Contemporary Issues Confronting International Carbon Markets: Critical Reviews

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ABSTRACT

This paper conducts critical reviews of the contemporary issues confronting the emission trading systems as international carbon markets. The reviews focus on Border Carbon adjustment (BCA) or Caborn Adjustment Mechanism (CBAM) Issues, social-political issues, and Legal or environmental jurisdictional overlap issues**.** Although the implementation of ETS markets is on the rise, there are contemporary issues that remain to be resolved. Carbon leakage and loss of competitiveness are the major reasons advanced for proposing BCAs/CBAMs as carbon leakage and competitive loss mitigation strategies. However, the BCAs/CBAMs have been criticized on several fronts. Firstly, the BCAs are perceived and criticized as covert 'green' protectionist measures. Secondly, critics argue that BCAs/CBAMs implementations will violate international trade laws and international climate agreements such as the Paris Agreement. Thirdly, with regards to the environmental jurisdictional authority, the reviews found that the over-centralization of environmental regulation and the lack of streamlining the environmental jurisdictional laws are the drivers of environmental jurisdictional authority disputes in the existing ETS jurisdictions. Fourthly, in terms of socio-political issues, critics argue that the theory underpinning the implementation of the BCAs/CBAMs as a way of combatting carbon leakage and loss of competitiveness is false or dubious because empirical literature on carbon leakage strongly suggests that firms make relocation decisions based on many factors of which environmental regulation is not the major factor. The literature recommends that the ideal approach to global climate change action is a mutual agreement on best practices in implementing BCAs, including climate clubs, that are not only environmentally effective but also more equitable and less disruptive of trade.

Keywords: International Carbon Markets; Climate Justice; Carbon Leakage; Carbon Border Adjustment Mechanism

INTRODUCTION

This paper conducts critical reviews of the contemporary issues confronting international carbon markets. Carbon markets refer to the transactions or trading systems whereby carbon credits (also called carbon permits, carbon certificates or carbon allowances) are sold and bought (Borghesi and Montini, 2016; Haites, et al, 2018; International et al., ICAP, 2022). Carbon credits are market-based instruments that allow firms, governments, and other entities to emit allowable amounts of greenhouse gases (GHGs) or carbon emissions (in this paper, GHGs and Carbon emissions are used interchangeably). The overall goal of carbon trading is to gradually reduce overall carbon emissions and thus contribute to climate change mitigation efforts. Carbon markets exist as mandatory (compliance) schemes and as voluntary programs. Mandatory carbon markets, which are also referred to as cap-and-trade programs, emissions trading systems (ETS) or allowance trading, are the focus of this paper.

International carbon markets are broadly categorized as Cap-and-Trade Systems (also called Emissions

Trading Systems, ETS), Voluntary Cabon Offset Markets, and Compliance Markets (Ingrid, 2009; ICAP, 2022). The regulation of carbon credit markets at the international level is done by the United Nations Framework Convention on Climate Change (UNFCCC), whereas national governments or regional governments, such as the European Union (EU) or Regional Green Gas Initiative (RGGI), in the US, regulate carbon credit markets. The international carbon markets are regulated by Article 6 of the Paris Agreement.

In a bid to explicate the contemporary issues confronting international carbon markets, it is necessary to set the parameters or the scope of the reviews. By 'critical', we imply that the paper identifies some contemporary key problems or challenges that beset the global carbon markets. The reviews do not fully weigh the costs and benefits of carbon trading markets. The reviews are largely based on secondary data sources. By 'international', the study focuses on carbon markets regulated by international bodies such as the Paris Agreement, Kyoto Protocol, and UNFCCC, as well as some regional emissions trading systems such as the EU-ETS.

In this paper, the critical reviews of the contemporary issues confronting the international carbon markets focus on the Emissions Trading Systems, ETS, also called compliant cap-and-trade. The reviews focus on the Border Carbon Adjustment (BCA) or Caborn Adjustment Mechanism (CBAM) Issues, Social-Political Issues, and Legal or Environmental jurisdictional overlap issues**.** Section 2 delves into the literature review, highlights the status of ETS in 2023, and brings to the fore the rationale for setting up ETS markets. Section 3 focuses on the critical reviews of contemporary issues confronting the ETS markets, while section 4 concludes the paper with section 5 making policy recommendations.

LITERATURE REVIEW

This section briefly reviews literature that is closely related to this study. Next, we highlight the rationale for establishing the emissions trading systems (ETS) and the conceptual operations of the ETS. This is followed by an overview of carbon emissions by country as of 2021. Section 2 ends with the global status of the Carbon Border Adjustment, CBA/Carbon Border Adjustment Mechanism (CBAM)

Review of Related Literature

Savacool (2011) conducts a critical review of carbon markets dubbed 'Four Problems with Carbon Markets-A Critical Review.' The critique focuses on the Clean Development Mechanism (CDM) of the Kyoto Protocol. The study explores the challenges with the use of carbon market trading permits/credits to mitigate the effects of climate change. The review is conducted in four areas, namely, gaming, homogeneity, information, and climate justice. Our study is different from this study in that while it touches on climate justice, it does not focus on clean development mechanisms of the Kyoto Protocol but on the environmental jurisdictional overlap issues, border carbon adjustment and socio-political issues.

Clive et al (2011) present a critique of carbon trading by explaining the complex issues involved in pollution control of vested interests in emissions trading systems (ETS). The study finds that the lack of a realistic ETS market structure and public policy means that ETS market designs cannot deliver the expected economic efficiency. The authors illustrate, using the greenhouse gas (GHG) accounting problem and allowance/credit allocation, how ETS markets can be better redesigned to develop realistic ETS market structures that will deliver economic efficiency by factoring in public policy and political economy. This study is similar to ours in terms of reviewing ETS in terms of political economy. However, this study is different in that it focuses more on the design of ETS markets to deliver economic efficiency, whereas our study does not concern itself with economic efficiency. Bohm, Misoczky and Moog (2012) review carbon markets from the Marxist Approaches. By constructing a structure for a Marxist analysis of the carbon market, the analysis demonstrates how the historical development of global capitalism and its relationship to

the environment includes carbon markets. The study asserts that carbon markets offer new, inventive ways to accumulate wealth by the capitalist classes and points out how carbon markets contribute to the Global South's unequal growth, as elites in emerging economies use carbon market finance to pursue new sub-imperial expansionist policies. In a similar study by Benjamin and Matthew (2012) regarding the politics of carbon markets, this review of the literature on the political analysis of carbon markets highlights three main themes. The first concerns the procedures used to create specific carbon market plans. The second focuses on specific actors' contributions to the development of carbon markets. The third strand evaluates carbon markets based on their effectiveness, legitimacy, or climate justice. The study shows that politics extends beyond the policy-making process that decides whether to implement an emissions trading system or an offset mechanism. This study is similar to our study in terms of the socio-political analyses of ETS. By and large, our study, unlike the studies reviewed, incorporates various political, social and international trade and climate law violations that the earlier reviews did not consider. The contemporary issues to do with border carbon adjustment mechanisms (CBAMs) are also considered, which, for obvious reasons, were omitted in the earlier literature because they were not eminent at the time.

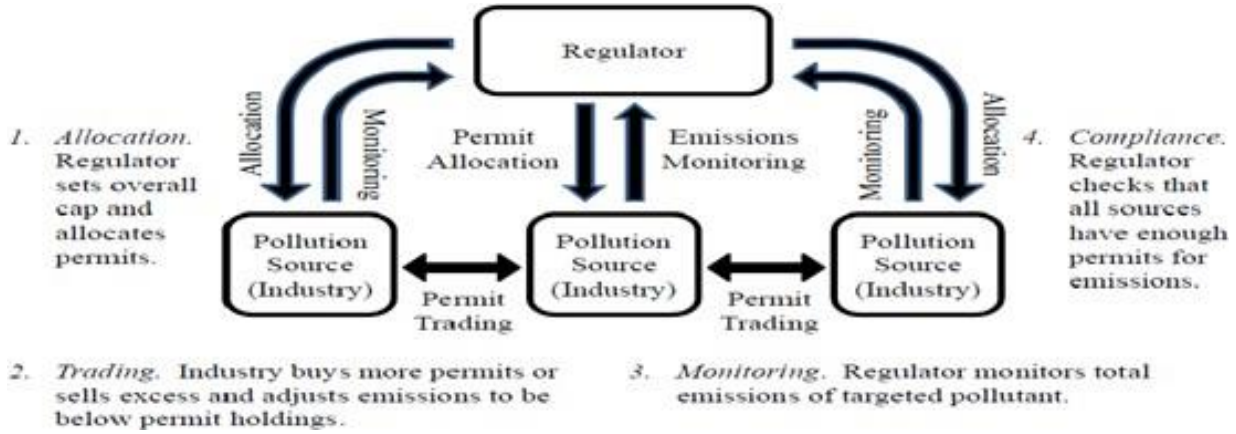
Rationale for Establishing Carbon Emission Trading Markets

For over two decades, carbon markets have come out strongly as a dominant market-based climate policy instrument over Pigouvian carbon taxes[1] for greenhouse gas emissions in many countries around the world. Carbon markets, specifically the emissions trading systems (ETS), form an integral part of the Kyoto Protocol and, by extension, the Paris Agreement given that the Kyoto Protocol preceded the Paris Agreement. Carbon markets are tools that put a price on carbon emissions (GHGs). Putting a price on carbon emissions theoretically provides an incentive for companies and other entities to reduce carbon emissions or augment efficiency. In other words, carbon markets or emissions trading systems (ETS) are market-based instruments for mitigating the effects of climate change, such as global warming (Grantham, et al, 2015; Haites et al, 2018). ETS is a market-based climate policy conducted by governments to limit or cap the total level of GHG emissions in an effort to mitigate the effects of climate change.

Conceptual/Operational Principle of ETS

Figure 1 shows the conceptual or operational principles on which ETS as carbon markets operate. The literature posits that ETS implementation is predicated on the assumption that they are more cost-efficient than carbon taxes implemented (Haites et al., 2018; Cludius et al., 2019; Ramseur, et al., 2022).

Figure 1: Conceptual Operation of ETS as Carbon Markets



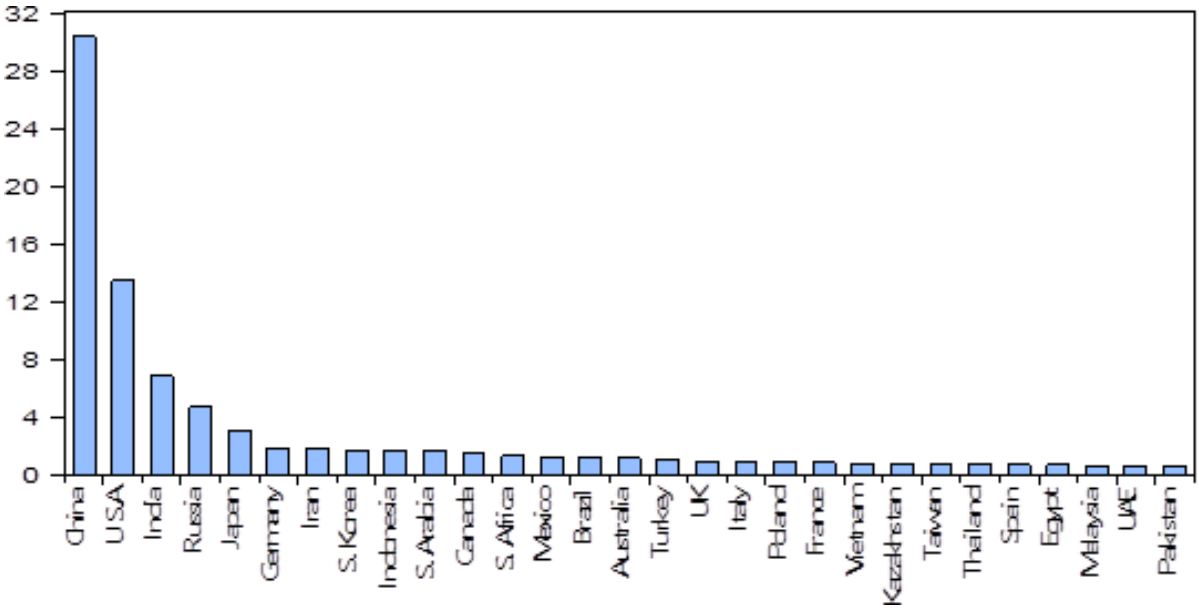
Under ETS, permits or credits are allocated mainly through auctions. However, free credits are given to Energy Intensive Trade Exposed sectors (EITEs). Trading among regulated entities occurs in the secondary

ETS markets (Haites et al, 2018; Cludius, et al, 2019). The economic intuition of ETS is that emissions allowances/credits gain an exchange value due to the central regulator's ability to limit the supply of emissions allowances. To reduce emissions over time, ETS regulatory authorities have some mechanisms in place whereby allowances are gradually reduced in the market. In theory, ETS is designed to cut down on Carbon/GHG emissions efficiently. This is done by lowering the cap (also known as cap tightening) or by an allowance retirement or banking procedure (a percentage of allowances are removed from the carbon market)

Overview of Carbon Emissions by Country

Figure 2 shows the global carbon emissions by the top thirty (30) countries in 2021. The calculations are based on data from the Emissions Database for Global Atmospheric Research data (EDGAR) Report 2022.

Figure 2: Global share of Carbon/GHG emissions in 2021- Top 30 Countries



Source: Author's calculations on Emissions Database for Global Atmospheric Research data (EDGAR) Report 2022.

From Figure 2, it is easy to note that in terms of the 2021 carbon emissions global ranking, China ranked first at 30 percentage points, followed by the United States (USA) at 14 percentage points, while India ranked third at 6 percentage points. Russia came 4th at 5 percentage points. Japan ranked 5th with 3 percentage points, Germany stood at 6th position with 3 percentage points. Iran and South Korea stood at 2 percentage points, respectively.

EDGAR (2022) reports that China, the United States, the EU27, India, Russia, and Japan together, were responsible for 67.8% of the world's fossil CO2 emissions, 66.4% of the world's fossil fuel consumption, and 49.2% of the world's population. In 2021 compared to 2020, all six countries increased their fossil CO2 emissions, with India and Russia experiencing the biggest percentage increases (10.5% and 8.1%, respectively). Seven nations—China, India, Russia, Iran, Saudi Arabia, Brazil, and Turkey—out of the 16 main emitters responsible for more than 1% of the world's CO2 emissions had higher CO2 emissions in 2021 than in 2019.

Status of ETS in Force in 2023

According to the International Carbon Action Partnership, ICAP (2023), as of January 2023, there were 28

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ETS jurisdictions in force[2]. This translates into 55 % of the world's gross domestic product (GDP) using emissions trading systems. 8 ETS were under development in Asia (these include, among others, Colombia, Indonesia, and Vietnam). 12 jurisdictions were considering incorporating ETS in their climate policy mix, including Nigeria (the first African to implement the ETS). The ETS covers 17 % of global GHG while nearly one-third (1/3) of the global population lives under the ETS in force (ICAP, 2023:28). ETS operates mainly through auctions. That is, credit auctions are the default method of allocating emission allowances to business or regulated entities in many national, subnational, and transnational ETS jurisdictions including the oldest and 2nd largest ETS on earth- the European Union Emission Trading System (EU-ETS). Credit markets serve as primary carbon markets[3] between governments and other market participants (Cosbey, et al, 2019). Arguably, the growth and significance of ETS as a market-based climate change mitigation policy has grown given that 55 % of the world gross domestic product (GDP) is generated under ETS-implementing jurisdictions globally. Table 1 outlines the main differences between ETS and Carbon tax regimes.

Table 1: Differences between ETS and Carbon (Pigouvian) Tax Regimes

Comparison Criteria	**ETS(Cap-Trade) Regime**	**Carbon/Pigouvian Tax Regime**
Cost-effectiveness	Achieves relatively high economic efficiency & high price flexibility	Economic efficiency is foregone under tax regimes
Price Predictability	Cannot be predicted beforehand as prices depend on market forces	Predicted beforehand under tax rates
Size of Public Revenue Raised	Generally, less revenue is raised because ETS distributes free allowance to some sectors (EITEs)[4]. The revenue is mostly ploughed back.	Raise relatively more revenue whose s uses are many, including tax cuts and tax rebate
Ease of Administration & Scope of coverage	Relatively harder to implement & include all sectors from the beginning due to the complexity	Relatively easier to include many sectors from the beginning due to the existence of tax Infrastructure
Emission Level Certainty	Certainty is guaranteed because the cap is determined in advance	Relatively hard to predict emissions levels beforehand.

Source: Illustration on data from Centre for Climate & Energy Solutions, 2009 & Haites et al, 2018.

Although the implementation of ETS regimes seems to be increasing, concerns have been bordering on carbon leakage and loss of competitiveness. Carbon emission leakage is a situation occurring when the implementation of carbon pricing in one jurisdiction leads to increased emissions in other jurisdictions or when companies transfer production or capital to countries that are less strict about carbon emissions (Branger & Quirion, 2014; Yu, et al., 2021; Grubb et al., 2022). In other words, carbon leakage can be categorized as either 'operational carbon leakage'- referring to the relocation of the business to less regulated jurisdictions, or 'investment carbon leakage'- referring to the redirection of investment flows to less regulated or climate lax countries or jurisdictions (Yu, et al., 2021; ICAP, 2023).

Consequently, there have been calls by the ETS implementing countries or jurisdictions to introduce Carbon Border Adjustment (BCA sometimes used interchangeably as Border Carbon Adjustment, BCA or Carbon Border Adjustment Mechanisms (CBAM)[5].

Border Carbon Adjustments (BCA/CBA) refer to any trade policy used by ambitious climate policy-implementing jurisdictions to tax or levy products from jurisdictions without carbon prices. The rationale of BCA/CBAM is to equalize the prices of goods/products between ETS-exposed firms and those in jurisdictions without ETS. Generally, BCA/CBAMs assume various formats including levies, border carbon

taxes and regulations. (Cosbey, et al., 2019; Mehling, et al., 2019). In this paper, BCA or CBMA refers to a border tax or levy charged on products/goods where they are consumed as opposed to levies or taxes imposed on the goods in jurisdictions where they are produced. By and large, BCAs or CBMAs are perceived as the panacea for carbon leakage problems and as competitive loss mitigation strategies.

Illustrating Carbon Leakage and Loss of Competitiveness

Suppose there are two steel producers /firms in the European Union (EU), **A** and **B**. Producer **A** uses an efficient production process that emits, say, 1kg of CO2 to produce **X** amount of steel. Producer/firm **B** is not as efficient as A, and it emits 2kg of CO2 to produce the same amount of steel. Additionally, there are two steel producers outside the EU, firms **C** and **D**. -Producer (C) produces **X** amount of steel and emits 3kg of CO2 emissions. Producer/firm D produces the same amount of steel and emits only 1kg of CO2. Suppose the global price of **Y** kg of steel is equivalent to 10 US dollars.

Suppose the EU ETS regulator introduces a carbon levy (Carbon Border Adjustment,

CBA) of $1 US Dollar (USD) per kg of CO2, but only on the EU steel producers. The result would be the following prices shown in Table 1.

Table 2: Illustrating Competitive Advantage and Competitive Loss

				Names of Firms/Steel Producers			
				A	**B**	**C**	**D**
Amount of CO2 emitted /X amount of steel				**1Kg**	**2Kg**	**3kg**	**1kg**
Price without carbon Levy (CBA)/USD				10	10	10	10
Price after a 1 USD/kg CO2 levy on domestic/EU steel producers/USD				11*	12*	10	10
Domestic price after a 1 USD/kg tax on all steel producers				11	12	13	11

Source: Author's Illustration

It is easy to observe from the illustrative results in Table 2 that the foreign producers, that is steel producers outside the European Union (EU), firms C and D, would gain a significant global competitive advantage in that they would charge low prices of USD 10 relative to the two EU domestic steel producers, A and B (market in asterisks) that would charge relatively high prices of USD 11 and USD 12 respectively. Note also that the domestic/EU producer A would gain a price advantage relative to producer B and sell more than B. However, most would shift to steel producers C and D (Outside the EU). This implies that the EU carbon levy might not achieve the goal of mitigating carbon emissions, and it would potentially destroy the domestic/EU steel industry. Clearly, carbon leakage in the form of moving steel production or investment abroad (away from the Eurozone) would be bad for the EU steel industries and global climate policy global emissions would not reduce.

Therefore, BCA/CBAM would be introduced ***to level the playing*** field between domestic (EU) and foreign (non-EU) steel producers and *presumably incentivize* other countries/producers to adopt ambitious climate policies. Essentially, BCAs ensure that domestic and foreign goods producers pay the **same** carbon price when they are competing or selling their goods on the same domestic or foreign market. This is done by charging **import fees** for goods produced in lower-carbon-priced jurisdictions or by subsidizing exports (in the form of **export rebates**) that have paid a higher domestic carbon price.

The Global Status of the CBA/CBAM

The EU announced in 2021 that the Carbon Border Adjustment Mechanism (CBAM) to be implemented in

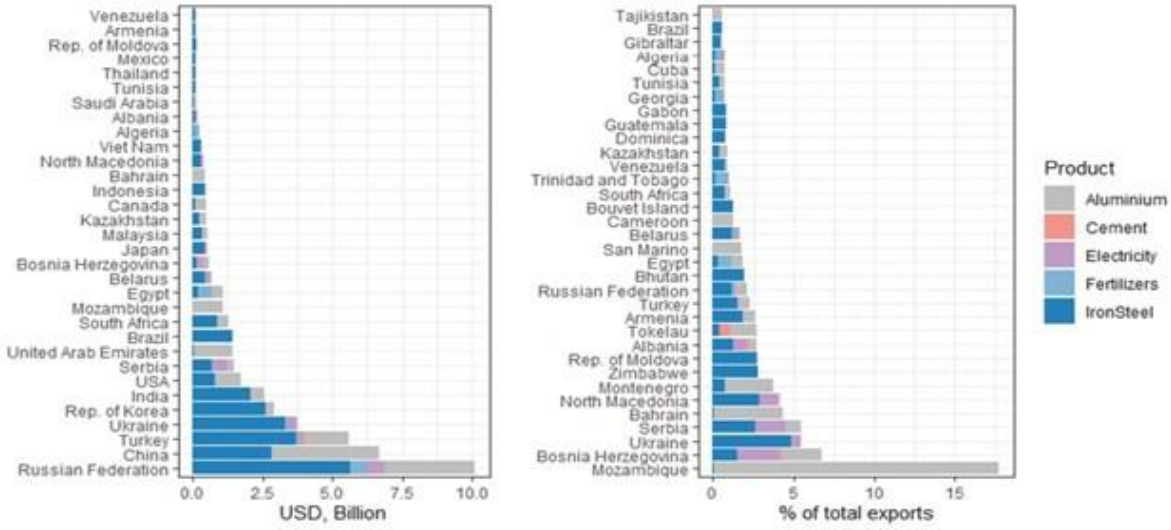
2023 to run side by side with the EUETS[6]. In 2020, Canada announced federal plans to affect the BCA[7]. In 2021, the US included BCA in the 2021 Trade Policy Agenda, in line with the Biden Administration's ramped-up climate ambition[8]. It appears that, generally, the West is on an upward trajectory in implementing BCAs/CBAM. It is worth noting that the CBAs or CBMAs are not yet in operation. However, these proposals have received significant backlash from trading partners, especially fromemerging and developing countries.

REVIEW OF CONTEMPORARY ISSUES ABOUT ETS MARKETS

BCA/CBAM: Potential International Trade & Climate Law Conflicts

Contemporary issues on CBA/CBAMs revolve primarily around wealthy nations or regional groupings like the EU's proposed ***unilateral deployment*** of BCAs/CBAMs. Brazil, Russia, India, China, and South Africa (BRICS) are emerging nations that have expressed concerns about the unfairness of the EU CBAM, claiming that BCAs or CBAMs breach the Paris Agreement[9]. The CBAM legislation, which was approved by the European Commission on July 14, 2021, and which is scheduled to take effect by 2026, aims to impose border taxes on the import of several carbon-intensive items (such as cement, energy, iron, and steel), with the possibility that these taxes would eventually be expanded to other goods. However, given the criticism from the BRICS and other emerging nations, it is still unclear whether the EU can communicate its climate taxation policy in a fair and acceptable way to the Global South. Some scholars contend that implementing BCAs by Developed Countries (DCs) could shift the cost of emission reduction from developed economies to developing and emerging economies via terms of trade channels (Babiker and Rutherford, 2005; Böhringer et al., 2022). Holmes et al (2011) postulated that BCAs have the potential to be used as ***covert 'green' protectionist measures***. Evenett and Whalley (2009) argued that the so-called "green protectionism" policies implemented through BCAs by Western policymakers would essentially undermine the very efforts to leverage emerging economies to make a binding commitment to emissions because this could spark trade retaliation, exacerbate political tensions, and impede diplomatic ties (OECD, 2013). The EU CBAM Act, according to its detractors, was written with an internal focus aimed at safeguarding European home industries. The CBAM plan of the EU, according to critics, is predicated on the incorrect assumption that "carbon leakage" is large even while simulation study findings indicate the contrary or no leakage at all (Winchester et al., 2011; Bao et al., 2012; Foure', Guimbard & Monjon, 2016). In the case of the EU, CBAM has the potential of reallocating the responsibility of emissions to consumer nations given that the carbon border tax/levy will be implemented in the consumer countries, not producer countries. We illustrate the potential trade impact of implementing the EU CBAM on trading partners. The CBAM's list of industries covered consists primarily of high-emitting industries that are currently vulnerable to carbon leakage. The emphasis of the impact study is the electrical sector, together with the four industrial sectors of cement, aluminium, iron/steel, and fertilizers. Because the value chains that must be considered within the CBAM's scope are not overly complex, limiting the CBAM to specific industries and eliminating all made or semi-manufactured products greatly simplifies the implementation of the mechanism. In addition, the CBAM only considers direct emissions, even though for many industrial commodities, indirect emissions connected to previous stages in the value chain make up a sizeable fraction of the total volume of emissions associated with the product. The CBAM will impact countries in proportion to how much they export to the EU. Turkey, Ukraine, China, and Russia are the economies that have been most significantly hit in terms of volume, as seen in Figure 3, left panel. (Check the uniformity of font size)

Figure 3: Exports of CBAM Products to the EU by Country 2019



Source: Computed on COMTRADE Data following models in Magacho, et al., 2022[10].

From Figure 3, it is observed that regarding total exports, the economies most impacted negatively by the CBAM are Indonesia, Malaysia, Mexico, Australia, and Vietnam, as well as the BRICS nations (Russia, Brazil, India, and South Africa). About 10 billion dollars (USD) worth of CBAM products are exported from Russia, with exports of iron and steel, aluminium, fertilizers, and electricity split evenly. The same two goods make up the majority of the CBAM exports from China, Ukraine, and Turkey to Europe, which total more than USD 2.5 billion. The most affected product in Turkey, the USA, BRICS nations South Korea, and Ukraine is iron and steel exports to the EU.

From the perspective of the trade partner, even though the total impact is important, the effect of CBAM on the economy will rely on its relative importance (for instance, as a percentage of total exports). Except for Ukraine and Russia, the most affected nations in terms of volume are not the same in terms of the percentage of exports, as we can see from Figure 3 right panel. The economy of Mozambique is the most severely affected because about 20% of its exports are aluminium to the EU nations.

It follows that exporters of CBAM-subjected products may suffer losses in export revenues, fiscal revenue as well as employment/wage shares. This potential negative outcome violates the Principle of Common But Differentiated Responsibilities (CBDR)[11] of the UNCCC also reaffirmed by Article 4(3) in the Paris Agreement[12]. It seems that CBAM will likely affect the price dynamics of some nations (not all countries will be affected) with some nations/jurisdictions more negatively impacted than others. Given that one of the main goals of CBAM is to incentivize the world to transition to climate policies, this simple analysis points to the fact that only some nations may be induced into implementing similar climate-based policies (CBA/CBAM).

The proposed unilateral imposition of BCAs/CBAM on emerging and developing countries' exports is perceived as a potential violation of international trade laws and the Paris Agreement. Although the World Trade Organization (WTO) oversees multilateral trade rules and arbitrates trade disputes, it is uncertain whether a BCA or CBAM would comply with WTO rules because a WTO dispute settlement panel has never considered the issue. Specifically, it is uncertain whether a BCA/CBAM would be consistent with the General Agreement on Tariffs and Trade (GATT) principles. It is also uncertain whether specific GATT exceptions might allow a BCA that is otherwise deemed inconsistent with key GATT principles (Osterwalder & Cosbey,2021). These concerns foreshadow future legal challenges at the World Trade Organization (WTO). In practice, differences in countries' climate ambitions are likely to persist, so the legal challenges or disputes to BCAs/CBAM may intensify in the future. The literature recommends that

the ideal approach to climate change action is a mutual agreement or consensus on best practices that should inform the design of BCAs so that the results of implementing BCA are not only environmentally effective but also more equitable and less disruptive of trade. Osterwalder and Cosbey (2021) assert that although legal dispute outcome at the World Trade Organization (WTO) would, in part, depend to a large extent on the design of the BCA, however, no legal dispute outcome at WTO would completely tackle the issues surrounding the inequity, trade disruptions and carbon leakage inherent in current BCA/CBAM models.

ETS Legal/ Environmental Jurisdictional Authority Overlap Issues

Environmental Jurisdictional Authority Overlap (EJAO) seems to be one of the major issues confronting international carbon markets in general and emissions trading systems (ETS) in particular. When state, provincial, or municipal decision-making authority overlaps with that of national governments for environmental regulation, it is known as environmental jurisdictional authority overlaps. This leads to disagreements or conflicts in the climate governance systems in respective ETS jurisdictions (Millimet, 2013; Dragoo, 2020). The legal or EJAO issues surrounding the ETS can be traced back to the evolution of environmental regulation or laws in the United States and/or Western Europe. Given the influence of Western European and American constitutional law systems—or the current European Union, EU, they can help explain some of the causes of environmental jurisdictional authority overlap problems in ETS jurisdictions (Vogel, et al., 2010). Historically, state, or municipal governments in the US and Western Europe oversaw enforcing environmental laws. But the emergence of environmental activist movements in the US and Europe during the 1960s and 1980s led to the centralization of environmental regulatory policymaking. For instance, the US federal government centralized all environmental policy in the mid-1970s based on the convictions of the environmental activist movements that environmental regulation was more successful at the federal level than at the state level (Vogel, et al, 2010). According to the European Parliament's 1957 Treaty of Rome report, the EEC's central authority was not given the authority to implement environmental protection laws in Western Europe. However, after the Single European Act was passed in 1987, the European Economic Community (EEC) assumed overall control of environmental regulations (Single European Act, 1987, SEA, 1987)[13]. To date, there are continuous disagreements or conflicts in the ETS-implementing countries regarding the relative competence of federal/central and state/municipal government authorities to regulate the environment in the US and the EU. Consequently, certain state/ municipal governments continue to play a regulatory role, while in other jurisdictions, environmental regulation is a shared responsibility manifested in the "sharing status or condition" of environmental regulation authority (Vogel, et al., 2010; Dragoo, 2020). Because environmental legislation is not clearly streamlined in many ETS jurisdictions, conflicts/disputes frequently arise. The conflicts may be lessened by decentralizing the environmental regulating measures. Legal reviews could also assist in resolving disputes (Dragoo, 2020). Mulenga, Ji, and Bhandari (2022) found that the major causes of environmental authority overlap among the ETS markets were the shared control/regulation of the environment. Table 3 shows the allocation of environmental jurisdictional authority. From Table 3, it is easy to observe that the sharing condition among the seven ETS jurisdictions is common. This shows that environmental regulation laws among the ETS are not well streamlined. In other words, the ongoing disputes in the ETS jurisdictions are due to environmental jurisdictional authority overlaps (Dragoo,2020; Mulenga et al.,2022).

Table 3: Allocation of Environmental Jurisdiction Authority among the ETS from around the World

Name/Region of ETS	**Environmental Legislation & launch year**	**Allocation of ETS Environmental Jurisdictional Authority**
CALIFORNIA (USA)	Global Warming Solutions Act,2006(AB 32) Amended in 2021, launched in 2013	Shared jurisdictional authority. Although Federal law is the national baseline for climate regulation, the enforcement of environmental law is delegated to the states.

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EU (Europe)	Directive 2003/87/EC of European Parliament & of the council. Amended in 2021. Launched 2005.	Articles 11, 191 to 193 of the treaty (Constitution) on the functioning of the European Union (TFEU). The scope is limited by the principle of subsidiary & requirement for unanimity in the Council on the fiscal, choice of energy sources & and resource management by member states.
KOREA (Asia)	Framework Act on Low-Carbon Green Growth 2010, Emissions Act, 2012, 2015. Amended 2021. Launched in 2015	**Shared jurisdictional authority**. Based on Article 35 of Korea's Constitution. The The Ministry of Environment (MOE) is the central climate-enforcing authority but there is delegation of enforcement to provincial & and local governments. This causes duplicative regulation & and overlapping in the enforcement process.
NEW ZEALAND Oceania	Climate Change Response Act 2002, Amended in 2020 and launched in 2008.	**Shared jurisdictional authority**. Although the regional policy is the baseline, both the territorial authorities and regional councils enforce the environmental laws.
QUEBEC **(Canada)**	Regulation respecting a cap-and-trade System for GHG allowances (RRCG, C2) 2011. Launched in 2013	**Shared jurisdictional authority**. The provinces and territories regulate 'local' carbon emissions while the federal government regulates interprovincial or International pollution.
RGGI (USA)	2005 RGGI Model Rule, Amended 2017	**Shared Jurisdictional Authority**. Although Federal law acts as the the national baseline for the environment, the enforcement of environmental laws is delegated to the states
SWISS **(Europe)**	Federal Act on the Reduction of CO2 Emissions Act (CO2 Act) 2008 Revised 2021. Launched 2008	**Shared jurisdictional authority.** Based on Article 74 seq. of the Federal Constitution of the Swiss Confederation. Both the Cantons & and Federal State/Confederation regulate and implement environmental law.

Source: Ji, Mulenga and Bhandari (2022).

Social-Political Issues Surrounding the ETS Markets

The socio-political backlash on carbon markets with respect to ETS largely revolves around the proposed unilateral implementation of BCAs by developed countries like the EU. Critics argue further that the EU's CBAM plan is based on the false premise that 'carbon leakage' is significant when simulation research results suggest the opposite or no leakage at all (Conrad, 2005; Panhans and Hanley, 2017). The extensive empirical literature on carbon leakage strongly suggests that firms make location or relocation decisions based on many factors, of which environmental regulation is not the major factor.

Carbon markets have been criticized for their lack of transparency, accessibility, equitability, and quality

(Eskeland and Harrison, 2003; Martin et al., 2014; Panhans and Hanley, 2017).

The proposed carbon CBA/CBAM by the EU has good intentions. However, the BCA implementation is fraught with practical challenges and is founded on the false concept of carbon leakage. Additionally, the proposed tax violates the Paris Agreement's principle of differentiated duties and will face opposition from developing nations (Dadush, 2021). When examined through the lens of climate justice, CBAM goes against the EU's own declared guiding principle of "Do no harm." Moreover, it is argued that the CBAM violates the right to development principle by impairing the exports of developing nations. Furthermore, it is challenging to reconcile CBAM with the notion of climate justice and, more broadly, the principle of Common But Differentiated Responsibilities (CBDRs). Additionally, critics contend that the nations that are most at risk from CBAM have traditionally and historically made fewer contributions to global warming and profited less from it (Panhans and Hanley, 2017; Dadush, 2021). Critics argue further that as emerging middle classes look to buy energy-intensive durable goods like cars, air conditioners, and other consumer durables, the carbon footprints of many households in developing and emerging countries will continue to rise. The same class of consumer durables that enabled households in the Global North to raise their standard of living decades ago will consequently be sought after by poorer households in the developing Global South. This consumption growth causes a political economy challenge because of the carbon-intensive lock-in effect. Voters in developing world regions are unlikely to support government initiatives such as carbon taxation that can hinder their access to the range of goods that are associated with the prospect of enhanced living standards. Beyond these economic considerations, the EU, in particular, should also assess CBAM's global impact from a geopolitical angle, especially in the wake of Russia's war in Ukraine. Few non-Western leaders have condemned Russian President Vladimir Putin publicly or imposed sanctions on Moscow. This lack of solidarity has deep roots. For instance, in Africa, many saw the European response to the war as a "prime example of double standards, given the disproportion in political and military support for Ukraine compared to assistance for African states battling aggression and instability (Panhans and Hanley, 2017; Smith et al., 2023)

The countries that are most vulnerable to CBAM have, historically, contributed less to global warming and benefited less from the industrialization associated with emissions than the EU member states. Thus, developing countries and emerging countries are significantly less able than European states to bear the costs of climate change. Implementing CBAM without due consideration of the socio-political ramifications raised in this section will only reinforce these socio-political conflicts in the future (Smith et al., 2023; Ulgen, 2023). That is, politically, if the EU does not take into consideration the needs of developing and emerging countries, it may undermine the cooperative spirit of climate negotiations and exacerbate the North–South divide (Ravikumar, 2020; Weko et al., 2020). This potential problem is also recognized by the EU, which states: 'In order to avoid new global dividing lines between countries with a low- and high-carbon export structure, the EU should carefully assess risk levels and support the transformative process that partner countries would need to undertake to adjust to the CBAM' (European Commission, 2021:193). Although justice considerations appear to be at odds with interest-based diplomatic practice, they have been central to the EU's self-conception as a 'normative power', seeking to lead by example in global climate policy. By securing support from the most vulnerable countries, the EU will shape the understanding of what fairness is (Weko, et al, 2020; Benjamin & Peterson, 2012). Both pragmatic political considerations and ethical concerns gain additional importance in the context of the EU's quest for an 'open strategic autonomy', which requires the diversification of raw material imports. The strategy has been combined with calls for a 'partnership with Africa', as well as calls for preferential bilateral relations with developing countries (European Commission, 2022; Smith et al., 2023).

CONCLUSION

This paper conducts critical reviews of the contemporary issues confronting the ETS as international carbon

markets. Although the implementation of ETS regimes are on the upward trajectory, there have been concerns bordering on carbon leakage and loss of competitiveness resulting in calls by the ETS jurisdictions to introduce Carbon Border Adjustment (CBA) or Carbon Border Adjustment Mechanisms (CBAM) as strategies to mitigate carbon leakage and competitive loss. However, the proposals to implement BCAs or CBAMs have been criticized on several fronts. Firstly, the BCAs/CBAMs are perceived as covert 'green' protectionist measures by trade partners, especially emerging and developing countries. Secondly, the proposed unilateral imposition of CBAM on emerging and developing countries' exports is perceived as a potential violation of international trade laws and the Paris Agreement which is perceived as undermining the purported efforts to leverage emerging economies to make binding commitments to emissions reduction because implementing BCAs may spark trade retaliation, exacerbate political tensions, and impede diplomatic ties. These concerns foreshadow future legal challenges at the World Trade Organization (WTO). Thirdly, with regards to the environmental jurisdictional authority, the reviews found that the over-centralization of environmental regulation and the lack of streamlining the environmental jurisdictional laws are the drivers of environmental jurisdictional authority disputes in the existing ETS jurisdictions. Fourthly, in terms of socio-political issues, the reviews found that critics perceive the theory underpinning the implementation of the BCAs/CBAMs as a way of combatting carbon leakage as false or dubious because empirical literature on carbon leakage strongly suggests that firms make relocation decisions based on many factors of which environmental regulation is not the major factor. Finally, when examined through the lens of climate justice, CBAM is criticized as violating the right to development principle by impairing the exports of developing nations and causing more socio-economic problems.

RECOMMENDATIONS

Given the foregoing contemporary issues confronting carbon ETS as carbon markets, the Literature recommends the following, among others:

1. That the ideal approach to climate change action is a mutual agreement or consensus on best practices that result in implementing BCAs and /or other climate policies, including climate clubs, that are not only environmentally effective but also more equitable and less disruptive of trade (Weko, 2020; Ramseur, 2022).
2. Streamlining environmental regulation laws could significantly reduce jurisdictional authority disputes (Vogel, et al., 2010; Drago, 2020)
3. Politically, the literature asserts that if the EU does not take into consideration the needs of developing and emerging countries in its plans to unliterally implement the CBAM, effecting CBAM may undermine the cooperative spirit of climate negotiations and exacerbate the North–South divide (Ravikumar, 2020; Weko et al., 2020)

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FOOT NOTES

[1] This is named after 1920 British Economist, Arthur C. Pigou pivotal works regarding the correction or mitigation of negative externalities such as pollution of the environment using taxes.

[2] ETS in force implies fully functional national, subnational, or regional emissions trading systems with the authority to allocate or sell permits or allowances to market participants in given jurisdictions (ICAP, 2023, Cludius et al., 2019).

[3] Secondary carbon markets exist whereby market players exchange carbon credits/permits directly. The market players transact in the secondary markets by creating futures or forwards contracts. For details, see, for example, The Role of Derivates in Carbon Markets

[4] EITEs are Energy Intensive Trade Exposed Sectors. Under ETS regimes, some core industries, mainly in manufacturing, are given free allowances/permits on the assumption that these industries/sectors face significant national or international competition from competitors located in jurisdictions with lax or no climate policies (Goulder & Shein, 2013; Haites, et al., 2018;).

[5] CBAs or CBAMs border taxes levied on imports from countries that do not have similar ambitious climate policies initially proposed by the EU-ETS but other countries in the global west such as Canada, and the US are also following suit (ICAP, 2022)

[6] As co-legislators, the European Parliament (EU-Parliament) and the Council of the European Union (EU-Council) signed the final CBAM Regulation on 10 May 2023. The provisions underpinning the CBAM, and its operational features will now progressively enter into force and application. For details, See, https://taxation-customs.ec.europa.eu/system/files/2023- 7/20230714%20Q%26A%20CBAM_0.pdf

[7] Chartered Accountants Canada, CPA, 2023 reports that while most industrialized countries are adopting carbon pricing mechanisms, Canada's main trading partners such as the US and China have been less ambitious on the environmental front, relying on lower or no carbon pricing to date. In 2023 Canada is undergoing consultations and reflecting on how to implement BCAs. https://www.cpacanada.ca/en/public-interest/public-policy-government-relations/policy-advocacy/climate-change-sustainability/border-carbon-adjustment-primer

[8] For details, refer to : USTR's 2021 Trade Policy Agenda.

[9] According to the Paris Agreement's Nationally Determined Contributions (NDCs), countries are given the freedom to self-define national climate pledges under the Paris Agreement, adapt to climate impacts and ensure sufficient finance to support these efforts. So imposing climate levies on exports of emerging and developing countries like the BRICS via the BCAs/CBAMs is arguably violating the NDC principle.

[10] Data on countries' exports and imports by product and trading partner are available in the UN COMTRADE database (UN, 2003). One might estimate a country's exports of CBAM-related goods based

on either its exports to the EU or its imports from partners in the EU. We used the EU imports because the EU data is more comprehensive. Therefore, the total imports of the 27 EU member states equal the total exports of a country to the EU.

[11] The principle of common but differentiated responsibilities (CBDR) recognizes that climate change is a global issue that all nations must address according to each nation's capabilities. The Stockholm Declaration, for instance, states that policymakers must consider "the applicability of standards which are valid for the most advanced countries, but which may be inappropriate and of unwarranted social cost for the developing countries." See details on CBDR here and Böhringer et al., 2022.

[12] For details, see The Paris Agreement

[13] Details about the Single European Act (1987) can be found at https://eur-lex.europa.eu/EN/legal-content/summary/the-single-european-act.html