



**DECARBONIZING THE GLOBAL
ECONOMY:
IS CARBON BORDER ADJUSTMENT AN
EFFECTIVE INSTRUMENT?**

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Abstract

In recent decades, the rising frequency of extreme weather events and their deadly repercussions has prompted an increasing number of governments to explore measures to mitigate the effects of climate change by reducing greenhouse-gas emissions. In the absence of a concerted global effort, many advanced economies have unilaterally implemented carbon-reduction programs that reflect their unique capacities and legislative circumstances. However, these national (or even sub-national) carbon dioxide reduction measures have resulted in issues such as carbon leakage and loss of competitiveness. Given this problem, the border carbon adjustments (BCA) mechanism has caught the attention of international policymakers as a viable policy instrument to address the challenges raised by unilateral carbon abatement measures. This paper's goal is to take into account all the different viewpoints and examine the effects of a BCA implementation comprehensively and exhaustively. In the absence of global environmental cooperation, this research suggests that, notwithstanding its flaws and legal difficulties, BCA is the optimal tool for most industrialized countries with stringent abatement policies. The environmental and economic effectiveness, legal acceptability, and political viability of border adjustment policies depend on their particular design. The value of any BCA design also varies depending on a country's economic and political context. Consequently, the design of BCA should be based on an appraisal of each country's specific conditions and factors. While the bulk of this research explores the BCA from an international viewpoint, Canada is used as a case study to see if the BCA would be a beneficial instrument for a trade-dependent, small, open economy that assumes world import and export prices.

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Chapter 1: Introduction

The increasing frequency of extreme weather events and their devastating consequences in today's world has spurred a growing number of governments to explore various environmental measures to mitigate the effects of climate change by reducing greenhouse-gas emissions. As a transboundary matter, environmental issues are intricate problems that cannot be fully addressed unilaterally; rather, international cooperation is required. However, an international approach to developing a uniform environmental policy is challenging in the contemporary world.

In the absence of a globally coordinated effort, many developed countries have unilaterally introduced carbon-cutting strategies that reflect their individual capacities and legislative circumstances. Nevertheless, it has been discovered that these uneven and indigenous carbon dioxide reductions in industrialized nations are typically coupled with an increase in carbon imports.¹ This raises concerns about carbon leakage, which occurs when a company decides to move its production from a country with stringent policies to a country with more lax policies, resulting in an increase in greenhouse gas emissions and the potential weakening of carbon-intensive industries in countries with stringent climate objectives.² From the standpoint of global greenhouse gas emission reduction, carbon leakage impairs the effectiveness of carbon-pricing regimes' capacity to reduce carbon emissions. On the other hand, in an increasingly interconnected globe, the fear that unilateral acts may impair national industries' competitiveness has hampered the adoption of broad-based strict environmental policies.

¹ Cosbey et al., "Developing Guidance for Implementing Border Carbon Adjustments"; Rivers, "Impacts of Climate Policy on the Competitiveness of Canadian Industry"; Fischer and Fox, "Comparing Policies to Combat Emissions Leakage"; Dissou and Eyland, "Carbon Control Policies, Competitiveness, and Border Tax Adjustments"; Van Asselt and Brewer, "Addressing Competitiveness and Leakage Concerns in Climate Policy."

² Cosbey et al., "Developing Guidance for Implementing Border Carbon Adjustments."

Given this context, the border carbon adjustment (BCA) mechanism has piqued the interest of international policymakers, particularly those in highly industrialized nations that have already implemented or plan to adopt stringent carbon restrictions and taxes. BCA has gained prominence as a potential solution to address the issues arising from unilateral carbon abatement strategies.

As BCA gained prominence as a potential policy instrument, various studies have been conducted to evaluate its merits and its practicality. While some believe that BCA would be the answer to the current problem and a step toward decarbonizing the global economy,³ others contend that the danger posed by BCA surpasses its limited effectiveness in reducing carbon leakage and restoring competitiveness.⁴

Against this backdrop, this paper's goal is to take into account all the different viewpoints and examine the effects of a BCA implementation in a comprehensive and exhaustive manner. Specifically, this paper answers the following question: Is BCA an effective instrument to implement alongside unilateral carbon regulations to decarbonize the global economy and combat climate change? While the bulk of this research explores the BCA from an international viewpoint, Canada is used as a case study to see if the BCA would be a beneficial instrument for a trade-dependent, small, open economy that assumes world import and export prices.

This study makes use of both qualitative and quantitative research methods. Although qualitative analysis of official government publications and scholarly articles is the primary approach, quantitative data are also analyzed throughout the paper.

³ Cosbey et al.; Department of Finance Canada, "Exploring Border Carbon Adjustments for Canada"; Dissou and Eyland, "Carbon Control Policies, Competitiveness, and Border Tax Adjustments"; European Commission, "Carbon Border Adjustment Mechanism"; Fischer and Fox, "Comparing Policies to Combat Emissions Leakage."

⁴ Lim et al., "Pitfalls of the EU's Carbon Border Adjustment Mechanism"; Tang et al., "Carbon-Based Border Tax Adjustments and China's International Trade."

Following a comprehensive assessment of BCA's strengths and drawbacks, this paper concludes that, despite BCA's shortcomings and legal issues, BCA is the best solution for nations with stringent abatement policies in the absence of a global carbon abatement regime. Border adjustment measures' environmental and economic efficacy, as well as their legal acceptability and political viability, are contingent on their precise design. The value of any BCA design also varies depending on a country's economic and political context. Consequently, the design of BCA should be based on an appraisal of each country's specific conditions and factors.

This paper is structured into eight chapters. After this introduction, chapter 2 presents a background of contemporary environmental challenges and their connection to the economy and international trade. Chapter 3 discusses modern multilateral environmental efforts and the obstacles to global environmental cooperation. Chapter 4 explores existing unilateral carbon reduction approaches. Chapter 5 then provides an overview of the BCA mechanism and explores its merits. Chapter 6 examines the challenges of implementing a BCA and why governments must take prudence when making BCA decisions. Chapter 7 presents a case study on Canada, evaluating its value and viability in a trade-dependent, small, open economy. Finally, chapter 8 concludes with a summary of findings and policy recommendations.

Chapter 2: Background

2.1 The effect of carbon emissions on the world

Although the climate of the world has changed often throughout history, present climatic changes are unprecedented.⁵ Climate change is now one of the greatest threats to the health and security of humans.⁶ The Intergovernmental Panel on Climate Change (IPCC) has determined that the extraordinary rise in global atmospheric concentrations of greenhouse gases (GHG) is the cause of increasing temperatures in the past 50 years.⁷ While the Earth's temperature rose at a rate of 0.08°C each decade from 1880 to 1980, the rate of warming has more than doubled to roughly 0.18°C per decade since 1981.⁸ If the Earth continues to warm at its current rate, it will eventually become uninhabitable for humans. Indeed, climate change and the associated extreme weather patterns have already resulted in fatal effects for humans and animals around the globe. The Earth's warming has disrupted water supplies and weather patterns, shifted the growing season for food crops, and posed a threat to coastal areas due to rising sea levels.⁹

As more families, businesses, and governments are suffering from the devastating effects of climate change, a huge number of scientific research have been conducted to determine how climate change may be managed. A recent study found that if GHG concentrations in the atmosphere are kept between 450 and 550 ppm (parts per million), the worst effects of climate change would be mitigated.¹⁰ These concentrations would keep global temperature increases to a

⁵ Houghton, *Global Warming*.

⁶ IPCC, "Summary for Policymakers — Global Warming of 1.5 °C."

⁷ Holzer, "A Bilateral Approach to Imposing Carbon-Related Border Adjustments."

⁸ Lindsey and Dahlman, "Climate Science Special Report."

⁹ Cairoli, "Consequences of Carbon Emissions for Humans | Sciencing."

¹⁰ Holzer, "A Bilateral Approach to Imposing Carbon-Related Border Adjustments."

reasonably safe two degrees Celsius above pre-industrial levels.¹¹ Nevertheless, combating climate change and managing its repercussions necessitates robust institutional, organizational, and financial resources on a global scale. Failure to address climate change would be self-destructive for civilization, and economists have warned that delaying action on climate change will cost society significantly more in the long run.¹²

2.2 The relationship between industrialization and carbon emission

While economic expansion generates a great deal of wealth for nations and people, it also consumes a significant number of resources and contributes to the degradation of the natural environment, including through the production of carbon emissions. Carbon dioxide has been identified as the primary contributor to human-caused climate change. Since the beginning of the Industrial Revolution, humans have burnt an increasing amount of fossil fuels and converted enormous tracts of forest to farming.¹³ The burning of fossil fuels is the biggest carbon-emitting human activity, accounting for 75 percent of all carbon dioxide emissions, and changes in land use also affect atmospheric carbon dioxide levels.¹⁴ By facilitating the global use of fossil fuels and goods with high emissions, trade has had and continues to have a significant influence on the climate.¹⁵

Since human activities are regarded to be the primary source of carbon emissions and carbon emissions are the principal cause of climate change, there is a strong reciprocal relationship between climate change and economic activities such as production and commerce. Using the most

¹¹ Holzer.

¹² Stern, *The Economics of Climate Change*.

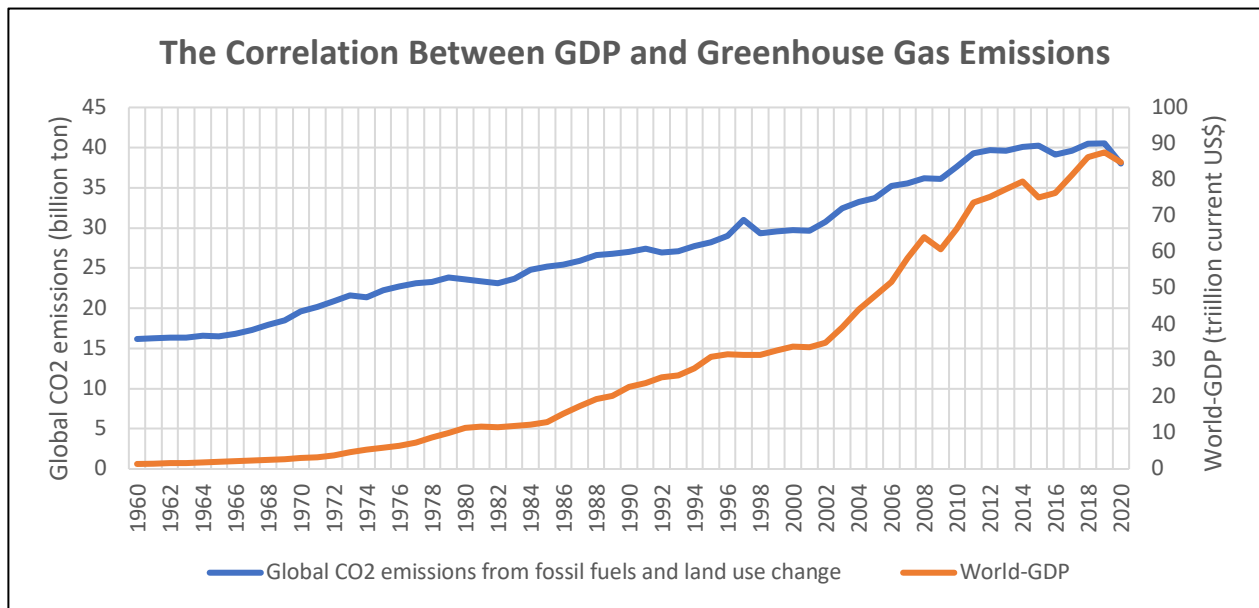
¹³ Environment and Climate Change Canada, "Causes of Climate Change."

¹⁴ IPCC, "Summary for Policymakers — Global Warming of 1.5 °C."

¹⁵ Holzer, "A Bilateral Approach to Imposing Carbon-Related Border Adjustments."

updated statistics from the World Bank Database, Figure 1 depicts the link between economic activities measured by global Gross Domestic Product (GDP) and global CO2 emissions from fossil fuels and land use change from 1960 to 2020. Fossil fuel combustion is the most carbon-emitting human activity, accounting for 75 percent of all carbon dioxide emissions.¹⁶ Changes in land use also have an influence on carbon dioxide levels in the atmosphere, although agriculture is the primary source of methane and nitrous oxide emissions.¹⁷ The graph demonstrates a clear correlation between global GDP and carbon dioxide emissions. As global GDP increases, so does the amount of carbon dioxide released into the atmosphere. In fact, the sharp declines in global CO2 emissions in 2009, 2016, and 2020 all correspond to a decline in worldwide GDP.

Figure 1.¹⁸ The correlation between world GDP and global CO2 emissions from fossil fuels and land use change.



¹⁶ IPCC, “Summary for Policymakers — Global Warming of 1.5 °C.”

¹⁷ IPCC.

¹⁸ The World Bank, “GDP (Current US\$) | Data”; Ritchie, Roser, and Rosado, “CO₂ and Greenhouse Gas Emissions.”

One thing to note from Figure 1 is that the gap between the two lines is narrowing, showing that although GDP has increased at an accelerated rate, carbon emissions have climbed at a relatively stable rate. This may be seen as a positive indicator that the world has been able to achieve GDP development while keeping harmful emissions under control, and it demonstrates the effectiveness of governments in their quest for alternative production practices that reduce environmental degradation. Nonetheless, despite the fact that emissions growth has slowed in recent years in comparison to GDP growth, they have yet to reach their peak, let alone decline.

While GDP growth has a tendency to lead to an increase in carbon emissions, the link also works in reverse. Pollution of the environment not only harms people's health but also has a direct impact on the economy's capacity to expand. Given that climate change raises the risk of natural disasters and endangers the global ecosystem, it is associated with significant economic losses across a broad range of industries, including agriculture and tourism.¹⁹ It exacerbates the vulnerability of countries with inadequate infrastructure and limited financial and technological resources.²⁰ The consequences of climate change need fast action on the part of governments, businesses, and individuals.

Furthermore, it is projected that climate change would have a substantial effect on trade, especially regarding agricultural products. Many important industries depend on natural resources as crucial inputs for manufacturing, and practically all sectors need labor. Thus, poor environmental quality has an influence on economic development and well-being by reducing the quantity and quality of available resources and by decreasing labor productivity as a result of health

¹⁹ Holzer, "A Bilateral Approach to Imposing Carbon-Related Border Adjustments."

²⁰ Holzer.

implications.²¹ If nations are able to limit the effects of pollution on economic growth, this will have a favorable effect on the future economic development of the globe.

²¹ OECD, "Global Forum on Environment and Economic Growth - OECD."

Chapter 3: International Environmental Initiatives

3.1 Global Collaboration as the Optimal Solution to Climate Change

Climate change is a global issue that requires international cooperation to overcome it. While people and goods can be managed at borders, environmental problems are transboundary and cannot be contained within a single area. The environmental effectiveness of the regulating country's efforts is reduced if only some countries commit to abating their emissions while others do not.²² Recognizing the importance of a global effort, the United Nations has hosted a number of significant international dialogues on climate change. The United Nations Framework Convention on Climate Change (UNFCCC) is currently the largest multilateral institution dedicated to facilitating intergovernmental responses to the dangers of climate change.²³ The Convention has almost universal membership with 197 signatories and is the parent treaty of both the 1997 Kyoto Protocol and the more recent Paris Agreement.²⁴

As the first addendum to the UNFCCC, the Kyoto Protocol was the first major international effort to slow global climate change.²⁵ The protocol obligated its signatories to implement national policies to reduce greenhouse gas emissions by five percent below 1990 levels from 2008 to 2012.²⁶ The Kyoto Protocol's first commitment period began on January 1, 2008 and concluded on December 31, 2012.²⁷ All 36 countries that fully participated in the first commitment period complied with the Protocol, notwithstanding the fact that nine of them had to use flexibility mechanisms to finance emission reductions in other nations since their national emissions were a

²² Tang et al., "Carbon-Based Border Tax Adjustments and China's International Trade."

²³ "About the Secretariat | UNFCCC."

²⁴ "About the Secretariat | UNFCCC."

²⁵ "What Is the Kyoto Protocol? | UNFCCC."

²⁶ Society, "Kyoto Protocol Signed."

²⁷ Government of Canada, "A Climate Change Plan for the Purposes of the Kyoto Protocol Implementation Act -- May 2009."

little greater than their targets.²⁸ In 2012, 37 nations agreed to a second commitment period, known as the Doha Amendment to the Kyoto Protocol, to prolong the pact through the year 2020.²⁹ However, only 34 of the 37 nations with enforceable obligations ratified the agreement.³⁰

Being the first “multilateral” initiative in the battle against global warming, the Kyoto Protocol’s success in lowering greenhouse gas emissions was very limited. Since 1997, greenhouse gas emissions have increased as opposed to decreasing.³¹ The Kyoto Protocol’s limited success was mostly due to its lack of worldwide support. Although more than 150 countries signed the Kyoto Protocol in 1997, only about a quarter of the signatories had enrolled in binding targets. Countries, including Japan, New Zealand, and Russia, who had participated in the first round of commitments all chose not to take on new targets for the second commitment period. Aside from these three countries, the United States did not ratify its second commitment, and Canada withdrew from it in 2012.³²

The Kyoto Protocol was founded on the principle of shared but differentiated obligations, which implies that many developing nations were not compelled to limit their emissions.³³ This principle recognizes that individual countries have different capabilities in combating climate change due to different levels of economic development and, thus, places the obligation to reduce current emissions on developed countries based on their historical responsibility for the current levels of greenhouse gases in the atmosphere.³⁴ As a result of this principle, the Protocol’s effectiveness in decreasing emissions was significantly hampered by the absence of the world’s

²⁸ UNFCCC, “Adaptation Fund | UNFCCC.”

²⁹ Government of Canada, “A Climate Change Plan for the Purposes of the Kyoto Protocol Implementation Act -- May 2009.”

³⁰ Kuh, “The Law of Climate Change Mitigation.”

³¹ Society, “Kyoto Protocol Signed.”

³² Kuh, “The Law of Climate Change Mitigation.”

³³ Tang et al., “Carbon-Based Border Tax Adjustments and China’s International Trade.”

³⁴ “What Is the Kyoto Protocol? | UNFCCC.”

largest and fastest-growing countries, which accounted for more than 40 percent of global GHG emissions. In addition, this notion also stopped the United States from ratifying its second pledge.³⁵ Ultimately, the Kyoto Protocol embraced less than 40 percent of worldwide GHG emissions.³⁶

Rather than revising the Kyoto Protocol, the Paris Agreement was negotiated and signed in 2016 as an independent instrument under the UNFCCC.³⁷ The Paris Agreement, like the Kyoto Protocol, intended to limit human greenhouse gas emissions and prevent the average world temperature from increasing.³⁸ The difference is that under the Paris Agreement, both developing and developed countries were required to cut their greenhouse gas emissions.³⁹ Nevertheless, the Paris Agreement is built on the idea of nationally determined contributions (NDCs). With the introduction of NDCs, international discussions have evolved away from methods that may result in a worldwide carbon price and toward enabling country-level initiatives.⁴⁰

3.2 Challenges to Global Cooperation

Although there is universal agreement on the need to mitigate global warming, achieving an international agreement on practical methods to reduce greenhouse emissions is difficult since such an accord could have a significant impact on national interests.⁴¹ Both the Kyoto Protocol and the Paris Agreement demonstrate the impossibility of building an effective multinational carbon abatement policy.

³⁵ Hunt, “Kyoto Protocol Fails.”

³⁶ Holzer, “A Bilateral Approach to Imposing Carbon-Related Border Adjustments.”

³⁷ “What’s in the Paris Agreement on Climate Change?”

³⁸ “What’s in the Paris Agreement on Climate Change?”

³⁹ “What’s in the Paris Agreement on Climate Change?”

⁴⁰ Asselt and Bößner, “The Paris Agreement.”

⁴¹ Lim et al., “Pitfalls of the EU’s Carbon Border Adjustment Mechanism.”

With the economic rise of many developing countries, the diffusion of power among countries with widely divergent interests has led universal membership bodies such as the UNFCCC to become increasingly unresponsive. There are fundamental disparities between the needs and interests of industrialized and developing nations. While fully industrialized countries have transitioned to the production of high-end products and have the capacity to develop technologies that reduce GHG emissions without severely impacting productivity, many developing countries are still in the industrialization process. Figure 1 demonstrates the positive association between industrialization and carbon emissions. Thus, unless developed countries provide unprecedented financial assistance to developing countries to aid their climate mitigation efforts and enable technology transfers through significant changes in intellectual property rights and investment stimuli, developing countries are unlikely to adopt developed countries' carbon abatement strategy.⁴²

Besides, another major barrier that prevents countries from entering a unified carbon abatement policy is that countries would have to transfer some control over fiscal policy matters to supranational institutions if they agreed to a globally determined environmental objective. Since production is correlated with emissions, a strict emission target without the option to pay for more emissions might impact a country's production capacity in certain vital industries. Even if there is the option to pay for additional emissions, it would result in a greater fiscal burden for the nation. Especially for non-market economies that rely on nationally determined production caps, consenting to a supranational organization's established aim would limit their control over their domestic economy. As well, although China has a market economy, China's communist political system relies on keeping control over aspects of the economy in an attempt to uphold political

⁴² Holzer, "A Bilateral Approach to Imposing Carbon-Related Border Adjustments."

power.⁴³ As a result, while China is likely to support abatement measures based on nationally determined contributions, it is difficult to envision China agreeing to relinquish control over economic output to a supranational body.

Moreover, the social dilemma of public goods is also a major barrier that prevents a unified global approach to reducing GHG emissions.⁴⁴ Climate and air quality are nonexcludable and nonrival public goods that lead to the classic collective action problem in the form of the prisoner’s dilemma. The collective action dilemma occurs when multiple parties desire and would benefit from a public good, such as a cleaner environment, but their individual interests conflict with the common good, resulting in no actor taking individual action to further the common good.⁴⁵

Figure 2.⁴⁶ *Prisoner’s Dilemma Pay-off Metrix for Environmental Cooperation*

		Country A	
		Reduce Emissions	Don’t Reduce Emissions
Country B	Reduce Emissions	3, 3	1, 4
	Don’t Reduce Emissions	4, 1	2, 2

Figure 2 depicts the possible payoff of this social dilemma. Even though opting to lower emissions would be advantageous for both countries, due to the costs associated with doing so in terms of economic power and geopolitical competition, neither country A nor B has a dominating strategy for reducing emissions. Collaboration may be developed to address this issue, which will result in the optimal solution. Nonetheless, the collaboration's outcome is unstable because both sides have an incentive to free ride. Despite the ongoing and repetitive nature of pollution abatement initiatives reduces the likelihood of failure due to the tit-for-tat rationale, tit-for-tat

⁴³ Bown and Irwin, “Trump’s Assault on the Global Trading System.”

⁴⁴ Holzer, “A Bilateral Approach to Imposing Carbon-Related Border Adjustments.”

⁴⁵ Sterescu, “The Prisoner’s Dilemma in Environmental Politics.”

⁴⁶ Sterescu.

works only when defections are easily identified and penalized.⁴⁷ In the case of emissions reduction, it is very difficult to keep track of free riders and defectors in order to penalize them without inflicting long-term harm to multiple actors. In addition, given the power imbalances among nations, it is highly improbable that players could implement sanctions unilaterally or even multilaterally in the face of stronger powers such as the US or China if they deviated from an international environmental agreement.⁴⁸

Furthermore, Figure 2 depicts the payoffs in an ideal system in which all nations have the same interests and would be better off cooperating than not cooperating. In reality, this is not the case for all countries. As previously noted, the net benefit of participating in a single global emission scheme varies significantly between developing and developed countries. Some developing countries may benefit more from not cooperating than from cooperating. This is presumably the reason why the Kyoto Protocol was unable to persuade all states participating in the first commitment period to sign on for the second commitment period.⁴⁹

⁴⁷ Sterescu.

⁴⁸ Sterescu.

⁴⁹ Sterescu.

Chapter 4: Beyond Global Efforts

Given the urgency of reducing carbon emissions and the present challenges in reaching a global climate agreement that would bind all countries to decrease emissions, several advanced economies have begun to take unilateral action. Regional and national initiatives are part of the so-called bottom-up method, which is seen to be a valuable complement to the UNFCCC's top-down approach and is embraced by the Paris Agreement's concept of nationally determined contributions.⁵⁰ Currently, countries around the world are implementing a variety of bottom-up climate policy strategies to reduce carbon emissions: e.g., the EU emissions trading scheme (EU ETS), China's and India's voluntary emission reduction targets based on carbon intensity per unit of GDP, current mandatory ETSs in Switzerland and New Zealand, a voluntary ETS in Japan, and mandatory ETSs in Australia and South Korea.⁵¹

4.1 Market-based carbon pricing schemes

Although some governments have chosen to impose non-monetary emission quotas on enterprises and industries, the vast majority of countries have chosen to implement carbon pricing. There is a broad consensus that placing a price on emissions is the most effective way to achieve GHG reduction. From an environmental economics lens, carbon emissions are an example of an externality. Businesses that emit carbon impose a cost on the environment that is borne by everyone in the form of climate change. By putting a price on GHG emissions, the externality's cost is internalized, and the selling price is brought closer to its true societal cost. At present, the

⁵⁰ Asselt and Bößner, "The Paris Agreement."

⁵¹ Holzer, "A Bilateral Approach to Imposing Carbon-Related Border Adjustments."

two most prominent market-based carbon pricing schemes are emissions trading and taxing emissions.

4.1.1 Carbon Tax

Carbon tax in the form of a Pigouvian tax is one of the two most commonly used strategies in the carbon pricing approach.⁵² Pigouvian taxes are taxes that are implemented on goods and services that generate negative externalities. In a perfectly competitive industry with no tax and no externality, the demand and supply reach equilibrium at the output level where the price equals the cost of production. This equilibrium reflects the most efficient outcome with no deadweight loss. However, when there are externalities, the equilibrium that the market reaches without government interference does not reflect the most efficient outcome since the cost of production does not consider the negative externalities associated with producing the product. Consequently, the rationale of the carbon tax is to impose a tax - equivalent to the externality costs of production - on carbon-intensive goods, thereby raising the price of the goods for its consumers. Consumers whose willingness to pay for a good is less than its actual cost will stop consuming the good. As well, it is anticipated that the price of emissions would impact the technical choices of businesses and assist the transition to a low-carbon economy.⁵³ By introducing a carbon tax and altering consumer and business behaviours, the government not only reduces harmful carbon emissions but also assists the market in reaching its highest degree of efficiency.

There are two ways of implementing a carbon tax. They can be imposed on the use of fossil fuels during product manufacturing and computed based on the carbon footprint of combusted fossil fuels, or they can be imposed on carbon emissions generated during the manufacturing

⁵² Holzer.

⁵³ Holzer.

process (for instance, in the production of cement or steel).⁵⁴ The first type of carbon tax is easy to calculate and is becoming increasingly widespread. Due to the administrative difficulties associated with acquiring and confirming emissions data, the second kind is hardly used.⁵⁵

4.1.2 Emissions-Trading Schemes

In addition to a carbon tax, emissions trading is another policy approach to lowering greenhouse gas emissions through emissions pricing.⁵⁶ Cap-and-trade is the most prevalent type of ETS. This was the system that was used in the Kyoto Protocol, and it serves as the foundation for the current EU ETS.⁵⁷ The system operates by imposing a cap on emissions and enabling businesses to purchase and sell emissions permits within the cap based on their willingness to pay for emissions.⁵⁸ A cap on emissions turns emissions into a scarce resource, with the market price defined by the supply and demand for emission permits.⁵⁹

Aside from the cap-and-trade system, the baseline-and-credit system, also known as an intensity-based system, is another popular ETS. In this system, the government establishes an emissions intensity goal that corresponds to a specific percentage reduction in a company's emissions intensity below business-as-usual circumstances.⁶⁰ At the end of the compliance period, an independent agency verifies businesses' actual quantity of emissions generated. If the firm's emissions are lower than the predetermined baseline, the difference is turned into emissions credits, which the company may then sell on the carbon market. If the company's emissions exceed the

⁵⁴ WTO, "Trade and Climate Change: WTO-UNEP Report."

⁵⁵ WTO.

⁵⁶ Holzer, "A Bilateral Approach to Imposing Carbon-Related Border Adjustments."

⁵⁷ Shapiro, "Addressing the Risks of Climate Change: The Environmental Effectiveness and Economic Efficiency of Emissions Caps and Tradable Permits, Compared to Carbon Taxes."

⁵⁸ Shapiro.

⁵⁹ Holzer, "A Bilateral Approach to Imposing Carbon-Related Border Adjustments."

⁶⁰ Holzer.

specified baseline, it has to purchase emissions credits on the market to make up the difference and meet its emission reduction targets.

Both carbon taxes and emission trading schemes have their advantages and disadvantages. From an economic viewpoint, a carbon tax provides greater price stability than EMS. With a carbon tax, the price can be adjusted to cope with changing economic conditions through corrections in tax rates. As well, the revenues generated from a carbon tax can be redistributed to ensure equity and finance environmental programs.⁶¹ Nevertheless, a carbon tax also has drawbacks in comparison to ETS. Most crucially, it does not guarantee the achievement of a certain emissions goal. Moreover, like with any other tax, politicians may encounter resistance from the public, making its adoption difficult. As a result, lawmakers are more likely to embrace carbon trading systems than pollution taxes.⁶²

The benefit of the ETS is that, while it is difficult to establish a carbon tax that reduces emissions to the desired level, the ETS ensures that no excess emissions are released.⁶³ Nonetheless, although the ETS is more useful in reducing emissions to the desired level, its ability to reach market efficiency is undermined. Since ETS is a quantity-based approach to cutting emissions, it can be difficult to foresee the resulting market price of the emission allowance.⁶⁴ This may lead to considerable negative consequences for emission-intensive, trade-exposed companies and affect the profitability and employment of these firms. The intensity-based emissions trading system mitigates the economic effect of the cap-and-trade system, particularly for emission-

⁶¹ Kasterine and Vanzetti, “The Effectiveness, Efficiency and Equity of Market-Based and Voluntary Measures to Mitigate Greenhouse Gas Emissions from the Agri-Food Sector.”

⁶² Bacchus, “The Case for a WTO Climate Waiver.”

⁶³ Frank, “Pricing Carbon: A Carbon Tax or Cap-And-Trade?”

⁶⁴ Frank.

intensive, trade-exposed enterprises, but at the expense of a diminished capacity to decrease emissions.⁶⁵

4.2 Command-and-Control Methods for Reducing Emissions

In addition to the pricing of carbon, there are also non-monetary methods for reducing emissions. In fact, command-and-control systems predated market processes and are the most prevalent environmental policy tools in both industrialized and developing nations.⁶⁶ The primary distinction between a command-and-control system and a market-based mechanism is that traditional command-and-control measures mandate emission limitations without providing any tolerance for excess emissions.⁶⁷ The government mandates that a certain party adhere to a certain standard. The prescriptions might take several forms, including sectoral carbon-intensity requirements, obligatory carbon labeling systems, and restrictions on the sale of emissions-intensive items, which are essentially prohibitions.⁶⁸ This type of carbon abatement policy often extends to imports as well.⁶⁹ Nevertheless, command-and-control instruments are often less cost-effective than market-based mechanisms since companies cannot acquire more emissions permits or sell excess emissions allowances on the market and choose whether to invest in low-carbon technology.⁷⁰ As well, the successfulness of a command-and-control systems also depend on governments'

⁶⁵ Bramley, "Pembina Institute Comments on Environment Canada's Notice of Intent to Regulate Greenhouse Gas Emissions by Large Final Emitters."

⁶⁶ Holzer, "A Bilateral Approach to Imposing Carbon-Related Border Adjustments."

⁶⁷ Green, "Climate Change, Regulatory Policy and the WTO."

⁶⁸ Green.

⁶⁹ Green.

⁷⁰ Freestone and Streck, *Legal Aspects of Implementing the Kyoto Protocol Mechanisms*.

willingness to impose sanctions in cases of non-compliance, especially if it leads to job losses and political support.

As more nations have realized the divergence from efficiency due to negative externalities, market-based carbon pricing schemes have become the most widespread in the globe. Approximately 40 nations and more than 20 cities, states, and provinces have already adopted carbon pricing systems, with more likely in the future.⁷¹ Existing carbon pricing programs cover around 13 percent of global greenhouse gas emissions annually.⁷² With the ubiquity of carbon pricing regimes, many governments have begun exploring the efficacy of BCA as a viable policy tool for nations facing difficulties owing to inequalities in the stringency of carbon pricing policy.

⁷¹ World Bank, "Pricing Carbon."

⁷² World Bank.

Chapter 5: Overview of Border Carbon Adjustments

5.1 Concerns over Inconsistent Environmental Regulations

A universal carbon price to reduce emissions is unquestionably the best solution to combat climate change. The unified scheme would allow all countries to assume responsibility for emissions originating within their borders, putting producers from all countries on a level playing field. This polluter-pays paradigm would allow for effective resource allocation in the long run.

Nevertheless, over the history of climate negotiations, the principle of common but differentiated responsibility has taken primacy over other climate regime principles.⁷³ Today's global power shift from advanced to developing economies has given emerging economies a level of international discourse and influence never previously seen, making environmental cooperation more difficult. Although addressing climate change is a goal shared by both advanced and developing economies, the latter will not agree to policies that would jeopardize their ability to satisfy their current development needs in the name of providing benefits to rich nations to meet their desire for luxuries or to the benefit of future generations.⁷⁴

As a result, it is anticipated that for the foreseeable future, wealthy countries will continue to have more ambitious emission reduction goals than developing ones.⁷⁵ Even within the group of industrialized countries, major discrepancies in the stringency of climate change policy may exist due to different emission reduction costs or other national factors.⁷⁶ However, differing emission reduction goals have been recognized as the underlying cause of a number of significant issues. As national efforts to combat climate change intensifies, two interrelated issues, namely carbon

⁷³ Holzer, "A Bilateral Approach to Imposing Carbon-Related Border Adjustments."

⁷⁴ Aerni et al., "Climate Change and International Law: Exploring the Linkages between Human Rights, Environment, Trade and Investment."

⁷⁵ Rivers, "Impacts of Climate Policy on the Competitiveness of Canadian Industry."

⁷⁶ Rivers.

leakage and international competitiveness, have risen to the forefront of domestic discussions in many countries.⁷⁷

5.1.1 Carbon Leakage

Putting a price on carbon and internalizing its externality cost is the most cost-effective option for reducing GHG emissions. However, as products, capital, and energy flow between economies with varied climate policies, globalization and the rise of international trade can significantly reduce the efficiency of carbon pricing.⁷⁸ The existing global configuration of varied carbon prices with limited regional coverage enables international commerce to hinder the efficiency of carbon pricing regimes through risks of carbon leakage.⁷⁹ A study has found that the EU ETS is projected to cause significant carbon leakage in the cement industry due to higher imports and production relocation.⁸⁰ Carbon leakage occurs when the adoption of a climate policy, especially carbon pricing, in one jurisdiction results in an increase in emissions in other countries.⁸¹ For example, when companies facing strict carbon policies in one country move carbon-intensive production overseas to take advantage of lax standards, or when consumers shift their consumption from domestically produced carbon-intensive goods to cheaper import substitutes, resulting in more carbon-intensive production in other jurisdictions.⁸² Since the GHG emissions responsible for climate change are a worldwide pollutant whose impact is independent of the location of emissions, transferring manufacturing from one nation to another does not improve the environment.⁸³

⁷⁷ Van Asselt and Brewer, “Addressing Competitiveness and Leakage Concerns in Climate Policy.”

⁷⁸ Cosby et al., “Developing Guidance for Implementing Border Carbon Adjustments.”

⁷⁹ Cosby et al.

⁸⁰ Fischer and Fox, “Comparing Policies to Combat Emissions Leakage.”

⁸¹ Cosby et al., “Developing Guidance for Implementing Border Carbon Adjustments.”

⁸² European Commission, “Carbon Border Adjustment Mechanism.”

⁸³ Rivers, “Impacts of Climate Policy on the Competitiveness of Canadian Industry.”

5.1.2 National Competitiveness

There are now approximately 250 multilateral environmental accords in force across the globe addressing environmental concerns. Approximately twenty of them have provisions that potentially affect trade. For example, they may prohibit the import of certain products or items or empower governments to restrict trade under specific conditions.⁸⁴ In addition to the environmental issues associated with carbon leakage, which has the potential to undermine the effectiveness of carbon abatement measures, the competitiveness issue that arises from carbon leakage is also a major concern. The unilateral imposition of carbon limitations generates uneven competitive circumstances between local and international markets. This occurs because overseas producers in countries with little or lenient carbon laws do not pay carbon costs. These producers can then sell their products at a price advantage in the marketplaces of nations with carbon limitations and other countries. Similarly, domestic producers are required to shoulder the cost of emissions and are not compensated for these costs. As a result, producers from countries with emissions reduction schemes are at a competitive disadvantage compared to those from countries without such schemes.⁸⁵ In countries with no emissions restrictions, production costs are expected to be lower and items imported from these countries are likely to be less expensive than those produced domestically in countries with carbon pricing regimes. Disparities in abatement efforts may result in trade changes as firms relocate the production of carbon-intensive goods from countries with stricter regulations to nations with fewer regulations. This might lead to a decline

⁸⁴ WTO, “WTO | Environment - Negotiations: MEAs.”

⁸⁵ Van Asselt and Brewer, “Addressing Competitiveness and Leakage Concerns in Climate Policy.”

in employment and economic output in carbon-intensive industries in nations with more stringent regulations.⁸⁶

Carbon abatement policy's impact on carbon leakage and competitiveness is contingent on several factors relating to the specific characteristics of a sector and the design of the emissions reduction measures in place. Most importantly, it heavily depends on the carbon intensity of production, the sector's exposure to international trade, and its ability to pass on cost increases to consumers through price increases.⁸⁷ Some opponents of BCA contend that most carbon emissions result from the use of energy in production and that energy costs account for just 1–3% of the value of exports for most industries.⁸⁸ Thus, carbon leakage is only a concern for a very limited number of industries with high energy consumption, such as electricity generation, petroleum refining, steel, aluminum, pulp and paper, cement, glass, and industrial chemicals manufacture.⁸⁹ While those industries are likely to be affected by domestic carbon policies, these are also capital-intensive industries that, compared to labor-intensive industries like electronics and textiles, are less exposed to international trade and, subsequently, to competition from similar items produced in nations without carbon constraints.⁹⁰

However, quantitative studies that have been undertaken in recent years indicate otherwise. Studies have been conducted to measure the risk of carbon leakage for energy-intensive and trade-exposed (EITE) sectors, such as cement, aluminum, and steel and iron manufacturing have been analyzed using partial equilibrium (PE) models. In the absence of leakage mitigation methods, these studies predict leakage rates ranging between 8 and 90 percent.⁹¹ In the EU, EITE sector

⁸⁶ Rivers, "Impacts of Climate Policy on the Competitiveness of Canadian Industry."

⁸⁷ Holzer, "A Bilateral Approach to Imposing Carbon-Related Border Adjustments."

⁸⁸ Holzer.

⁸⁹ Holzer.

⁹⁰ Cosby et al., "Developing Guidance for Implementing Border Carbon Adjustments."

⁹¹ Chen, "Does a Regional Greenhouse Gas Policy Make Sense?"; Quirion and Demailly, "CO2 Abatement, Competitiveness and Leakage in the European Cement Industry under the EU ETS."

leakage rate projections are in the middle of the range, 20–73 percent for the cement industry and 30 and 50 percent, respectively, for the aluminum and steel industries.⁹² Policymakers are concerned about policy-induced carbon leakage because it can seriously undermine a country’s global climate efforts and increases the level of effort and expense required to achieve the intended abatement target. In addition, carbon leakage is anticipated to affect the economy substantially. The shift of local production to pollution havens would diminish GDP and employment in a nation with an established climate policy.⁹³

Moreover, carbon leakage is undeniably a political issue that prevents governments, particularly wealthy nations, from enacting significant steps to combat climate change. Concern for competitiveness distortions was the principal factor preventing the United States from ratifying the Kyoto Protocol's second commitment period.

5.2 Border Carbon Adjustments as a Strategy for Addressing Issues

As a means of resolving these two issues, BCAs have been the policy option that governments are now leaning towards implementing. In practice, BCAs consist of two parts: an import BCA and an export BCA. Import border adjustment impacts solely the relative prices of domestic and foreign goods in the home nation. On the other hand, export-relief policies alter the relative price of domestic goods in the rest of the world and discourage foreign countries from substituting away from domestic goods.

⁹² Quirion and Demailly, “CO₂ Abatement, Competitiveness and Leakage in the European Cement Industry under the EU ETS.”

⁹³ Holzer, “A Bilateral Approach to Imposing Carbon-Related Border Adjustments.”

The way BCAs operate is determined by the carbon policy they are combined with. When BCA is paired with a carbon tax, the purpose of the import tariff component is to impose a duty on imported goods that is equivalent to the carbon payment that would have been made if the goods had been produced domestically.⁹⁴ Import BCA functions similarly to traditional value-added taxes, which apply only to domestically consumed goods.⁹⁵ The export BCA, on the other hand, attempts to give relief to exported goods by rebating the equivalent domestic carbon payments so that local exporters are not disadvantaged in international markets in comparison to competitors from jurisdictions without carbon pricing. When instead paired with an emissions trading system (ETS), an import BCA would require foreign producers of emission-intensive commodities to purchase emission permits, depending on the quantity of carbon generated during production, thereby imposing a price comparable to that imposed on domestic producers.⁹⁶ The export BCA works similarly: it allows domestic producers to release emissions in excess of the domestic cap if the items are produced for export.

The BCA mechanism has been supported by many developed-country authorities as a potential instrument to mitigate the effect of carbon leakage. The justification for the BCA mechanism is that it would ensure that nations' climate ambitions are not jeopardized by manufacturing relocation to countries with less rigorous regulations by equalizing carbon prices for domestic and imported products.⁹⁷ BCA allows countries to use trade measures to level the playing field between items from overseas manufacturers that do not face a carbon price and those from domestic producers that do face a carbon price. As a result, implementing BCA guarantees

⁹⁴ Cosby et al., “Developing Guidance for Implementing Border Carbon Adjustments.”

⁹⁵ Cosby et al.

⁹⁶ Cosby et al.

⁹⁷ European Commission, “Carbon Border Adjustment Mechanism.”

that customers face consistent prices regardless of where the emission-intensive product was produced.⁹⁸ Extensive numerical analyses using multisector and multiregional models consistently reveal that BCA has a significant potential to reduce leakage rates, by around one third.⁹⁹

Aside from BCAs, there are additional unilateral ways to address the economic and environmental issues linked with carbon leakage. Other strategies include free permit allocations for vulnerable EITE sectors under the ETS framework and tax exemptions for EITE sectors under carbon tax regimes or output-based allocations and tax collection. Nevertheless, by transferring carbon costs to consumers, BCAs are often more cost-effective than other unilateral approaches.¹⁰⁰ EITE sectors are the most carbon-intensive industries. By allocating free permits or providing tax exemptions to EITE sectors, the vigor of the policy will be weakened. Therefore, both the free allocation and the output-based allocation would considerably impair the carbon policy's efficacy.

Since import BCA imposes commensurate prices on the emissions of foreign producers, which prevent domestic industries from losing international competitiveness. If import BCA were in existence, domestic businesses would have more incentive to participate in pollution reduction programs.¹⁰¹ As well, foreign manufacturers would also have an incentive to cut emissions: by reducing the carbon footprint of their goods, they would pay reduced border charges when exporting to a nation with carbon laws.¹⁰² In addition, BCA might also incentivize countries facing BCAs to build emission reduction schemes so that their firms are exempt from the BCAs.¹⁰³

⁹⁸ Cosby et al., “Developing Guidance for Implementing Border Carbon Adjustments.”

⁹⁹ Branger and Quirion, “EconPapers: Would Border Carbon Adjustments Prevent Carbon Leakage and Heavy Industry Competitiveness Losses? Insights from a Meta-Analysis of Recent Economic Studies.”

¹⁰⁰ Cosby et al., “Developing Guidance for Implementing Border Carbon Adjustments.”

¹⁰¹ Holzer, “A Bilateral Approach to Imposing Carbon-Related Border Adjustments.”

¹⁰² Holzer.

¹⁰³ Holzer.

Moreover, many argue that the threat of imposing BCA mechanisms, even if they are not implemented, can be useful. Fear of their usage alone would motivate countries to engage in and adhere to a system of greenhouse gas objectives. For example, the credible threat of instituting border restrictions has considerably contributed to the success of the Montreal Protocol.¹⁰⁴ The Montreal Protocol on Substances that Deplete the Ozone Layer is a major multinational environmental agreement that limits the manufacturing and use of over 100 synthetic compounds known as ozone depleting substances (ODS).¹⁰⁵ Although border restrictions were never established as part of the protocol, they were envisioned as quantitative limitations on trade in ODSs with non-parties to the convention. The inclusion of these measures in the protocol has aided in limiting ODS leakage and free riding while also incentivizing compliance.¹⁰⁶

5.3 Existing Proposals for Carbon Border Adjustments

In countries adopting or proposing to undertake emissions reduction programs, legislative proposals on BCA mechanisms are now being drafted. Despite its lack of adoption, a BCA has been explored in the context of greenhouse gas emissions trading programs in both the United States and the European Union. In early 2022, the European Council (heads of member states) established a consensus on the rule for the world's first BCA mechanism.¹⁰⁷

The EU's Carbon Pricing System (ETS) is the first international carbon trading scheme in the world. By establishing an emission cap and creating an ETS trading market, it restricts the amount of greenhouse gas emissions that industrial industries may produce. Currently, a predetermined number of free permits are provided to prevent carbon leakage, but this free

¹⁰⁴ Holzer.

¹⁰⁵ United Nations Environment Programme, "About Montreal Protocol."

¹⁰⁶ Holzer, "A Bilateral Approach to Imposing Carbon-Related Border Adjustments."

¹⁰⁷ European Commission, "Carbon Border Adjustment Mechanism."

allocation reduces the incentive for enterprises to invest in cleaner domestic and international production. As a remedy to this issue, a BCA mechanism, referred to as the Carbon Border Adjustment Mechanism (CBAM), will progressively be implemented to complement the ETS and end the free allocation of permits.¹⁰⁸ In March 2021, the European Parliament passed a resolution supporting the implementation of a WTO-compliant carbon border adjustment.¹⁰⁹ In this proposal, EU importers will purchase carbon credits equivalent to the carbon price that would have been paid had the items been manufactured in accordance with EU carbon pricing regulations. The price of the credits will be based on the average weekly auction price of EU ETS permits, expressed in euros per ton of CO₂ emitted. Individual importers will be required to register with national authorities, where they may get CBAM certifications.¹¹⁰ However, suppose a non-EU manufacturer can demonstrate that they have previously paid the price for the carbon used in the manufacturing of the imported products in a third country, then the relevant cost may be fully deducted from the EU importer.¹¹¹ In addition, the CBAM will exclude some third countries that participate in the EU's ETS or have an emission trading scheme connected to the EU's. Members of the European Economic Area (Iceland, Liechtenstein and Norway) and Switzerland fall under this category.¹¹²

The CBAM is intended to establish a comparable carbon price on goods produced or imported in the EU with the goals of creating consistent incentives for emissions reduction, limiting the risk of carbon leakage (CL) from the EU ETS, and encouraging the use of carbon

¹⁰⁸ European Commission.

¹⁰⁹ European Commission, "Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL Establishing a Carbon Border Adjustment Mechanism."

¹¹⁰ European Commission, "Carbon Border Adjustment Mechanism."

¹¹¹ European Commission, "Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL Establishing a Carbon Border Adjustment Mechanism."

¹¹² European Commission, "Carbon Border Adjustment Mechanism."

pricing as a policy measure to mitigate GHG emissions in other parts of the world. Therefore, the CBAM should concentrate on the industries that are at risk of carbon leakage.¹¹³ Following a rigorous examination, the European Commission identified 63 industries as vulnerable to carbon leakage to varying degrees. To make the BCA mechanism more manageable and to provide legal certainty and stability to businesses and other countries, it was determined that the CBAM would be phased in gradually and initially apply only to a limited number of high-risk carbon-leaking goods, including iron and steel, cement, fertilizer, aluminum, and electricity generation.¹¹⁴ In accordance with the most recent proposal for a revised ETS by the European Commission, the number of free permits for all sectors will decline over time so that the ETS can have the maximum effect on reaching its ambitious climate goals. Furthermore, it is anticipated that, starting in 2026, free allowances for the CBAM sectors will be gradually eliminated.¹¹⁵

Moreover, the EU's CBAM will involve a three-year transition period from 2023 to 2025. During this period, importers will be required to disclose emissions contained in their products without making a financial adjustment, allowing time for the ultimate system to be implemented.¹¹⁶ As mentioned, only the importation of cement, iron and steel, aluminum, fertilizers, and electricity will be subject to CBAM during the transition phase. The CBAM will apply to direct greenhouse gas emissions released while manufacturing covered items. Upon the conclusion of the transition phase, the Commission will assess the effectiveness of the CBAM and decide whether to expand its scope to include additional sectors susceptible to carbon leakage, including those further down

¹¹³ European Commission, "Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL Establishing a Carbon Border Adjustment Mechanism."

¹¹⁴ European Commission.

¹¹⁵ European Commission, "Carbon Border Adjustment Mechanism."

¹¹⁶ European Commission.

the value chain, and whether to include so-called "indirect" emissions, such as carbon emissions from the electricity used to produce the good.¹¹⁷

Other industrialized countries are investigating the prospect of BCAs. For instance, in June 2022, the White House introduced the Clean Competition Act in an effort to make American businesses more competitive on the global market and to combat major sources of greenhouse gas emissions that contribute to global warming by establishing a carbon border adjustment mechanism.¹¹⁸ Both Democrats and Republicans have expressed support for BCAs.¹¹⁹ A BCA system is already in use in California, which has an ETS in place, where an adjustment is applied to certain imports of electricity to prevent the relocation of energy production to dirtier facilities outside of the state.¹²⁰ The ministers of finance from the G20 also emphasized the need for stronger international cooperation over carbon pricing methods.¹²¹

5.4 Border Carbon Adjustments in Operation

Currently, proposed BCA mechanisms work under the same premise: they aim to impose charges on imported goods that are comparable to the costs incurred by home producers.¹²² However, the EU and US proposals employ divergent approaches in computing these import costs. In the EU, the import tax is tied to the dynamic price of carbon under the EU's ETS. Declarants will be registered in the CBAM system, and national authorities will be responsible for assessing and validating declarations, as well as selling importers CBAM certificates.¹²³ To import items covered

¹¹⁷ European Commission.

¹¹⁸ Sheldon Whitehouse, "Whitehouse and Colleagues Introduce Clean Competition Act to Boost Domestic Manufacturers and Tackle Climate Change | U.S. Senator Sheldon Whitehouse of Rhode Island."

¹¹⁹ Center for Climate and Energy Solutions, "Carbon Border Adjustments."

¹²⁰ European Commission, "Carbon Border Adjustment Mechanism."

¹²¹ European Commission.

¹²² Gruenig and Sutton, "Proposed Carbon Border Adjustments in the US and EU."

¹²³ European Commission, "Carbon Border Adjustment Mechanism."

by the CBAM into the EU, businesses must disclose the amount of goods and embedded emissions in those commodities brought into the EU the previous year. At the same time, prior to importation, businesses must relinquish the CBAM credits they had obtained from the government authorities.¹²⁴

On the other hand, the tax under the US plan is based on the cost of regulatory carbon compliance, which is a sort of "shadow pricing."¹²⁵ This shadow price is not the same for every company but varies depending on the selected compliance approach. Consequently, greater implementation costs for the US carbon border adjustment are projected. In comparison to the EU's CBAM, the US' abatement plan is less rigorous. Studies have found that the cost of complying with US climate law will be relatively low. Consequently, it means that the BCA under the US plan will be operationally difficult due to variable prices for each company, and that the less stringent abatement outcome would help less to addressing climate change.¹²⁶

In all proposals, national authorities will play a vital role in the operation of BCAs. Given that the mechanisms would require foreign exporters to supply information on embedded emissions for products subject to the BCAs, their effectiveness is contingent in part on the information provided by foreign exporters. Even when emissions statistics are accessible, decision-makers must evaluate the data's reliability.¹²⁷ The US government has long been aware of the challenges and potential threats associated with foreign data. Both the Food and Drug Administration and the Department of Commerce deploy investigators to international companies to assess foreign data.¹²⁸ Although these procedures involve costs, they might be extended to BCAs

¹²⁴ European Commission.

¹²⁵ Gruenig and Sutton, "Proposed Carbon Border Adjustments in the US and EU."

¹²⁶ Gruenig and Sutton.

¹²⁷ Gruenig and Sutton.

¹²⁸ Gruenig and Sutton.

to assure the mechanisms' success. The EU also recognizes the possibility of information being unavailable at the time of importing. In this instance, EU importers will be permitted to use default values to determine the number of certifications they must acquire. Importers will be able to demonstrate actual emissions through a reconciliation process and return the corresponding number of CBAM certificates.¹²⁹

Despite BCAs' shortcomings (see next chapter), their very existence is noteworthy. Two of the world's most important economies are on the verge of establishing a connection between climate mitigation and their share of the global market. The United States and the European Union account for one-third of global imports and are China's two major export markets.¹³⁰ Recognizing that trade flows should be more climate-friendly could initiate a reorientation of the global economy toward carbon neutrality.¹³¹

¹²⁹ European Commission, "Carbon Border Adjustment Mechanism."

¹³⁰ Gruenig and Sutton, "Proposed Carbon Border Adjustments in the US and EU."

¹³¹ Gruenig and Sutton.

Chapter 6: BCA Shortcomings

The design of a BCA is essential to its success, and governments must assess its benefits against its risks to determine the optimal tradeoff. Despite the aforementioned reasons supporting carbon-related border mechanisms, there is significant criticism about the use of these measures in climate policy. These initiatives are criticized based on their potential environmental, economic, legal, and political effects.

6.1 Environmental Limitations

Multiple studies evaluating the short and medium-term effects of the EU ETS concluded that carbon price differentials between countries would not result in competitive distortions or emissions leakage in 99.9 percent of economic activity.¹³² This means that while a number of domestic trade sectors, including iron and steel, cement, and paper and pulp, may benefit from this mechanism, its effects on other sectors would be rather limited.¹³³ As a result of these findings, the design of BCAs is now increasingly focused on identifying the sectors that would be primarily affected by competition and leakage issues.

Unless BCA programs are implemented on a plant-by-plant basis and include indirect emissions, it is unclear if they will level the CO₂ playing field enough to restore competitiveness and prevent leakage.¹³⁴ BCAs' environmental and economic success is strongly reliant on product and sector coverage, the inclusion of marginal climate policy costs, and application to both imports and exports.¹³⁵ Although the BCA was able to level the playing field for certain sectors, findings

¹³² Van Asselt and Brewer, "Addressing Competitiveness and Leakage Concerns in Climate Policy."

¹³³ Fischer and Fox, "Comparing Policies to Combat Emissions Leakage."

¹³⁴ Reinaud, "Trade, Competitiveness and Carbon Leakage: Challenges and Opportunities."

¹³⁵ Van Asselt and Brewer, "Addressing Competitiveness and Leakage Concerns in Climate Policy."

indicate that not all industries were able to level the playing field.¹³⁶ In some cases, the protection afforded by the BCA may not be sufficient to compensate for the rise in production costs brought about by the domestic carbon tax. As a result, the negative effect of carbon target imbalances on competitiveness has not been totally eliminated in all sectors. Based on a stimulation for the Canadian economy, this inadequate adjustment was found to occur in the "Chemical and Rubber Products Industry," where the policy has had a detrimental effect on production, notwithstanding the BCA.¹³⁷

Furthermore, there is a channel to carbon leakage that the BCA cannot address. The income channel recognizes that the cost of abatement measures and the change in relative prices resulting from the implementation of carbon pricing may have a significant effect on the terms of trade, which in turn influences consumption habits and the global income distribution.¹³⁸ For instance, if the price of carbon-intensive commodities increases in a controlled region, the demand for those goods and the inputs required for their manufacture would decrease. The drop in demand for manufacturing inputs would result in a fall in the input's global price, which could raise its demand in unregulated regions. Thus, changes in consumption habits might either increase or decrease the overall international emissions. On the other hand, proponents of BCA argue that similar indirect impacts on production may arise if changes in input demand in the regulated zone increase salaries and the cost of cleaner inputs, hence possibly reducing the nonregulated region's output and emissions.¹³⁹ Whether it increases or decreases global emissions, the impacts of the income channel are secondary and unlikely to counteract a substantial portion of the direct effects of the competition and production relocation channels.

¹³⁶ Dissou and Eyland, "Carbon Control Policies, Competitiveness, and Border Tax Adjustments."

¹³⁷ Dissou and Eyland.

¹³⁸ Cosby et al., "Developing Guidance for Implementing Border Carbon Adjustments."

¹³⁹ Cosby et al.

6.2 Economic Implications

The imposition of BCA represents a significant step back from the trade liberalization efforts of recent decades. Increasing trade barriers have a negative impact on the efficient allocation of global resources, damage local enterprises that depend on imported intermediate inputs, and harm domestic consumers.¹⁴⁰ Even if all countries implement a carbon border tax, further research indicates the global trade volume is anticipated to decline by 14 percent.¹⁴¹

Once the EU implements its CBAM, the economic risk to its trading partners will depend on factors such as its dependence on trade with the EU, its emission level of production, its ability to transition to greener production, and its systemic capacity to quantify the quantity of carbon emissions required by EU monitoring, reporting, and verification.¹⁴² As a result, the impact of the EU's CBAM would be disproportionately felt by emerging and advanced countries. Although the BCA mechanism is an attractive instrument for industrialized nations with climate concerns, it could lead to several pernicious repercussions for industrializing nations. Historically relying heavily on EU trade, African nations would experience a harsher shock.¹⁴³ This further demonstrates the advantages of a communal climate measure over the unilateral CBAM.

In addition, while wealthy countries have more capability to transition away to greener production, less-developed countries have less access to low-carbon funding and technology, delaying the energy transition, which might reduce their stability and competitiveness. The economic impact of BCA mechanisms on developing nations will depend on the number of countries that use BCAs and the scope of sectors in which they are implemented. It is projected

¹⁴⁰ Dissou and Eyland, “Carbon Control Policies, Competitiveness, and Border Tax Adjustments.”

¹⁴¹ Holzer, “A Bilateral Approach to Imposing Carbon-Related Border Adjustments.”

¹⁴² Lim et al., “Pitfalls of the EU’s Carbon Border Adjustment Mechanism.”

¹⁴³ Lim et al.

that if the United States and the European Union decide to apply carbon taxes on the carbon content of all imported goods, it would be analogous to an import tariff of over 20% for exports from China and India, resulting in export decreases of up to 20% for these nations.¹⁴⁴ Therefore, BCA mechanisms may exacerbate the disparity between industrialized and developing countries.¹⁴⁵

Furthermore, research indicates that leveling the playing field between local producers and their overseas counterparts by the imposition of a BCA could result in a higher welfare cost than in the absence of a BCA. Adopting a BCA raises welfare costs by at least 25 percent compared to the welfare loss caused by the unilateral domestic GHG reduction strategy.¹⁴⁶ This is primarily due to the increased cost of imported intermediate goods as a result of enforcing a carbon-related import fee.¹⁴⁷ As externality taxes are passed on to consumers in the form of higher product prices, the BCA would result in an increase in the overall price level. Similar to how a direct tax on salaries and savings/investment income distorts labor supply and capital accumulation, this decreases real household earnings and the real return on capital.

Nevertheless, there are potential strategies to mitigate the economic impact of BCAs. A well-designed BCA system could reduce a portion of the BCA's potentially harmful consequences. For example, externality tax revenues may be used to reduce broader tax distortions, thereby increasing economic efficiency.¹⁴⁸ Items produced by energy-intensive and trade-exposed industries are frequently employed as intermediary goods, leading to further rises in the overall price level. By recycling the externality tax revenues produced by the BCA and returning all proceeds

¹⁴⁴ Holzer, "A Bilateral Approach to Imposing Carbon-Related Border Adjustments."

¹⁴⁵ Lim et al., "Pitfalls of the EU's Carbon Border Adjustment Mechanism."

¹⁴⁶ Lim et al.

¹⁴⁷ Dissou and Eyland, "Carbon Control Policies, Competitiveness, and Border Tax Adjustments."

¹⁴⁸ Parry, "Green Tax Design in the Real (Second-Best) World."

domestically, the distortionary tax's economic impact will be minimized, as would the cost of compounding tax distortions in labor and capital markets.¹⁴⁹

6.3 Legal Challenges

The legal compatibility of BCAs with international trade rules is one of the fundamental concerns in the discussion surrounding the feasibility of its implementation. The problem is marked by a high degree of unpredictability and raises the concern for trade conflicts and retaliatory actions if these measures are implemented unilaterally. When the General Agreement on Tariffs and Trade (GATT) and subsequently the WTO were established, the multilateral body acknowledged the significance of environmental protection and dedicated itself to environmental consideration. However, at that time, there were no BCA proposals, and factors such as carbon leakage were not taken into account. As a result, the GATT lacks clearly specified principles dealing with BCA. While border adjustments for consumption taxes are typical international trade practices, WTO considers border adjustments for domestic measures relating to emissions to be special measures since they are not imposed on goods directly but rather on processes and production methods unrelated to goods.¹⁵⁰

The idiosyncrasies of emissions permit requirements under an ETS call into doubt the legitimacy of carbon-related border adjustments under WTO rules. Current BCA proposals incorporate a substantial consumption tax element. Article II, paragraph 2, subparagraph (a) of the GATT permits adjustments to be made at the border for indirect taxes on “similar” goods, but not for direct taxes, which are imposed on the sources of production in the country of origin.¹⁵¹ Taxes

¹⁴⁹ Parry, “Green Tax Design in the Real (Second-Best) World.”

¹⁵⁰ Holzer, “A Bilateral Approach to Imposing Carbon-Related Border Adjustments.”

¹⁵¹ Fischer and Fox, “Comparing Policies to Combat Emissions Leakage.”

on the emission of final goods are likely determined as direct taxes, but it gets more difficult to determine when looking at taxes on the emission of products utilized in the production process. Energy is a perfect example of a carbon-intensive good that is also a factor of production, making it difficult to determine whether it is categorized as a direct or indirect tax under WTO guidelines.

The adjustability of tariffs at the border between imports and exports is governed by distinct components of GATT legislation. Regarding export rebates, the Subsidies and Countervailing Measures (SCM) agreement formerly specified that taxes on production inputs are border-adjustable only when the components are physically incorporated into exported products. During the Uruguay Round, the category of adjustable taxes was broadened to permit export rebates for indirect taxes on goods and services if they were used in the manufacture of the exported product.¹⁵² In addition to physically incorporated inputs, the amended agreement allowed export rebates on energy, fuels, and oil employed in production.¹⁵³ Nevertheless, even with this adjustment, although a fuel tax now complies with the law since energy is a qualifying material input in the exported good, an environmental tax on noxious emissions would not be adjustable because pollution is a disincorporated material production. With regard to energy and GHG emissions regulations, it remains unclear if particular energy taxes are adjustable and, if so, whether changes may only be applied to exports and not imports.¹⁵⁴

For the import component of BCA, the WTO's Most Favoured Nation (MFN) rule is also a major potential source of contention. MFN treatment is one of the WTO's key pillars; it requires member countries to refrain from discriminatory trade practices and to offer comparable benefits from a given product to all similar items from other member nations.¹⁵⁵ Yet, due to the technical

¹⁵² Fischer and Fox.

¹⁵³ "WTO | Legal Texts - Agreement on Subsidies and Countervailing Measures."

¹⁵⁴ Fischer and Fox, "Comparing Policies to Combat Emissions Leakage."

¹⁵⁵ WTO, "WTO | Trade and Environment."

differences across exporters, the BCA tariffs will always be assessed differently based on the extent of each country's environmental regulations, their technological levels, the existence of an ETS, and other considerations.¹⁵⁶ Even if the carbon border tax is enforced uniformly, discrimination will likely occur in reality. Consequently, BCAs may violate the MFN principle as it relates to the exporting of similar goods by other countries.

Although certain GATT and WTO laws might be a substantial hurdle to the implementation of the BCA, there are also Articles in GATT that could assist in justifying border charges. Regarding the discriminatory rule, for instance, there are three general exceptions under Article XX - the general exceptions clause - that BCA may be able to utilize: “(b) necessary to protect human, animal or plant life or health; (d) necessary to secure compliance with laws or regulations which are not inconsistent with the provisions of this Agreement; (g) relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption.”¹⁵⁷ If a dispute arises, these three exemption requirements may be able to provide a legal basis for BCAs.

Currently, the majority of the restrictions that international trade agreements impose on market-based climate policy are speculative. To prevent future disagreements in the interpretation of WTO rules and to avoid conflict between trade and environmental rules, a number of modifications to WTO texts have been proposed. If all WTO members could agree on amendments, BCAs may be legally exempted from WTO laws. However, amending clauses in the WTO and GATT is very difficult, owing to the discordant political and economic interests of its members, and even if it is feasible, it will take a long time to complete.¹⁵⁸ But, even if certain measures are

¹⁵⁶ Lim et al., “Pitfalls of the EU’s Carbon Border Adjustment Mechanism.”

¹⁵⁷ WTO, “WTO | Environment - Issues 3,” 3.

¹⁵⁸ Lim et al., “Pitfalls of the EU’s Carbon Border Adjustment Mechanism.”

deemed unlawful under WTO law, future climate accords may still include them as long as parties to the agreement willingly waive their WTO rights.¹⁵⁹ It further emphasizes the significance of BCA design. The design will influence whether the measure will be broadly accepted and whether it is likely to be acceptable under international trade law. Although both the ETS and the carbon tax system utilize carbon pricing to drive pollution reduction, one is a tax, and the other is a regulation, and they would have distinct legal implications. Therefore, while GATT may hamper the adoption of some economically acceptable restrictions intended to prevent emissions leakage, certain design solutions may satisfy the legal test.

In contrast to the GATT 1947, which solely focused on trade barriers, WTO law now encompasses a broader range of services, intellectual property, investment, government procurement, and other regulatory areas. WTO adjudicative bodies have shown their commitment to public policy agendas and environmental considerations in a number of disputes. The US-Gasoline case, in which the US was found in violation of WTO regulations for discriminating against gasoline imports, is a good example. When interpreting the relationship between GATT non-discrimination rules under Article III:4¹²⁷ and environmental exceptions to them under Article XX(g), the Administrative Board determined that the phrase "relating to the conservation of exhaustible natural resources" may not be interpreted so broadly as to seriously undermine the purpose and object of Article III:4. Nor may Article III:4 be given such a wide interpretation as to deprive Article XX(g) and the aims and interests it represents.¹⁶⁰ This conclusion of the Advisory Board implies that the terms of GATT Article XX will be interpreted to guarantee that WTO members' rights to take steps to safeguard the environment are not illusory.¹⁶¹ Eventually, the

¹⁵⁹ Fischer and Fox, "Comparing Policies to Combat Emissions Leakage."

¹⁶⁰ WTO, "WTO | Dispute Settlement - the Disputes - DS2."

¹⁶¹ Holzer, "A Bilateral Approach to Imposing Carbon-Related Border Adjustments."

international community will need to strike a balance between the Rights and Obligations of nations under the WTO Agreement and their potential commitments under international climate agreements.

6.4 Potential Political Frictions

Several crucial political concerns must be considered when deciding whether or not to implement the BCA. Despite the fact that all nations have profited from trade liberalization over the past two decades, WTO members have suffered unequal gains. Middle-income countries such as China and India have seen a progressive increase in their part of global wealth growth, while advanced economies in the West, such as the United States, have seen their share decline from 75 percent to 65 percent.¹⁶² Some countries, notably the United States, perceive this shift in global wealth distribution as a challenge to their position of global supremacy. As a result, several Western countries, particularly the United States, have undergone a sudden populist backlash against trade liberalization during the past decade. And these anti-globalization sentiments have led to many protectionist policies and even trade wars. Although the BCA mechanism is an economically and environmentally justifiable tool used to internalize negative externalities and encourage international adoption of climate goals, it is also a protectionist policy. One of the objectives of the BCA mechanism is to safeguard home industries from foreign competition by imposing tariffs, import quotas, subsidies, or other restrictions on foreign competitors' imports. The international climate regime serves as a safety net against protectionism concealed beneath climate policy objectives.¹⁶³ Trade regulations limit the scope of unilateral actions that can be taken to address

¹⁶² Alden, "The Global Trading System."

¹⁶³ Holzer, "A Bilateral Approach to Imposing Carbon-Related Border Adjustments."

climate change. If the BCA is exempted from WTO regulations, there is fear that nations may use the BCA's environmental objectives to disguise their underlying aim of implementing protectionist policies.

Another political issue with the BCA is that it may impair international ties between countries and lead to trade disputes and other forms of retaliation. As stated in chapter 3, international climate cooperation has so far been based on the notion of shared but differentiated responsibility. This is also the reason why the Paris Agreement adopted nationally decided contributions as opposed to a uniform emission goal. The imposition of carbon-related border adjustment mechanisms by rich countries on imports from developing countries would likely be perceived as unjust because of divergent perspectives of how the burden of climate change mitigation expenses should be borne.¹⁶⁴ As a result, poor countries may turn to retaliatory measures or even sabotage international climate dialogues. Furthermore, developing countries may regard some components of the trade-related regulatory structure of countries that apply BCA to be in conflict with climate policy, such as subsidies, and seek to offset them with countervailing tariffs and other border measures.¹⁶⁵

In fact, developing countries, particularly China, have already complained that the EU's CBAM violates the WTO's principles of free trade and is unjust from several viewpoints.¹⁶⁶ If these issues are not overcome, the EU will not be able to avoid an international trade dispute.¹⁶⁷ Major exporters of energy goods would be incentivized to introduce retaliatory tariffs rather than accept the EU's unilateral tariffs since retaliatory tariffs could counteract the impact of the CBAM,

¹⁶⁴ Holzer.

¹⁶⁵ Holzer.

¹⁶⁶ Lim et al., "Pitfalls of the EU's Carbon Border Adjustment Mechanism."

¹⁶⁷ Lim et al.

therefore enhancing the price competitiveness of their energy goods.¹⁶⁸ If countries with large carbon emissions, like Russia, China, and India, engage in trade retaliation, the CBAM will become unfavorable for the EU.¹⁶⁹ Consequently, the EU has stated its desire to investigate strategies to accommodate developing nations' perspectives and align the CBAM with WTO principles prior to its implementation. The European Parliament also stated that it “supports the introduction of a CBAM, provided that it is compatible with WTO rules and EU free trade agreements (FTAs) by not being discriminatory or constituting a disguised restriction on international trade.”¹⁷⁰

Moreover, the US Trade Representative has also voiced concern that such measures may undermine trade relations and has promised to oppose any EU effort to put climate levies on US exports.¹⁷¹ In addition to the explicit instability that trade retaliation can cause, it also has implicit consequences on the reconfiguration and configuration of global supply chains and reduces trade flows. As a result, the WTO's authority will ultimately decline due to its limited role in resolving trade disputes.¹⁷² In the worst-case scenario, retaliatory actions would escalate into a full-fledged trade war. Hence, in order for CBAM to be implemented effectively, a number of technical, legal, and, most importantly, political hurdles must be surmounted.

6.5 Other Operational challenges

While environmental, economic, legal, and political impediments must be considered when deciding whether to embrace the BCA mechanism and its design, the implementation stage presents operational challenges. First, it will be difficult to measure foreign emissions. Some

¹⁶⁸ Lim et al.

¹⁶⁹ Lim et al.

¹⁷⁰ Lim et al.

¹⁷¹ Fischer and Fox, “Comparing Policies to Combat Emissions Leakage.”

¹⁷² Lim et al., “Pitfalls of the EU’s Carbon Border Adjustment Mechanism.”

studies have found that the primary goods such as steel, cement, and paper that would most likely be subject to border adjustment measures would only account for a small portion of the emissions embodied in imports, whereas calculating the emissions embodied in final goods such as electronic appliances and automobiles is a very complicated and onerous process.¹⁷³

In addition, the prevalence of global value chains further complicates this process. Over the past three decades, production systems have become increasingly fragmented. As the fragmentation of production across national borders becomes an increasingly essential aspect of the global economy, not only the size and composition of carbon footprints but also the number of borders a product crosses along its supply chain is relevant for determining BCA.¹⁷⁴ Due to the fact that goods are frequently assembled from components coming from different countries, quantifying the emissions emitted during the production of goods would necessitate the use of complex methods. The country that adopts the BCA could levy carbon taxes on foreign emissions embedded in imported commodities every time they cross its national border. Thus, a rise in border crossings may lead to a greater proportion of indirect tariffs and significant multiple taxation concerns.¹⁷⁵ As the number of countries adopting a BCA mechanism rises, the issue of multiple taxations might grow more severe. The number of borders crossed by a manufacturing chain has an impact on the carbon emissions accumulated in the final product. A BCA can be established efficiently only when the carbon footprint of a specific product can be reliably determined and the necessary data can be shared internationally.¹⁷⁶

¹⁷³ Reinaud, "Trade, Competitiveness and Carbon Leakage: Challenges and Opportunities."

¹⁷⁴ Zhang, Zhu, and Hewings, "The Effects of Border-Crossing Frequencies Associated with Carbon Footprints on Border Carbon Adjustments."

¹⁷⁵ Zhang, Zhu, and Hewings.

¹⁷⁶ Lim et al., "Pitfalls of the EU's Carbon Border Adjustment Mechanism."

Moreover, the difficulty in precisely estimating the amount of BCA for each commodity in each nation might give rise to illegal circumventions, which is another possible operational issue of the BCA mechanism. Many scholars have voiced concern that the effectiveness of a BCA may be hampered by circumvention behaviors of affected enterprises and governments.¹⁷⁷ For instance, businesses in BCA-targeted countries may attempt to channel their goods to countries that are not particularly targeted for BCA prior to exporting them to their destination market. This gives them the opportunity to either evade BCA altogether or pay a lesser amount. The likelihood of circumvention could greatly compromise the effectiveness of the BCA and erode the government's legitimacy and authority.

¹⁷⁷ Van Asselt and Brewer, "Addressing Competitiveness and Leakage Concerns in Climate Policy."

Chapter 7: BCA in Canada

Canada is a trade-dependent, small, open economy that assumes world import and export prices. In recent years, to avert the worst impacts of climate change, the Canadian government has proposed a number of policies devoted to reducing carbon emissions. The Canadian Net-Zero Emissions Accountability Act, which was signed into law on June 29, 2021, codifies Canada's promise to achieve net-zero emissions by 2050.¹⁷⁸ The recent Emissions Reduction Plan outlines how Canada will complete its expanded Paris Agreement objective of reducing emissions by 40 to 45 percent below 2005 levels by 2030.¹⁷⁹ In addition, from 2019, the federal government has implemented a coordinated national carbon pricing system in which emissions of carbon dioxide equivalent (CO₂e) are charged at \$20 per ton.¹⁸⁰ This criterion became more stringent on April 1, 2022, when the price per ton of CO₂e increased from \$20 to \$50 throughout the country.¹⁸¹ Furthermore, Canada currently has a federal Output Based Pricing System (OBPS) in place to ensure a price incentive for industrial emitters to reduce their greenhouse gas emissions and spur innovation while maintaining competitiveness and protecting against carbon leakage. Under the OBPS, covered facilities are obligated to pay the federal government at the specified rate for excess GHG emissions that exceed the facility's yearly emissions limit.¹⁸²

¹⁷⁸ Government of Canada, “Net-Zero Emissions by 2050 - Canada.Ca.”

¹⁷⁹ Government of Canada.

¹⁸⁰ Ministry of Environment and Climate Change Strategy, “British Columbia’s Carbon Tax - Province of British Columbia.”

¹⁸¹ Ministry of Environment and Climate Change Strategy.

¹⁸² Environment and Climate Change, “Output-Based Pricing System.”

7.1 The Value of BCA in Canada

As Canada continues to prioritize carbon abatement and its main economic partners (EU and US) turn to BCA mechanisms, the federal government is now seriously examining the possibility of adopting a BCA mechanism as part of its climate change policy toolkit. Without a coordinated international emission target, there will inevitably be differences in method and pace of implementation across nations. Given this situation, the Canadian government has recognized the BCA as a potential policy instrument to address disparities in the stringency of climate policies in a nationally coordinated manner to achieve results in reducing GHG emissions while mitigating pressures on international trade without unintentionally undermining Canada's global competitiveness. Even before the Canadian federal government began enacting strong measures to regulate GHG emissions, some scholars advocated adopting BCAs once stringent environmental rules were implemented.¹⁸³

As seen in previous chapters, BCA is primarily used as an instrument to mitigate the economic and environmental effects of carbon leakage. In order to determine if a BCA mechanism is appropriate for Canada, it is necessary to first assess the extent to which Canada is damaged by the economic and environmental effects of carbon leakage. Canada is a very trade-dependent country, with its trade to GDP ratio at 60 percent in 2020, in spite of a fall due to the pandemic's negative effect on the world economy.¹⁸⁴ Although Canada has a small economy, its reliance on international commerce exacerbates carbon leakage issues. Figure 3 shows the result of a prior study that measured the leakage potential for Canada.¹⁸⁵ The study performed the analysis on seven emission-intensive sectors: electricity (ELE); refined petroleum products (OIL); chemicals (CRP);

¹⁸³ Dissou and Eyland, "Carbon Control Policies, Competitiveness, and Border Tax Adjustments."

¹⁸⁴ Macrotrends, "Canada Trade to GDP Ratio 1961-2022," 1961–2022.

¹⁸⁵ Fischer and Fox, "Comparing Policies to Combat Emissions Leakage."

nonmetallic minerals (NMM), which include some ceramic production; pulp, paper, and print (PPP); iron and steel (I_S); and nonferrous metals (NFM), which include aluminum and copper smelting.¹⁸⁶ As a consequence of inconsistencies in carbon abatement regulations internationally, these industries are likely to encounter competitive challenges. While the electricity industry's sensitivity to carbon leakage concerns is modest, with export share of domestic production at only 5 percent and import share of domestic consumption at only 4 percent, the chemical and nonferrous metals sectors are heavily exposed to leakage concerns, with export share of domestic production at 46 percent and import share of domestic consumption at 51 percent for chemicals and 71 percent and 51 percent for nonferrous metals.¹⁸⁷

Figure 3.¹⁸⁸ Trade shares and relative emissions intensities in Canada

	ELE (%)	OIL (%)	CRP (%)	NMM (%)	PPP (%)	I_S (%)	NFM (%)
<i>Canada</i>							
Export share of home production	5	14	46	18	41	26	71
Import share of home consumption	4	10	51	27	22	34	51
Foreign Emissions/ Domestic	196	118	168	190	78	108	128

These results justify the concern that Canadian economy's most energy- and trade-intensive sectors may become somewhat less competitive compared to foreign businesses if a high carbon price in Canada is introduced. Concerns about these consequences and the resulting job losses might undermine support for carbon pricing in Canada.¹⁸⁹ Despite the fact that only a small number of sectors are vulnerable to the potential dangers of carbon leakage, the federal government should ensure that all Canadians are protected from any type of injustice and have a level playing field, as any deterioration in competitiveness could cause a cascade of economic effects that could even harm the country's international standing. Moreover, many of the industries potentially

¹⁸⁶ Fischer and Fox.

¹⁸⁷ Fischer and Fox.

¹⁸⁸ Fischer and Fox.

¹⁸⁹ Rivers, "Impacts of Climate Policy on the Competitiveness of Canadian Industry."

harmful by carbon leakage produce necessities such as electricity, steels and copper. This implies that carbon leakage not only jeopardizes the survival of enterprises in these sectors and undermines climate efforts but may also result in a loss of domestic production capacity for these essential goods. It is essential for a country to have its own industrial capability, particularly for Canada, which has a powerful neighbour. Without a robust industrial infrastructure, the nation will be susceptible to crises and conflicts.

Now that it has been identified that carbon leakage and its associated loss of competitiveness is a concern for Canada, the next step is to determine whether BCA is the optimal tool for addressing these issues. Other than the BCA, the other policy choice often considered as an alternative to the BCA is the Output Based Rebating (OBR) system. While a BCA would focus on imports and exports, an OBR would compensate vulnerable domestic industries based on their production.¹⁹⁰ Hence, in addition to paying a tax on the carbon they generate, domestic manufacturers of EITE goods would get a payment for each unit of output.¹⁹¹

Canada is currently implementing an OBR on emission permits to avoid competitiveness losses without violating international trade regulations. However, many empirical studies have argued that OBR may not be the most efficient approach.¹⁹² The OBR reduces the carbon leakages issue by preventing a substantial portion of the lost productivity, which is often linked with reduced conservation incentives. The OBR system may circumvent some of the most severe legal obstacles of BCAs since its scope is focused on domestic productions. However, the system mimics free allocations of emissions permits, so reducing the government's capacity to cut GHG emissions and

¹⁹⁰ Kaufman, King, and Marsters, "Output-Based Rebates."

¹⁹¹ Fischer and Fox, "Comparing Policies to Combat Emissions Leakage."

¹⁹² Rivers, "Impacts of Climate Policy on the Competitiveness of Canadian Industry"; Fischer and Fox, "Comparing Policies to Combat Emissions Leakage"; Dissou and Eyland, "Carbon Control Policies, Competitiveness, and Border Tax Adjustments."

reach its carbon neutrality objective.¹⁹³ A consistent finding across all nations is that OBR is counterproductive for creating incremental emission reductions in the refining sectors.¹⁹⁴ In this regard, BCAs are the most effective means of enhancing net reductions in these industries while achieving the primary goal of reducing emissions. Furthermore, the EU and US are Canada's largest trade partners and they are both planning the implementation of a BCA mechanism, which means that it might be in Canada's best interest to align its trade and environment policies with those of its closest economic partners in order to avoid trade barriers and administrative hurdles.

7.2 Recommendations

Comparing solely the benefits of BCA with OBR, it is evident that BCA is the superior policy tool for Canada. However, when considering whether to implement such a policy, it is essential to also factor in the limitations of BCA. In the end, the policy decision is a political one that involves weighing these losses and advantages.¹⁹⁵ There are also tons of obstacles to implementing a BCA in Canada. Essentially, all concerns mentioned in Chapter 6 apply to Canada if the country adopts this mechanism. Environmentally, if Canada implements a BCA with a limited scope of applicability, the detrimental impact of carbon target mismatches on competitiveness would be significantly mitigated but would not be eradicated. Economically, even though BCA is a justifiable approach, it acts as a trade barrier that may have a detrimental influence on Canadian businesses that rely on imported intermediate inputs, and harm Canadian consumers.¹⁹⁶ From a legal and political standpoint, a BCA in Canada may spark trade disputes and issues with trade partners under international trade agreements and may potentially result in retaliatory tariffs from

¹⁹³ Kaufman, King, and Marsters, "Output-Based Rebates."

¹⁹⁴ Fischer and Fox, "Comparing Policies to Combat Emissions Leakage."

¹⁹⁵ Rivers, "Impacts of Climate Policy on the Competitiveness of Canadian Industry."

¹⁹⁶ Dissou and Eyland, "Carbon Control Policies, Competitiveness, and Border Tax Adjustments."

trade partners. As a country that is strongly reliant on international trade, operational impediments would also be a substantial barrier for Canada. Estimating the emissions associated with all imports and exports may be a challenging and time-consuming task. Nonetheless, as shown in Chapter 6, the majority of the BCA's deficiencies can be mitigated with a well-designed policy.

While the idea of BCA is simple and intuitively attractive, its design and execution are rather challenging. Specifically, a policymaker drafting BCA provisions must make numerous complex regulatory decisions, such as the BCA's scope of applicability, the methodology for assessing the carbon content of products, the type and price of the adjustment, scenarios requiring modification, and how the resulting revenues will be utilized.¹⁹⁷ The BCA's effectiveness is affected by each of these choices because of the economic, environmental, technical, legal, and political aspects each entail.

Canada currently has a well-developed and functioning antidumping and countervailing¹⁹⁸ program to safeguard domestic producers from unfairly subsidized international competition.¹⁹⁹ Although the problem of competitiveness caused by varying levels of carbon abatement efforts does not come under the ambit of unfair foreign subsidies, the concept is comparable. Climate change is a global concern. For nations with a less stringent carbon abatement price mechanism, it is analogous to having an unjustified subsidy to carbon embedded goods. Thus, when designing the import-BCA, the government could opt to adopt a similar strategy.

For the import-BCA, a fair determination of the BCA's scope of applicability might be challenging. Instead of applying BCA to specific industries, the government may explore imitating

¹⁹⁷ Cosbey et al., "Developing Guidance for Implementing Border Carbon Adjustments."

¹⁹⁸ Dumping occurs when producers export products to another country at a price below the normal market price, typically as a result of internationally unjustifiable subsidies, causing harm to the destination country. Anti-dumping and countervailing duties are tariffs on imported goods that are intended to offset exporting country's unfair subsidies.

¹⁹⁹ Government of Canada, "What's New - Anti-Dumping and Countervailing."

the antidumping and countervailing program, initiating investigations, and implementing BCA on a case-by-case basis by complaints filed by domestic industries. A set of eligibility requirements for filing a complaint could be developed. Suppose certain domestic sectors think they are facing unfair competition as a consequence of carbon leakage and meet the qualifications for filing a complaint. In that case, they could file a complaint in which the Canada Border Services Agency would initiate an investigation and apply a BCA. The case-by-case application method with defined eligibility for application reduces the number of cases requiring review and pass a portion of the obligation for proof to the exporter, so relieving the government of some operational strain.

In terms of the export aspect of the BCA, there are also existing international trade programs in Canada that could be leveraged to reduce the operational hurdle and administrative cost of implementing a BCA. Canada presently has in place a Duty Drawback Program. The Canadian Duty Drawback Program intends to promote the competitiveness of domestic businesses by allowing importers, exporters, processors, owners, and producers of goods that were subject to duties at the time of importation and have since been exported from Canada to file a claim for a refund of the duties paid on the imported goods.²⁰⁰ Although the Duty Drawback Program is meant to refund import duty, it could theoretically be modified to incorporate a domestic carbon tax drawback scheme. If the exporter can demonstrate that the items they are exporting were subject to domestic carbon pricing, they are eligible for a refund of the carbon price they paid. Again, this program would operate on a case-by-case basis upon domestic businesses' application. Given Canada's expected pace of rapid population growth, economic expansion, and increase in energy exports, high carbon pricing would be necessary to achieve Canada's ambitious climate targets.²⁰¹ Through leveraging existing trade programs, the country could significantly reduce the increase in

²⁰⁰ Department of Finance Canada, "Duty Drawback Application Process."

²⁰¹ Rivers, "Impacts of Climate Policy on the Competitiveness of Canadian Industry."

operational burden at the border caused by BCA and fulfill its goal of protecting domestic producers from carbon leakage.

In the current international climate of escalating anti-globalization attitudes, trade retaliation against any border adjustments is quite likely. Before implementation, the Canadian government should engage in extensive dialogue with the international community. If the BCA would inevitably have a substantial effect on developing countries, the government could consider offering trade partners a progressive implementation to provide trade partners time to adjust. Ultimately, a well-designed BCA mechanism could allow Canada to unilaterally implement a rigorous climate policy with minimal impact on the international competitiveness of key emission-intensive industries.²⁰²

²⁰² Rivers.

Chapter 8: Conclusion

In an ideal world, implementing carbon price globally would avoid the leakage issues associated with climate policy. However, an international approach to developing a uniform environmental policy is impractical in the contemporary world due to the diffusion of power among countries with widely divergent interests, and the classic free rider problem of public goods. In the absence of a concerted global effort, countries' uneven and indigenous carbon dioxide reductions have the potential to result in a variety of carbon leakage problems.

From the perspective of reducing global GHG emissions, carbon leakage impedes the potential of carbon pricing regimes to reduce carbon emissions. On the other hand, in a world that is becoming increasingly linked, the worry that unilateral actions may harm the competitiveness of national businesses has also impeded the implementation of broad, rigorous environmental rules. The unilateral application of carbon restrictions creates disparate competitive conditions across domestic and foreign markets. As a result, manufacturers from a country with an emissions reduction program are at a competitive disadvantage compared to those from countries without such rules.

In this regard, the possibility of instituting compensatory measures at the border, namely the BCA, has garnered considerable interest. This major research paper conducts a thorough examination of the BCA, assessing both its potential merits and drawbacks. In the absence of a global carbon abatement system, this paper concludes that, despite BCAs' environmental and economic limitations as well as legal, political, and circumvention concerns, they could be the ideal solution for countries with stringent carbon emission abatement targets.

Nevertheless, the success and effectiveness of a BCA system are strictly conditional on its design. The BCA is a highly contentious issue in the international community. While many

industrialized economies are more receptive to this policy instrument, less developed countries that rely significantly on emission-intensive industries are opposed to it. This divergence presents numerous obstacles for countries attempting to implement a BCA. Therefore, the BCA mechanism needs to be implemented with careful consideration and appropriate design. This paper has suggested that border adjustment policies' environmental and economic effectiveness, legal acceptability, and political viability all depend on a BCA's particular design. All fundamental weaknesses of the BCA could be removed or mitigated if it is well-designed. On the other hand, if it is not correctly built, it can result in a variety of problems and, therefore, fail to address the issue of carbon leakage while posing greater political and legal ramifications.

The Canada case study points out that the value of each BCA design choice fluctuates based on the economic and political climate of a country and its existing international trade infrastructure. Thus, there is no universal design that fits all countries. The design choice for a BCA should be based on an overarching evaluation of each country's particular situations and variables. A well-designed BCA system should allow countries to independently implement strict climate policies while maintaining their economy's international competitiveness.

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