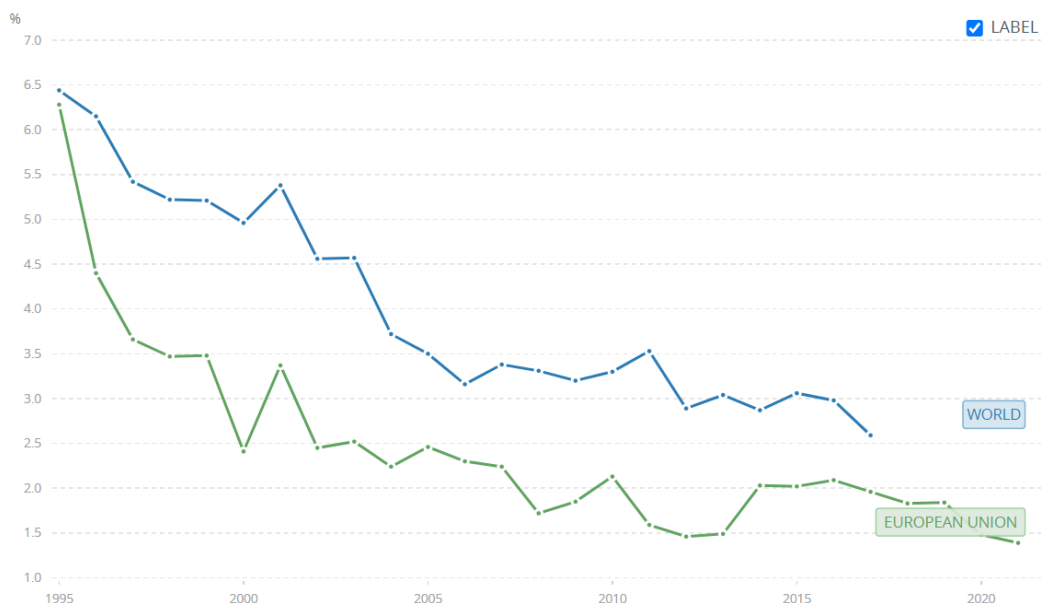
**Note:** Excerpt from GURBUZ G., Report GALSI project - the new route for Algerian gas to Italy and Europe, Energy Charter Treaty (ECT), Belgium. 2007. 1 – 15. At p. 5.

**Figure 43 – Tariff rate (applied, weighted mean, all products) in percentage as global average from 1995 to 2017.**



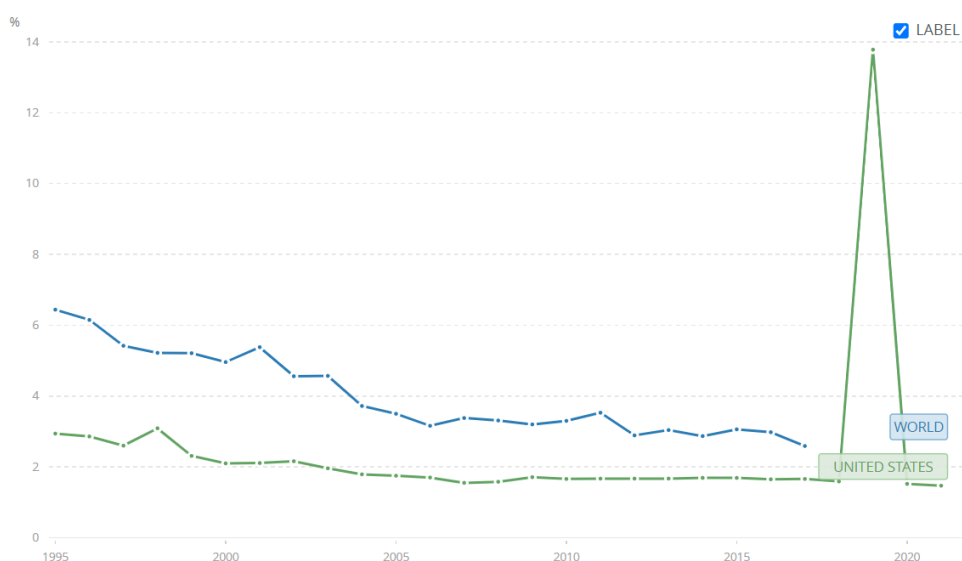
**Note:** Excerpt from WORLD BANK., Tariff rate, applied, weighted mean, all products (%), 2024. Available at: <https://data.worldbank.org/indicator/TM.TAX.MRCH.WM.AR.ZS>.

**Figure 44 – Tariff rate (applied, weighted mean, all products) in percentage as applied by the EU compared with the global average.**



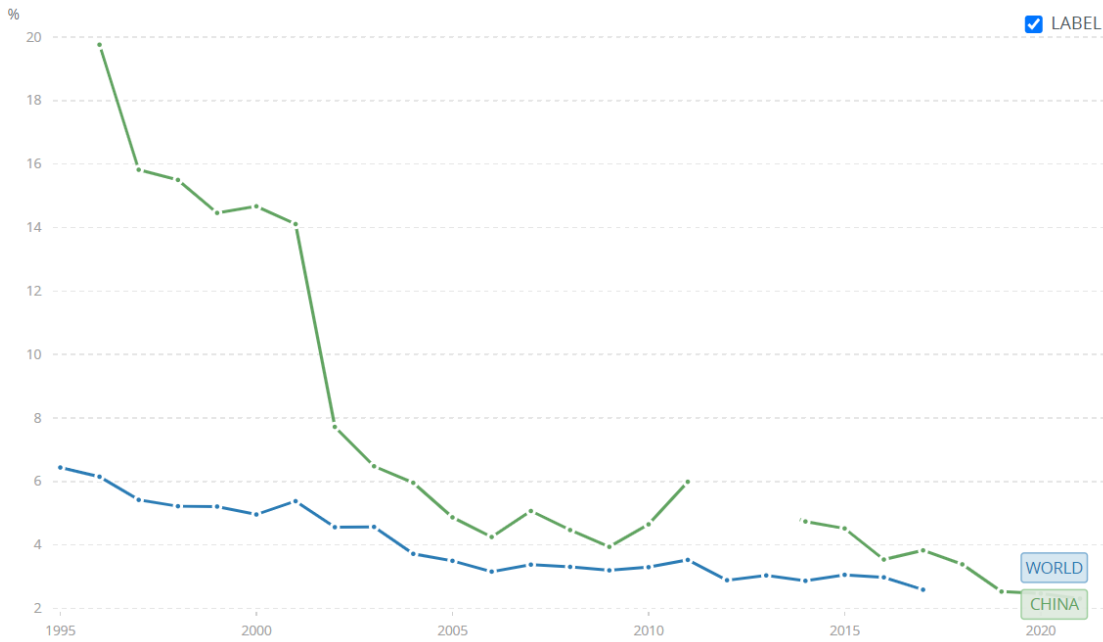
**Note:** Excerpt from WORLD BANK., Tariff rate, applied, weighted mean, all products (%), 2024. Available at: <https://data.worldbank.org/indicator/TM.TAX.MRCH.WM.AR.ZS?contextual=default&end=2021&locations=IW-EU&start=1995&view=chart>.

**Figure 45 – Tariff rate (applied, weighted mean, all products) in percentage as applied by the US compared with the global average.**



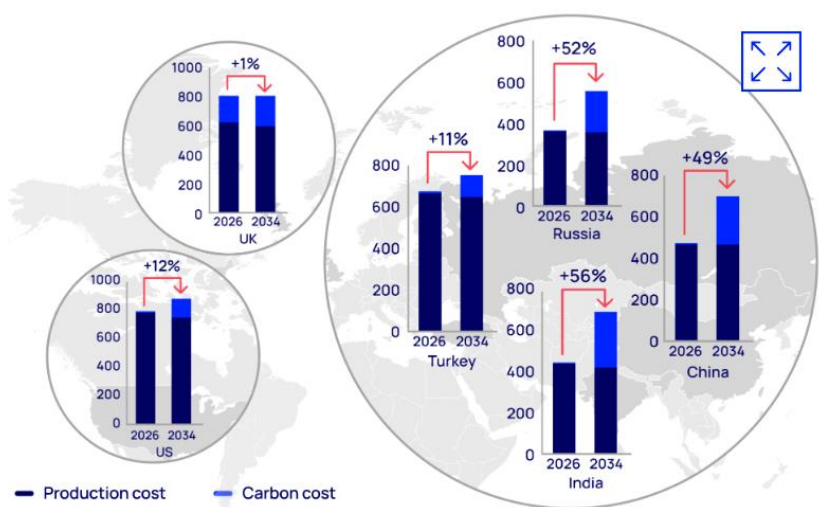
**Note:** Excerpt from WORLD BANK, Tariff rate, applied, weighted mean, all products (%), 2024. Available at: <https://data.worldbank.org/indicator/TM.TAX.MRCH.WM.AR.ZS>.

**Figure 46 – Tariff rate (applied, weighted mean, all products) in percentage as applied by China compared with the global average.**



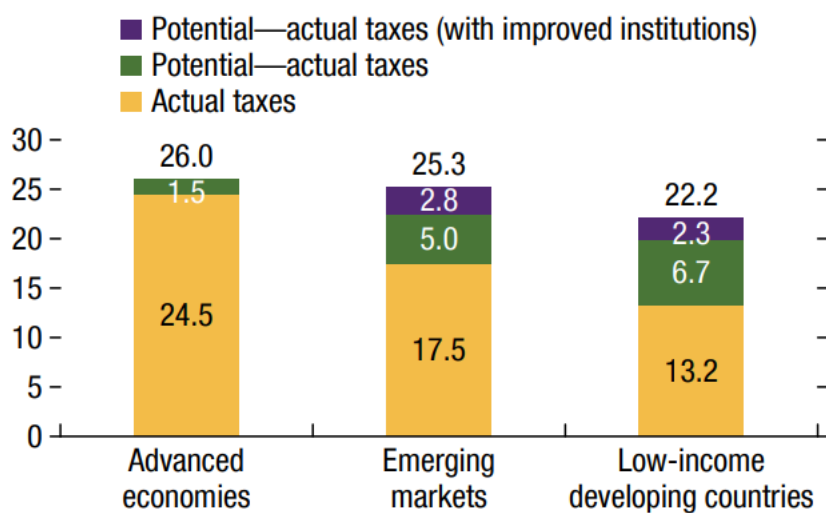
**Note:** Excerpt from WORLD BANK., Tariff rate, applied, weighted mean, all products (%), 2024. Available at: <https://data.worldbank.org/indicator/TM.TAX.MRCH.WM.AR.ZS?contextual=default&end=2021&locations=IW-CN&start=1995&view=chart>.

**Figure 47 – Expected increase in the cost of steel after CBAM (in US\$ per ton)**



**Note:** Excerpt from BELLETTI E., NUOMIN H., PÉREZ I., *Playing by new rules: how the CBAM will change the world*, Wood Mackenzie, 2023, 1-13.

**Figure 48 – Difference between actual and potential revenues from taxation as percentage of GDP**



**Note:** Excerpt from INTERNATIONAL MONETARY FUND, *Fiscal Monitor. Fiscal Policy in the Great Election Year*, Washington D.C., April 2024.

## **Thesis Recap**

### **(versione italiana)**

Le recenti iniziative fiscali annunciate nel contesto dell'European Green Deal (EGD) (European Commission, 2019)<sup>308</sup>, mirano a fare dell'Unione Europea (UE) una pioniera della sostenibilità ambientale e dello sviluppo economico sostenibile.

Il Green Deal Europeo rappresenta un'iniziativa di rilievo per la transizione verso un'economia sostenibile e a basse emissioni di carbonio. L'Unione Europea aspira a dissociare la crescita economica dall'uso di risorse naturali ed a ridurre le emissioni di gas serra di almeno il 55% entro il 2030 rispetto ai livelli del 1990 (European Council, 2020)<sup>309</sup>.

Tale ambizioso progetto politico è stato introdotto nel dicembre 2019, con l'obiettivo di rendere l'Europa il primo continente al mondo climaticamente neutro entro il 2050.

In tale contesto il "Carbon Border Adjustment Mechanism" (CBAM) impone agli importatori dell'UE l'obbligo di acquistare permessi di emissione di carbonio, influenzando la competitività delle merci importate.

Per limitare efficacemente le emissioni europee di gas serra, concentrarsi esclusivamente su standard imposti alla produzione continentale sarebbe insufficiente; è necessario riformare anche le pratiche commerciali.

Una strategia puramente continentale comporterebbe il rischio di trasferire le industrie più inquinanti all'estero o di aumentare le importazioni di beni con un'elevata impronta ambientale; pertanto, l'ambizione del Green Deal deve essere estesa oltre i confini dell'Unione (Leonard et al, 2021)<sup>310</sup>.

In altri termini, il CBAM impone dazi sulle merci importate da paesi con limitate o inefficienti regolamentazioni ambientali, in modo da compensare le spese sostenute dai produttori europei nel fronteggiare i requisiti ambientali imposti dall'Unione, i più avanzati al mondo.

Il Green Deal (GD) non solo mira a trasformare l'UE in una moderna economia sostenibile e neutra dal punto di vista climatico, ma riconosce l'importanza di affrontare la concorrenza da regioni con regolamentazioni ambientali meno rigide.

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<sup>308</sup> EUROPEAN COMMISSION, *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of The Regions, The European Green Deal*. Brussels, 2019, 1-24.

<sup>309</sup> EUROPEAN COUNCIL, *General Secretariat of the Council, European Council meeting conclusions*, Brussels, 2020, 1-14.

<sup>310</sup> LEONARD M., PISANI-FERRY J., SHAPIRO J., TAGLIAPIETRA S., WOLFF G. B., *The geopolitics of the European green deal*. Policy contribution no. 04, European Council on Foreign Relations, 2021, 1 – 23, noted that "The EU produces less than 10 percent of global greenhouse-gas emissions. This implies that to have an impact on global warming, the EU needs to push the green transition beyond its borders." (see p. 20).



Tenendo conto dell'impronta di carbonio delle merci importate, il CBAM garantisce che i produttori stranieri affrontino costi ambientali simili alle industrie dell'UE, prevenendo così la semplice sostituzione di più care merci europee prodotte con metodi sostenibili con più economici prodotti esteri, che non rispettano standard ambientali adeguati.

Tuttavia, il successo dell'implementazione del CBAM potrebbe incontrare sfide nel rispettare le regole poste dall'Accordo generale sulle tariffe e sul commercio (GATT) imposto a tutti gli Stati membri dell'Organizzazione Mondiale del Commercio (OMC), che prevede il trattamento equo di prodotti simili e la non discriminazione tra produttori domestici e stranieri.

Se, in linea teorica, il CBAM è disegnato per equiparare le condizioni produttive dei produttori Europei e mondiali, la struttura unica del sistema, fondata su dazi, pone diverse sfide alla luce delle disposizioni vigenti sulle principali questioni del commercio internazionale (Benson et al, 2023)<sup>311</sup>. Con la sostanziale imposizione di dazi all'importazione su beni ad altro contenuto di emissioni CO2 (Acciaio, Alluminio, Fertilizzanti, Cemento, Fonti energetiche e Idrogeno, il CBAM provoca sensibili effetti di ricaduta sui partner commerciali dell'UE, in particolare sulle economie dei Paesi in via di sviluppo o c.d. "emergenti": Africa, Sud America ed Asia. (Pöhl, 2023)<sup>312</sup>.

Nel più ampio contesto del Diritto tributario internazionale, il meccanismo svolge principalmente tre funzioni: salvaguardare la competitività delle industrie domestiche (UE), ridurre le emissioni di carbonio e rafforzare gli incentivi internazionali per la tassazione del carbonio.

L'imposizione di tariffe sulle importazioni può influenzare significativamente la politica commerciale di ogni paese, ma anche la filiera produttiva interna, il tasso di occupazione e il livello medio di innovazione. Le politiche protezionistiche possono anche stimolare la produzione industriale nazionale, rendendo più costosi i beni importati, aumentando così la domanda interna di analoghi prodotti.

Al contrario, tariffe ridotte o accordi commerciali che rimuovono ogni tariffa possono esporre le industrie domestiche ad un maggior vantaggio competitivo estero, legato a un più basso costo del lavoro e a sistemi di produzione meno rispettosi dell'ambiente.

Tariffe eccessive o misure di ritorsione da parte dei partner commerciali possono interrompere la catena di approvvigionamento globale delle fonti energetiche e a conseguenti situazioni di crisi nel commercio internazionale (Gómez, 2021)<sup>313</sup>.

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<sup>311</sup> BENSON E., MAJKUT J., REINSCH W. A., STEINBERG F., *Analyzing the European Union's Carbon Border Adjustment Mechanism*, Center for Strategic and International Studies (CSIS), Washington D.C., 2023, 1-9.

<sup>312</sup> PÖHL D., *Gli impatti del CBAM sui paesi in via di sviluppo*, Equilibri Magazine, 2023, 1-7.

<sup>313</sup> GÓMEZ J. F., *The European Green Deal and the Energy transition: challenges and opportunities for industrial companies*. Boletín de Estudios Económicos, Issue 76, 2021, 191-211.

La struttura e l'attuazione del CBAM hanno il potenziale per riconfigurare significativamente le dinamiche commerciali dell'Unione, influenzando le proprie relazioni con i partner commerciali di tutto il mondo.

Da un lato spingerebbero i partner commerciali dell'Unione a adottare politiche ambientali più stringenti, favorendo l'adozione e la diffusione di analoghe iniziative virtuose, di ulteriori meccanismi di protezione e di nuove tariffe a livello globale; dall'altro produrrebbero maggiori interconnessioni economiche tra i paesi più sviluppati (Belletti et al, 2023)<sup>314</sup>.

Ciò alzerebbe notevolmente il livello medio dei dazi imposti nel commercio globale, in forte controtendenza con le dinamiche commerciali degli ultimi 30 anni (Goldthau et al, 2023)<sup>315</sup>.

Dal 1995, data di fondazione del WTO, ad oggi si è assistito ad un generale e costante abbassamento dei dazi imposti e dunque ad una generale accettazione della dottrina economica del "free trade".

I nuovi bisogni globali in tema di ambiente potrebbero motivare l'imposizione di nuove misure protezionistiche non solo in Europa, ma a livello mondiale. In tal senso, il CBAM potrebbe rappresentare il primo passo di una trasformazione internazionale del rapporto tra disciplina fiscale e politiche industriali. (Hufbauer et al, 2022)<sup>316</sup>.

Il successo del Green Deal non sarà misurato solo dai suoi risultati interni, ma anche dalla sua capacità di influenzare positivamente l'agenda globale e di ispirare azioni simili da parte di altri paesi.

La dimensione politica internazionale del Green Deal è duplice.

Da un lato, è essenziale anticipare e affrontare l'opposizione internazionale da parte di potenze economiche avverse al meccanismo. Dall'altro, la misura ha la possibilità di costruire una nuova leadership europea sui temi ambientali attraverso la promozione dei suoi standard e delle sue politiche eco-sostenibili.

Questi obiettivi costituiscono la colonna portante del nuovo approccio europeo, attraverso la predisposizione di regole di natura fiscale (Magacho et et al, 2022)<sup>317</sup>.

L'Italia svolge un ruolo critico in questa strategia, in particolare nel contesto della politica energetica da e verso il Nord Africa.

Gli ultimi due governi italiani, sotto la presidenza Draghi e Meloni, si sono concentrati sul potenziamento delle relazioni commerciali energetiche con paesi nordafricani, riconoscendo

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<sup>314</sup> BELLETTI E., HAN N., PÉREZ I., *Playing by new rules: how the CBAM will change the world*, Wood Mackenzie, 2023, 1-13. See Figure 47 in the Appendix.

<sup>315</sup> GOLDTHAU A. C., YOUNGS R., *The EU Energy Crisis and a New Geopolitics of Climate Transition*, in *Journal of Common Market Studies*, 2023, Vol. 61, Annual Review, 115 – 124.

<sup>316</sup> HUFBAUER C., SCHOTT J. J., HOGAN M., KIM J., *EU Carbon Border Adjustment Mechanism Faces Many Challenges*, PB 22-14, Peterson Institute for International Economics, Washington D.C., 2022, 1 – 22.

<sup>317</sup> MAGACHO G., ESPAGNE É., GODIN A., *Impacts of CBAM on EU trade partners: consequences for developing countries*. AFD Research Papers, 2022, 1-20.

l'importanza, notata da diversi leader Europei nel processo di definizione del CBAM, di proteggere le connessioni commerciali con l'Africa e le sue economie principali da risvolti eccessivamente negativi (Ouli, 2023)<sup>318</sup>.

Attraverso lo sviluppo degli investimenti nei settori che compongono il c.d. "Piano Mattei, l'Italia, e l'Europa che ne sostiene gli obiettivi, mirano a fare dell'Africa un partner privilegiato nell'adozione di nuove pratiche industriali ed energetiche. (Gritz., Wolff., 2024)<sup>319</sup>.

Le economie avanzate, tra cui l'Unione europea (UE), hanno sostenuto, nel tempo, una marcata tendenza alla riduzione delle tariffe, ispirata ai principi ed ai benefici del libero scambio, sostenendola con un'imponente produzione di accordi internazionali volti all'eliminazione o quanto meno alla riduzione di dazi e accise.

Questo movimento ha certamente determinato un impatto positivo su scala globale. I Paesi in via di sviluppo sono stati incentivati ad abbandonare ogni misura protezionistica e ad accogliere il libero scambio con le nazioni più ricche. Tale cambiamento ha facilitato la crescita economica mondiale e ristrutturato la localizzazione di tutte le principali industrie globali

Il perseguimento di un'economia sostenibile da parte dei Paesi più ricchi richiede ora la protezione delle industrie più avanzate ed eco-sostenibili, riflettendo un'evoluzione significativa nelle relazioni economiche internazionali, in cui le considerazioni ambientali determinano sempre più spesso le scelte fiscali (Colli, 2020)<sup>320</sup>.

Inoltre, l'imposizione indiretta può servire da strumento cruciale nelle politiche fiscali dei Paesi in via di sviluppo, dato che i loro sistemi di riscossione delle imposte dirette risultano relativamente poco evoluti. Il miglioramento della capacità fiscale, ovvero delle politiche, delle Agenzie fiscali e delle capacità tecniche di riscossione del gettito fiscale (*Tax compliance and Asset Recovery*), è fondamentale per la funzionalità di ogni governo (IMF, 2024)<sup>321</sup>.

I Paesi in via di sviluppo, caratterizzati da una ridotta capacità di adottare efficaci sistemi di imposizione sul reddito e sui capitali, e nel contesto di uno spostamento globale verso misure protezionistiche di imposizione indiretta, potrebbero preferire anch'essi una politica fiscale di tipo indiretto imposta dalla necessità di attingere a nuove risorse in grado di sostenere le esigenze di bilancio, innescando così una spirale sempre più restrittiva del commercio mondiale.

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<sup>318</sup> OUKI M., *Italy and Its North African Gas Interconnections: A Potential Mediterranean Gas 'Hub'?* OIES Energy Comment, Oxford Institute for Energy Studies, 2023, 1-7

<sup>319</sup> GRITZ A., WOLFF G. B., *CBAM, Hydrogen Partnerships and Egypt's Industry: Potential for Synergies*, in *Intereconomics*, vol.59, no.2, 2024, 92-97.

<sup>320</sup> COLLI F., *The end of 'business as usual'? COVID-19 and the European Green Deal*, Egmont Institute European Policy Brief no. 60, 2020, 1-5.

<sup>321</sup> INTERNATIONAL MONETARY FUND, *Fiscal Monitor. Fiscal Policy in the Great Election Year*, Washington D.C., April 2024.

Considerando, da un lato i nuovi obiettivi Europei di salvaguardia delle proprie industrie più sostenibili, e dall'altro gli incentivi che il CBAM potrebbe generare a livello mondiale per l'adozione di nuove misure protezionistiche, il meccanismo potrebbe spostare l'attenzione dei Governi e dei c.d. "policymakers" delle disposizioni di carattere fiscale verso una nuova frontiera: l'impiego di dazi e accise non quali strumenti aggiuntivi rispetto a quelli adottati su reddito e capitale, ma quali misure di deterrenza nei fori commerciali internazionali dei prossimi decenni (Xiaobei et al, 2022)<sup>322</sup>.

In questo contesto, il Piano Mattei, concepito per promuovere una maggiore cooperazione economica con i Paesi africani per favorire la loro transizione verso standard energetici ed ambientali più ambiziosi, riflette un'ampia tendenza europea nel cercare di stringere i legami con il continente economicamente più giovane del pianeta.

È l'intuizione di Enrico Mattei, condensata nel noto aforisma "L'ingegno è vedere possibilità dove gli altri non ne vedono". I nuovi progetti europei per l'Africa, in particolare per il Nord Africa, sembrano cogliere opportunità che altri Paesi non hanno ancora pienamente riconosciuto e capitalizzato.

Questi progetti mirano a sostenere la produzione di energia pulita, in parte per esportazione in Europa, favorendo così la contemporanea transizione energetica dei due continenti.

Più in generale, queste nuove iniziative dell'UE sostengono lo sviluppo di industrie eco-sostenibili in Africa attraverso l'esportazione e l'installazione di tecnologie sostenibili, sviluppate in Europa e la formazione "in loco" di tecnici e ricercatori, che promuovano crescita e interscambio.

Si può quindi osservare che il Green Deal stimola due importanti trasformazioni globali: rafforzare l'influenza internazionale dell'UE, in particolare in Africa, e sostenere la transizione ecologica attraverso il passaggio dalla semplice economia dal libero scambio e riduzione delle tariffe a misure protezionistiche legate a obiettivi ambientali.

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<sup>322</sup> XIAOBEI H., ZHAI F., JUN M., *The Global Impact of a Carbon Border Adjustment Mechanism. A Quantitative Assessment*, Boston University – Global Development Policy Center, Task Force on Climate, Development and International Monetary Fund, 11 March 2022, also available at <https://www.bu.edu/gdp/2022/03/11/the-global-impact-of-a-carbon-border-adjustment-mechanism-a-quantitative-assessment>, already quoted, p. 5.