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# Climate Change, Trade and Emissions Leakage: Trade Measures and Climate Agreements

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# Abstract

Climate change is a serious threat to all nations. In response to this global commons problem, nations have come together to establish a multilateral climate change agreement with the goal of mitigating climate change and achieving long-term global GHG reductions. One important and growing issue that the current international climate change regime tragically does not address is that of emissions leakage, or the increase in emissions outside of a region as a direct result of a policy to cap or limit to emission within the region.

Emissions leakage is an essential issue in international efforts to combat climate change. If it remains unaddressed, it will continue to offset the emissions reduction efforts of countries with mitigation policies, eroding the effectiveness and credibility of both domestic climate change policy and international climate change agreements. This paper argues that despite an unfortunate lack of focus on the emissions leakage issue in international climate negotiations, it is essential and possible to address it and ensure a more effective international climate change agreement.

There are several policy options, of varying feasibility, which could be implemented to better mitigate emissions leakage and achieve global emissions reductions. Such options include an international climate change agreement to cap the emissions of all states, as well as, and perhaps more realistically, specific trade measures that could be incorporated into an international climate change agreement.

These measures clearly have the potential to violate international trade law, but as this paper demonstrates, if cautiously designed and applied, they could be compatible with WTO, significantly reduce trade-related emissions, mitigating climate change and emissions leakage, while simultaneously incentivizing adherence to and enforcement of a more effective international climate change agreement.

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**The Sustainable Development Diplomacy and Governance Program (SDDG)** focuses its research on the processes of creating policies and on how effectively alternative governance systems and policies can create sustainable development solutions. Negotiations over global and transboundary issues for the most part are locked into traditional models of diplomacy. Pioneering a new diplomacy of environment and resource policy will require new approaches based upon mutual gains principles of negotiation, stakeholder participation, the engagement of multiple institutions and coordination of multiple treaties and actions.

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## Acronyms

BAT	Best Available Technology
CBDR	Common But Differentiated Responsibilities
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COP	Conference of the Parties
CO <sub>2</sub>	Carbon Dioxide
CGE	Computable General Equilibrium
GATT	General Agreement on Tariffs and Trade
Gt	Gigatonnes
GTAP	Global Trade Analysis Project
GHG	Greenhouse Gas
IPCC	Intergovernmental Panel on Climate Change
MEA	Multilateral Environmental Agreement
MFN	Most Favored Nation
ODS	Ozone-Depleting Substances
PMP	Predominant Method of Production
PPM	Process and Production Measure
SCM	Subsidies and Countervailing Measures
TBT	Technical Barriers to Trade
UNFCCC	United Nations Framework Convention on Climate Change
WTO	World Trade Organization

# Introduction

Climate change is a complex, multi-dimensional challenge and the most formidable global environmental problem threatening our lives today. Climate change is a global commons problem, meaning the international community must address this challenge collectively and must achieve real greenhouse gas (GHG) emissions reduction in the long-term. However, in reality, the global community has struggled to establish an effective multilateral climate change agreement.

One of the challenges to efficacy is the phenomenon of carbon leakage (i.e., emissions leakage). Carbon leakage is narrowly understood as the increase in emissions in countries with no carbon mitigation policy associated with tightened carbon mitigation those countries with carbon mitigation policy. It is often said that the more stringent mitigation actions resulting from mitigation commitments, under domestic policy or international climate change agreements, undermine the price competitiveness of domestic industries and hence lead inevitably to carbon leakage. Leakage can also be driven by falling energy-prices due to more stringent mitigation policies. This research defines carbon leakage as carbon emissions intended to be limited by mitigation commitments but that are in reality continuing through various channels.

Recently, a number of stakeholders have paid attention to the leakage issue, especially in countries where they have, or have tried to, introduce domestic climate mitigation policies. Despite concerns, there does not yet exist a clear definition of carbon leakage, nor is there evidence of whether or not it actually occurs, and we still need to determine how significant such a phenomenon might be to global GHG emissions. Although there have been many attempts to estimate the degree of emissions leakage and its impacts on the economy, these data have not been systematically or comprehensively analyzed. This paper analyses the growing phenomenon of carbon leakage, for which it puts forward a new, broader definition, presents currently available data, and proposes international climate change agreements that may help better mitigate emissions leakage in the future.

Trade-related emissions substantially affect global GHG emissions. Any meaningful international climate change agreement must take into consideration the effects of emissions leakage through mitigation policies in order to be effective. The challenge is that trade measures incorporated into international climate agreements might conflict with World Trade Organization (WTO) law. However, as this paper demonstrates, carefully crafted measures with internationally collaborative actions can be compatible with such laws. This research provides a careful review of the relevant WTO trade laws and how best to ensure an international climate agreement complies with these laws.

This paper comprises five sections. Section 1 gives a brief summary of the status of climate change, the history and future of international climate negotiations and agreements, remarkable attributes of climate change issues, and intersections of climate change and international trade. Section 2 describes the various definitions



of carbon leakage and details the impacts of carbon leakage on the international and domestic climate change regimes. Based on the analyses, this research proposes an alternative definition of carbon leakage (emissions leakage). Section 3 discusses international climate change frameworks that address the emissions leakage issue without trade measures. Section 4 discusses trade measures integrated into international climate change agreements that address the emissions leakage issue. It lists relevant trade measures and analyzes their feasibility and effectiveness. Then, it focuses on compatibility of these measures with WTO law. Lastly, Section 5 explores possible designs of international climate change agreements. It also analyzes the role of trade measures in the enforcement of international climate agreements. The paper concludes by proposing key elements that must be included in the establishment of an international climate agreement if it is to be effective.

# Section 1: Climate Change and International Trade

## 1.1 INTERNATIONAL CLIMATE CHANGE AGREEMENTS AND NEGOTIATIONS

Aiming to stabilize GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, the international community adopted the United Nations Framework Convention on Climate Change (UNFCCC) at the United Nations Conference on Environment and Development in 1992. Subsequently, parties to the UNFCCC adopted the Kyoto Protocol in 1997, which eventually entered into force in 2005. The Kyoto Protocol is currently the only international climate change agreement on mitigation that obliges self-nominated parties to limit GHG emissions below their targets between 2008 and 2012. Although it is a first crucial step towards addressing climate change, it has several critical problems. The emissions reduction under the Protocol is modest at best and lacks any long-term emissions reduction solution. Furthermore, the enforcement mechanism of the treaty is weak and cannot achieve meaningful global emissions reduction since the largest emitters are not constrained by the treaty (Aldy and Stavins, 2008). Canada ratified the Kyoto Protocol in 2002 but withdrew in 2011, simply stating that the cost of compliance was too high.

Given the projected impacts of climate change, parties under the UNFCCC have recognized the urgency of mitigation actions and have agreed to the long-term target of slowing temperature rise and holding it at 2°C above the pre-industrial levels<sup>1</sup> (UNFCCC, 2011a). To realize such a target, a long-term and ambitious GHG emissions cut at the global level is necessary. However, the negotiations pursuing a new international climate change agreement beyond the Kyoto Protocol 2012 completion

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1 There is a possibility to lower the temperature target to below 1.5°C (UNFCCC, 2011a).

have stalled. In the thirteenth session of the Conference of Parties (COP13) in Bali in 2007, the parties agreed to reach a long-term mitigation agreement by 2009. At the 2009 negotiations in Copenhagen, the UNFCCC parties failed to agree on establishing a new legally binding agreement in relation to mitigation actions. The result of these negotiations was the Copenhagen Accord, which is a non-binding document and was not adopted in the COP decisions at the time.<sup>2</sup> It was not until 2011 in Durban that the parties made a decision to move on from the failures of the 2009 negotiations and produced an agreement that aims to reach a new long-term commitment by no later than 2015 while extending the Kyoto Protocol for five years. Despite 20 years of intense negotiations since the adoption of the UNFCCC, there is still no agreement that sufficiently addresses the challenges of climate change.

## 1.2 KEY FEATURES OF THE CLIMATE CHANGE POLICY CHALLENGES

The main objective of climate change agreements is to achieve GHG emissions reduction at the global level to avoid a climate-induced catastrophe. However, the multifarious nature of the climate change problem makes the negotiations extremely difficult.

Climate change is the ultimate global commons problem. It is by nature a global concern since all countries share the same atmosphere, which is a global public good. Everyone shares the atmosphere and yet no one country is responsible for its protection. Because of the shared atmosphere, adverse effects of climate change are not limited to a specific region, though impacts are felt differently by region. The main causal factor of climate change is GHG emissions that are created by human activities, regardless of where these gases are emitted into the atmosphere. To have any real impact the international community must address this issue collectively as otherwise emissions cannot be reduced globally. Since the cost of mitigation is high, one challenge is sharing the burden equitably. The unequal distribution of adverse impacts of climate change and differing capabilities to absorb impacts is an additional complication. Conversely, there is a significant incentive to free-ride (Kemfert, 2006; Dellink et al., 2007, Barrett, 2005). Free riding allows states to receive benefits from other states' mitigation actions while bearing no costs themselves. Therefore, a successful international climate change agreement must give states incentives to participate in negotiations and remain in the agreement, and to comply with the agreement regardless of its legal status in international law (i.e., a treaty or non-binding agreement).

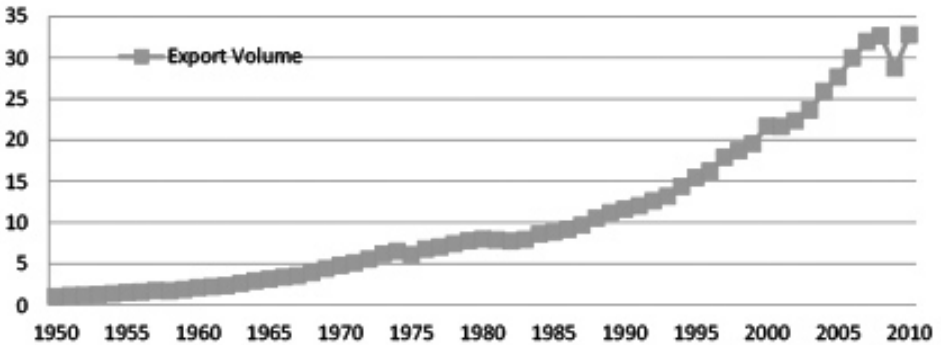
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2 Subsequently it was incorporated in the COP decision at the COP16 in 2010 (UNFCCC, 2010).

### 1.3 INFLUENCE OF INTERNATIONAL TRADE ON CLIMATE CHANGE

Globalization has rapidly increased since mid-20th century. Barriers to economic exchange between countries, including tariffs, costs of transportation, communication and access to information, have been greatly reduced due to technological innovation and international trade rules. International trade activities have expanded considerably as a result. The WTO is the global mechanism for managing trade between countries. It was founded in 1948 with 23 members under the name General Agreement on Tariffs and Trade (GATT). In 1995 the GATT became the WTO. While the GATT was a provisional legal agreement with contracting parties, the WTO contains permanent agreements among members. The WTO contains all the agreements of the GATT as well as new trade regulations. Crucially, the WTO maintains an enforcement mechanism whereas the GATT did not. This analysis will consider regulations under both the GATT 1994 rules and today's WTO agreement. Tariffs and quantitative trade restrictions have decreased significantly through decades of trade negotiations (round negotiations) and trade agreements, which promoted freer trade across borders. The world export volume has significantly increased since World War II, growing 32-fold between 1950 and 2010 (see Figure 1.1). This explosive growth of international trade has driven world economic growth and increased standards of living.

**Figure 1.1: Transition of Trade Export Volume (Index: 1950=1)**



Source: Created by author based on data from International Trade Statistics (WTO, 2011a).

The increased volume of international trade has raised energy consumption and GHG emissions at the same time. In 2008 more than a quarter of global carbon emissions were related to internationally traded goods and services, a progressive increase from the 1990 level of 20 per cent (Peters et al., 2011). Given the magnitude of trade-related emissions, changes in trade practices and patterns as well as trade laws and rules significantly affect global GHG emissions. Consequently, international climate change policy and its governance are also impacted by trade-related emissions.

There are several ways in which international trade activities affect global GHG emissions. First, “the scale effect”, discussed above, in which carbon emissions are proportional to the level of trade activities. The augmentation of whole economies by international trade has led to increased demand for energy and resources. Some trade activities contribute to GHG emissions reduction. For example, environmentally sound goods and climate-friendly technologies — if widely traded across borders — help countries to cut GHG emissions. In the current round of trade negotiations, the Doha Round, WTO members have discussed further promotion of environmentally sound goods (Tamiotti et al., 2009).

One significant opportunity for reducing trade-related carbon emissions is to address fossil fuel subsidies. Fossil fuel subsidies are not directly a trade activity but are discussed as a trade-related issue that significantly raises global carbon emissions. If fossil fuel subsidies were phased out, there would be substantial emissions reduction. The International Energy Agency (IEA, 2010) estimates that such emissions reduction would be 5.8 per cent of total CO<sub>2</sub> emissions by 2020 compared with the business-as-usual case. Although members of the WTO can prevent subsidies from distorting trade through the Agreement of Subsidies and Countervailing Measures (SCM Agreement), climate change and other environmental issues are not addressed. Therefore, as long as subsidies are compatible with the SCM rules, states cannot use the WTO dispute settlement as a tool to abolish such subsidies. As a result, states are currently discussing this issue at political meetings, including G-20 summits<sup>3</sup>, rather than at formal trade negotiations.

Finally, trade activities change the distribution of GHG emissions among countries and inevitably affect mitigation policy in the international and domestic climate change regimes. Within their jurisdictions, some states will increase GHG emissions while those of others will decrease depending on the change in trade volume and types of traded goods. Carbon leakage, narrowly understood as the increase in emissions in countries with no mitigation policy associated with tightened carbon mitigation in other countries, cannot be separated from trade activities. The competitiveness concerns of domestic firms in countries with mitigation policy lead them to pay more attention to the carbon leakage issue. The dampening effect of carbon leakage on global emissions reduction has called the Kyoto Protocol’s credibility and enforceability into question.

#### 1.4 SUMMARY

Climate change is an unprecedented global environmental problem that will impose ever more severe threats to future generations and ecosystems. Whereas the necessity to reduce GHG emissions to avoid dangerous adverse effects in the future is clear, an international climate change agreement to truly mitigate climate change has not as yet been reached.

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3 See G-20 Summit, 2010: para.42; G-20 Summit, 2011: para.20.

The magnitude of trade-related emissions relative to overall GHG emissions and the influence that trade patterns have on emissions distribution indicate the importance of including trade-related emissions in international negotiations. If trade activities are expected to (and actually continue to) increase net GHG emissions, trade-related emissions must be addressed in order to mitigate climate change effectively. Said another way, any international climate change agreement that aims to reduce GHG emissions but does not take into consideration international trade patterns or rules may not be able to effectively reduce GHG emissions.

Carbon leakage is a particularly important trade-related issue in global emissions reduction since it has a large impact on both global emissions and the legal elements of the international climate change regime.

## Section 2: Emissions Leakage and Climate Change

### 2.1 PRELIMINARY ANALYSIS OF CARBON LEAKAGE

This section examines various attributes of carbon leakage, including its definitions, scope, estimated impacts on emissions reduction actions and the relationship between carbon leakage and competitiveness issues.

#### 2.1.1 DEFINITIONS OF CARBON LEAKAGE

The various definitions of carbon leakage discussed in international agreements, and climate change and trade literature can largely be divided into two major categories: narrow and broad.

The IPCC AR4 defines carbon leakage as “the increase in CO<sub>2</sub> emissions outside the countries taking domestic mitigation action divided by the reduction in the emissions of these countries” (IPCC, 2007b). In the case of the Kyoto Protocol, it would be defined as the increase in CO<sub>2</sub> emissions in non-Annex B countries divided by the reduction in CO<sub>2</sub> emissions in Annex B countries.<sup>4</sup> In particular, the IPCC (ibid.) gives the example of the relocation of production from countries with mitigation policies to countries with less stringent or no mitigation policy, often due to higher prices of energy. This causes increases in emissions in these carbon-neutral countries, which offset the emissions reductions in the original country. The IPCC (ibid.) also mentions that the decline in demand for fossil fuels in countries with carbon-constraint leads to a decrease in the world prices of fossil fuels, and therefore an increase in consumption of

<sup>4</sup> Annex B countries: the countries included in Annex B to the Kyoto Protocol that have agreed to a target for their greenhouse gas emissions.

fossil fuels and emissions outside of those countries. While the above definition does not explicitly state it, we can understand carbon leakage as the increase in emissions in countries with no mitigation policy associated with tightened carbon mitigation in other countries. This paper refers to this definition of carbon leakage as “narrow.” It is a narrow understanding of carbon leakage because it only covers those nations implementing emissions reduction targets such as in the Kyoto Protocol, nations which produce only 55% of total global emissions of GHGs.

Some argue that a definition of leakage should be more inclusive since trade-related emissions increase over time and are not covered by the narrow definition covered by a classification of mitigation policy. Peters and Hertwich (2008) suggest that a definition of carbon leakage should include all export-related emissions and should not be limited to emissions associated with implementation of the Kyoto Protocol. Their definition includes all emissions embodied in exports from countries without emissions constraints to those with constraints, regardless of the cause of emissions (i.e., carbon leakage caused by factors other than mitigation policy). This paper refers to this as a “broad” definition of carbon leakage.

### 2.1.2 CHANNELS OF CARBON LEAKAGE

There have been extensive discussions about channels of leakage within the narrow definition. Although these vary among studies, there are at least two channels most studies consider competitiveness driven leakage and energy price driven leakage. Competitiveness-driven leakage arises when the cost of production increases because of more stringent climate policy. This can raise the price of goods and lead to loss of competitiveness for domestic firms in both domestic and international markets. This in turn can cause production to move offshore, increasing imports and decreasing domestic production for both domestic consumption and for exports. It results in emissions increase outside of the country, which is defined as leakage.

Energy price driven leakage is described by the IPCC. A decrease in domestic production in countries with mitigation policies lowers demand for fossil fuels, causing a fall in the global price of fossil fuels. This in turn encourages those countries without carbon emission reduction policies to increase consumption of the cheaper fossil fuels, thereby increasing overall carbon emissions in these countries.

There are other channels for carbon leakage discussed in the literature. For example, Reinaud (2008) considers that an increase in the price of low-emission materials reduces their consumption in countries without mitigation constraints. Further, Copeland and Taylor (2003) argue that change in income of countries due to mitigation actions of certain other countries will either increase or decrease emissions in non-mitigation constrained countries. For example, if a country is a net importer of emission-intensive goods, its real income will fall, which decreases the demand for

environmental quality. This may lower environmental standards in those countries, thus leading to carbon leakage. However, these channels are less significant in terms of contribution to carbon leakage and have not attracted much attention overall.

Lastly, some argue that more stringent emissions standards in countries can actually help mitigate carbon leakage. The argument is that more stringent emissions standards lead to improvements in technology, which will eventually benefit both carbon-constrained and non-carbon-constrained countries. Though not technically a channel of leakage, these technological spillover effects can help counter carbon leakage in the long run (Grubb et al., 2002).

### 2.1.3 ESTIMATIONS OF DEGREE OF CARBON LEAKAGE

There are a number of studies that estimate the magnitude of carbon leakage. Results from such studies vary substantially since the scope and definition of leakage varies between them, and different assumptions are applied to each model. For example, estimations of carbon leakage under the Kyoto Protocol range from 2 to 130 per cent (Dröge, 2009).<sup>5</sup> Although most research papers use the narrow definition, the channels of leakage considered in these papers are not the same. Most of the studies considered by this research use computable general equilibrium (CGE) models, including the Global Trade Analysis Project (GTAP) and its derivative models; however there are a variety of different assumptions applied in these models that make them difficult to compare. In particular, assumptions of Armington elasticity, homogeneity of goods, degree of competition in markets (perfectly competitive vs. monopolistic), economies of scale, and barriers to entry and exit of firms considerably change the results of these models (Babiker, 2005; Dröge, 2009; Monjon and Quirion, 2011).

The carbon leakage rate of a specific sector, in particular an industry which produces globally traded goods, is estimated much higher than others. The existing literature focuses on energy-intensive industries, which are affected by carbon mitigation policy. These sources have found higher leakage rates for such industries (Gielen and Moriguchi, 2002; OECD, 2003; Reinaud, 2008). However, the most influential factor in leakage is the volume of goods traded internationally. Domestically traded goods are assumed to have no leakage.

### 2.1.4 CARBON LEAKAGE AND COMPETITIVENESS

A concern with competitiveness is frequently discussed simultaneously with the carbon leakage issues. It is often said that the more stringent mitigation actions resulting from mitigation commitments, under domestic policy or international climate change agreements, undermine the price competitiveness of domestic industries

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5 Based on the narrow definition of carbon leakage.

and hence lead to carbon leakage. This is in addition to the above-mentioned leakage driven by falling energy prices due to more stringent mitigation policy. Therefore, competitiveness driven leakage is a legitimate concern. However, there are factors other than energy and emissions abatement costs that change the competitiveness of firms. These include currency exchange rates, labor and capital costs. Furthermore, carbon leakage occurs even when the competitiveness of carbon-constrained countries in international markets is not changed by increased energy and emissions reduction costs. There are also multiple reasons a firm may relocate production, such as to increase the ease of exporting to emerging markets due to increased demand in those markets. As the definition of carbon leakage in the previous section demonstrates, carbon leakage includes emissions shifts through international trade regardless of its cause. Thus, it is important to make a clear distinction between carbon leakage and the competitiveness issue when states discuss addressing the carbon leakage issue for the purpose of effective emissions reduction.

As a concern about domestic firms' competitiveness directly affects a country's political economy, it attracts more attention from policy-makers than the carbon leakage issue. Although a change in competitiveness itself is not a direct problem for global GHG emissions as far as the carbon leakage issue is concerned, there would still be a problem. In the United States there have been several climate change bills that have introduced cap-and-trade schemes to reduce GHG emissions. Between 2008-2010 the following bills were submitted in the U.S. Congress: Waxman-Markey (H.R.2545), Lieberman-Warner (S.2191), Kerry-Boxer (S.1733), and Kerry-Lieberman<sup>6</sup>. Each of these bills has provisions that mitigate the competitive disadvantage of domestic producers, which would have occurred due to enforcement of the bills. None of these bills have been enacted, but they all reflect a concern for loss of competitiveness with carbon abatement legislation. In Europe, the heads of France and Germany expressed a concern regarding carbon leakage and asked the United Nations to support a carbon tax on imports (AFP, 2009). There were underlying concerns regarding domestic firms' loss of competitiveness, even though these were not explicit in the statement. Although these concerns for competitiveness in the United States and Europe have been amplified by the economic crisis since 2008, there will continue to be such concerns.

## 2.2 ANALYSIS OF TWO DEFINITIONS OF CARBON LEAKAGE AND PROPOSAL FOR AN ALTERNATIVE DEFINITION

The above-mentioned narrow definition assumes that carbon leakage occurs only when countries carry out mitigation actions. In other words, carbon leakage must be caused by emissions reduction actions of certain countries. In reality, however, global emissions can be increased even when those countries participating in emission reduction agreements do not have any climate mitigation policy. Suppose there is a country that has participated in international emissions reduction commitments under

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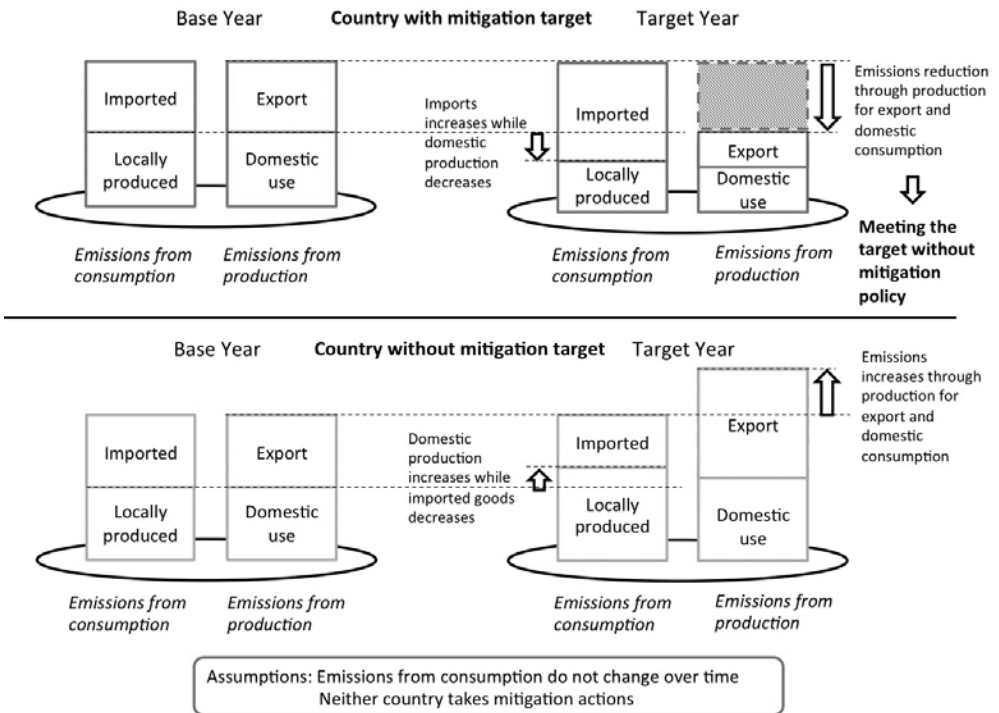
6 There is no bill number in the Kerry-Lieberman bill.



the Kyoto Protocol. The country may achieve the emissions reduction target without tightening domestic standards of GHG emissions. It can reduce its emissions by increasing imports of energy-intensive products, such as cement and steel, from other countries that do not commit to emission reduction targets under the Kyoto Protocol.

Neither the narrow definition nor other existing studies consider these emissions as a part of carbon leakage. Reinaud (2008), for example, argues that “the shifting of industry structures for reasons not related to the climate policy is not qualified as leakage.” Growth of cement production in China and India is not due to climate mitigation policy of other countries but due to increases in domestic demand for cement in these countries. Therefore, this cannot be deemed a carbon leakage. The reasoning behind this argument is that carbon leakage must be associated with carbon emissions reduction policy.

**Figure 2.1: Carbon Leakage under Mitigation Targets**



Source: Author

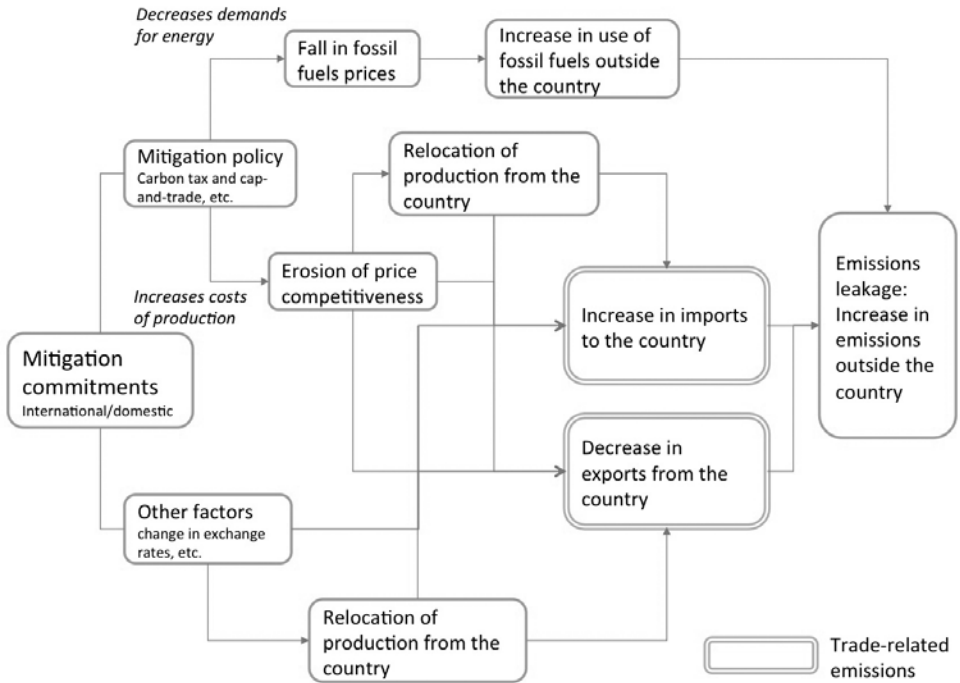
While an increase in carbon emissions due to increased domestic production of cement to meet growing domestic demand in countries with no mitigation policy is not regarded as carbon leakage, an increase in carbon emissions due to domestic production of cement for export to carbon-constrained countries is included in this definition of carbon leakage. This is because these emissions would have been reduced

by mitigation policies within these importing countries but in reality are not covered by such policies due to a shift in production from the countries with mitigation policy to countries with no mitigation policy. In other words, if a carbon-constrained country fails to reduce emissions that are intended to be addressed by mitigation policy, then such emissions should also be considered carbon leakage. In Figure 2.1, the country with the mitigation target would reduce emissions at the target year without regulating carbon emissions while carbon emissions in the country without the mitigation target would increase. Emissions from consumption stay the same but international trade changes the distribution of carbon emissions production. This results in achievement of the reductions target for one country but fails to meet the global emissions reduction target.

Most definitions of carbon leakage do not include this type of leakage. The narrow definition of the IPCC AR4 does not seem to regard trade-related emissions as a significant factor of carbon leakage. Rather than relocation of production to those countries with no mitigation commitment due to losing price competitiveness caused by stringent emissions regulation, countries with mitigation commitments would keep or decrease production output within their territories while increasing imports from outside, regardless of intention. Because of this limited scope of leakage, the IPCC AR4 review of literature relating to estimates of carbon leakage under the Kyoto Protocol only range from 5 to 20 per cent (IPCC, 2007b).

Alternatively, the broad definition allows for carbon emissions that could have been generated in countries with mitigation commitments and that could have been capped by such commitments, but in fact occurred in other countries without an obligation of emissions reduction; therefore emissions were not covered by these commitments. In this regard, the broad definition would reflect actual emissions more accurately because it captures all emission shifts, including unintentional emissions shifts, to countries with no mitigation policies. However, the broad definition does not include increases in emissions outside carbon-constrained countries due to a decline in demand for carbon-intensive energy in those countries as this is not a change in volume of internationally traded goods, but a change in demand for fossil fuels.

Given the above analysis, a comprehensive definition of carbon leakage is understood as carbon emissions that intended to be limited by either unilateral or multilateral mitigation commitments but that are in reality continuing through various channels. In other words, carbon leakage can be defined as an increase in emissions outside countries with mitigation commitments or targets not covered by them, regardless of actual mitigation actions in those countries. Figure 2.2 shows this definition of emissions leakage and major channels of leakage.

**Figure 2.2: Definition and Major Channels of Carbon Leakage**

Source: Author

Identified channels of leakage under this definition are the following:

- (a) **Energy-driven leakage:** leakage caused by emissions mitigation policy that is believed to decrease demand for fossil fuels, which in turn lowers the price of these fuels and stimulates an increase in use in economies outside of the mitigation policy enacting country.
- (b) **Competitiveness-driven leakage:** leakage caused by emissions mitigation policy, which leads to an increase in the domestic cost of production and a relocation of production outside of the country. This increases imports into and decreases exports from the mitigation policy enacting country.
- (c) **Trade-driven leakage:** leakage caused by increased imports to a country (with or without a mitigation policy) and decreases in exports from that country due to the relocation of production to outside of the country. This phenomenon is understood to be caused by multiple market forces in the country, such as exchange rate fluctuations and increases in demand for goods outside the country. This should be “net” emissions since carbon emissions might increase in the country and net emissions could be negative in some countries.<sup>7</sup>

<sup>7</sup> When we consider Annex B countries, the net emissions are still positive as described in Figure 2.3.

In testing the two definitions of carbon leakage, the narrow definition includes channels (a) and (b) but not (c) whereas the broad definition includes channels (b) and (c) but not (a). The definition of carbon leakage in this paper is intended to include all three channels.

### 2.3 WHY AND HOW DOES CARBON LEAKAGE MATTER?

Given the definition discussed in the previous section, there are two fundamental problems caused by carbon leakage.

First, a direct effect is the increase in global GHG emissions, which offsets the emissions reduction efforts of countries with mitigation policies. Increased emissions at the global scale arise because of the fall in energy prices, less stringent regulations on GHG emissions outside these countries, and emissions from transportation of imported goods.

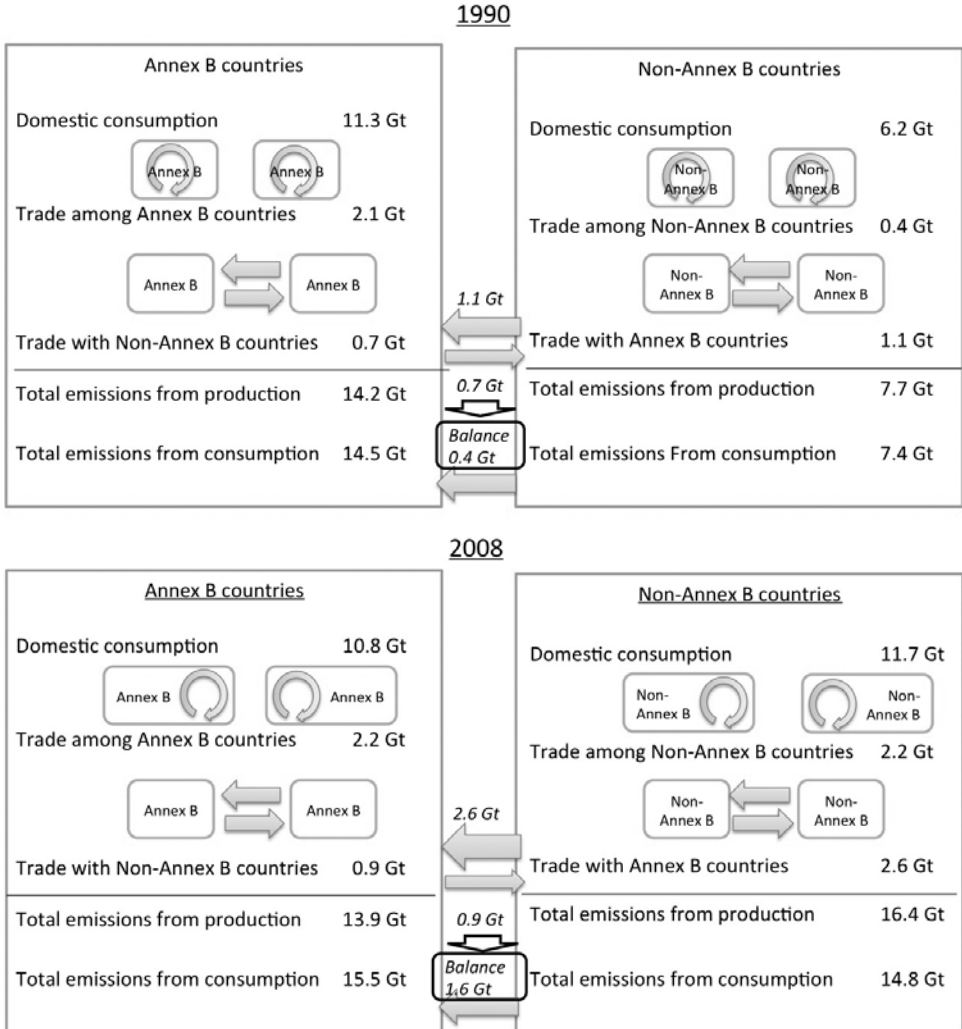
Second, carbon leakage erodes the effectiveness and credibility of both domestic climate change policy and international climate change agreements. Loss of credibility discourages those states that committed to emissions reduction to strengthen commitments or even to comply with existing commitments. Further, carbon leakage diminishes the competitiveness of industries in countries with mitigation policies, and thus fosters fierce opposition from industries in countries with emission reduction commitments. This opposition in turn adversely affects domestic politics attempting to effectively design and implement climate change policy.

#### 2.3.1 INCREASE IN CARBON EMISSIONS

Peters et al. (2011) explained CO<sub>2</sub> emissions and their distribution between Annex B and non-Annex B countries as well as trade-related emissions among these countries (see Figure 2.3). CO<sub>2</sub> emissions from the production of goods exported from non-Annex B countries to Annex B countries in 1990 were 1.1 Gt while those in 2008 were 2.6 Gt — an increase of more than 130 per cent in 18 years. Emissions from the production of goods exported from Annex B countries to non-Annex B countries were 0.7 Gt in 1990 and 0.9 Gt in 2008 — an increase of 30 per cent in 18 years. Hence, the trade balance in carbon emissions between Annex B and non-Annex B countries has changed. Annex B countries imported 0.4 Gt of carbon dioxide from non-Annex B countries in 1990, which increased to 1.7 Gt in 2008. Economic growth (i.e., increase in consumption) alone between 1990 and 2008 cannot explain such an increase in imported emissions (1.2 Gt, from 1990 to 2008). There have clearly been shifts in emissions from Annex B countries to non-Annex B countries. If one does not look at this increase in trade-related emissions, Annex B countries seem to have reduced CO<sub>2</sub> emissions by 0.3 Gt from the 1990 levels in 2008. In reality, however, emissions produced in Annex B countries and emissions imported from non-Annex B countries have risen much more than emissions

reductions from domestic production. If there had been no trade transaction between Annex B countries and non-Annex B countries, CO<sub>2</sub> emissions produced in Annex B countries would have increased by 0.9 Gt.

**Figure 2.3: Change in Emissions and their Distribution between 1990 and 2008**



Source: Crafted by the author based on data used in Peters et al. (2011).

This emissions shift, from Annex B to non-Annex B countries, is 1.2 Gt of CO<sub>2</sub> emissions, exceeding annual emissions reduction of all Annex B countries during 2008-2012 under the Kyoto Protocol. This is an emissions reduction in Annex B countries by an average of 5.2 per cent from the 1990 level, or 0.7 Gt.<sup>8</sup> Since the United States has

<sup>8</sup> Counted by only CO<sub>2</sub> emissions (does not include other greenhouse gases).

not ratified the Kyoto Protocol, the actual emissions target is even smaller. This means that national emissions reduction efforts under the Kyoto Protocol were cancelled out by increases in emissions of internationally traded products. It does not mean that the Kyoto Protocol in fact increased GHG gas emissions as an increase in emissions associated with traded goods would have occurred even without the existence of the Kyoto Protocol. The degree of influence on the emissions increase that the Kyoto Protocol caused is unclear. However, it is clear that the Kyoto Protocol's architecture, which only limits GHG emissions from a limited number of (Annex B) countries, does not address trade-related emissions.

Consequently, carbon leakage is a significant issue in international efforts to combat climate change. This research determines that despite a lack of concern for this issue in international climate negotiations, it is essential to address the carbon leakage issue to ensure an effective international climate change agreement as a complement to domestic climate policy.

### 2.3.2 COMPETITIVENESS ISSUES AND POLITICS

Carbon leakage and loss of competitiveness provoke strong opposition from domestic actors, in particular from industries facing international competition. A rise in production costs causes a perceived erosion of competitiveness and a decrease in profits for domestic firms, as well as a loss of jobs and economic growth for the country. The beneficiaries of climate change policies are not clearly defined and as a result the intensity of opposition to climate policy is generally greater than that of its proponents.<sup>9</sup> Actors with a demonstrable cost burden exert significant influence on the crafting a domestic climate change policy.

Domestic actors have several tactics to use in response to the introduction or reinforcement of GHG mitigation policy. Responses to regulatory adjustments include: domestic lobbying, exiting the country (shifting production or operations to another country), or exiting the market (shutting down business) (Drezner, 2007). Domestic actors may choose to join with other affected actors and put pressure on the government to minimize the economic impacts of climate policy. This is most likely to occur when the cost of exiting the country is very high. In most cases and in most countries, affected domestic actors are likely to lobby first. Carbon leakage and competitiveness issues are perceived to be closely tied. Even though the main cause of carbon leakage may not be loss of competitiveness, states — especially developed countries — likely need to address carbon leakage in order to introduce or strengthen domestic climate policy.

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<sup>9</sup> Beneficiaries do not recognize benefits of climate change policy, and they include the future generation.

## 2.4 SUMMARY

The carbon leakage issue has been considered a marginal problem for climate policy in many discussions so far due to the lack of consideration of trade-related emissions leakage. However, as demonstrated by the fact that emissions imported from non-Annex B countries to Annex B countries exceed the total emissions reduction under the Kyoto Protocol, it is necessary to consider trade-related emissions leakage to effectively reduce global GHG emissions. This paper proposes an alternative definition of carbon leakage that includes trade-related emissions leakage to help scope adequate climate policy. This alternative definition articulates that the carbon leakage issue must be addressed when states seek a meaningful international climate agreement to mitigate climate change. A failure to do so will significantly diminish the effectiveness of such an agreement. Besides the direct impacts on global emissions, the carbon leakage issue adversely affects domestic climate policy (politics) due to competitiveness issues partly induced by carbon leakage. Addressing emissions leakage is also likely to improve the effectiveness of domestic climate policy.

Since there are GHG other than CO<sub>2</sub> that should be included in the concept of carbon leakage, this paper uses the term “emissions leakage” instead of “carbon leakage” in the following sections.

## Section 3: Options for Climate Change Agreements to Combat Emissions Leakage

Since emissions leakage is rooted in climate change mitigation policy, including climate mitigation commitments under the Kyoto Protocol, modifications of these agreements and the policies they influence is where we can begin to address the leakage issue. There are several options that have been discussed in the relevant literature. These approaches can be summarized as follows:

- A framework that caps the GHG emissions of all states with schedules and targets for emissions reduction (targets and timetables approach)
- A framework that harmonizes prices of GHG emissions for all states (harmonization of emissions prices approach)
- A framework that caps the GHG emissions of some states, but with the inclusion of trade measures to reduce emissions leakage (border adjustment measures for imported goods or measures for domestically produced goods)

This section will briefly discuss the first two frameworks in which all states participate from the perspective of feasibility, effectiveness, economics, and legal issues. The third framework will be discussed in the section four.

### 3.1 INTERNATIONAL CLIMATE CHANGE AGREEMENT TO CAP THE GHG EMISSIONS OF ALL STATES

The approach of enforcing an agreement for mitigation actions by all states<sup>10</sup> produces a predictable reduction as it does not distort trade and does not directly change trade rules and policy. Emissions leakage caused by domestic mitigation policy in each state and/or change in trade patterns will be addressed in countries outside the emission reductions commitments unless such commitments are set to absorb emissions leakage. There is no need to address the leakage issue from the perspective of emissions reduction since it can ensure global emissions reduction.

There are, however, concerns with this approach. First and foremost, the practical feasibility of reaching such a comprehensive agreement is unproven. Thus far, the global community has not been able to come to an agreement on effective international climate change mitigation. Many developing countries have opposed imposition of any restriction on their GHG emissions, arguing that states share common but differentiated responsibilities (CBDR) for mitigating climate change. Such language is stipulated in the UNFCCC provisions and makes it unlikely for all states to find it fair to agree to emissions targets and reductions.

<sup>10</sup> It may preclude least developed countries.



Progress has, however, been made. The climate change talks in Durban, South Africa (COP17/CMP7), in 2011 produced what is known as the Durban Package. The most significant progress in the package was that all parties agreed to establish, no later than 2015, a legal agreement regarding mitigation actions<sup>11</sup> that will include all states and will come into force no later than 2020 (UNFCCC, 2011b). After 2020, all states including the United States, China, India and other major economies, which did not have mitigation targets under the Kyoto Protocol,<sup>12</sup> have committed to reduce GHG emissions under international law. While there is no guarantee that all parties will follow through with the Durban Package, at least there is now the possibility that a framework that includes mitigation commitments for all states will be agreed to by 2020.

There is concern that the mitigation targets set in these agreements will not effectively address carbon leakage because they have created so called ‘hot air.’ Hot air challenges occur when emissions targets are set higher than a given nation’s actual emissions in the target year, leaving excess emissions allowable that a nation can then trade. This defeats the purpose of mitigation efforts in that country. Where a state possesses “hot air” in its target, increases in GHG emissions associated with emissions leakage from other countries do not require that state to reduce domestic GHG emissions to meet its target. Therefore, mitigation targets must be stringent enough to make sure such emission reduction targets truly abate global GHG emissions.

Finally, even if the world agrees to create an international climate change agreement that restricts the GHG emissions of all states, there is still no way to ensure that everyone will comply with such an agreement. There is always an incentive for states to default because free riding gives states a greater payoff than complying with the agreement. Unless the agreement has a strong and workable enforcement mechanism, something that the Kyoto Protocol lacked, full compliance is unlikely.

### 3.1.1 EFFECTIVENESS OF THE AGREEMENT

Obtaining a commitment to emissions reduction from all states at simultaneously allows for certainty in terms of the volume of global emissions reduction and the potential for making a real impact on global GHG emissions. In comparison to the Kyoto Protocol, in which only some states had to commit to emissions reduction targets, this approach is also more favorable from an economic standpoint as it levels the playing field. It also entails that the overall costs of abatement of GHG emissions will likely be lower since GHG abatement costs are generally lower in developing countries. Emissions trading between countries should be allowed under the agreement to decrease the abatement cost. If a future agreement allows parties to trade emissions permits globally and utilize emissions credit similar to those in the Kyoto protocol, it is possible to reduce overall abatement costs.

11 “A protocol, another legal instrument or an agreed outcome with legal force under the Convention” (UNFCCC, 2011b).

12 The United States is not a party to the Kyoto Protocol (as of March, 2012).

### 3.1.2 LEGAL ISSUES OF THE AGREEMENT

There are no significant legal issues related to an international emissions reduction agreement. The only concern is that such an agreement might be contrary to principles of CBDR and respective capabilities to protect the climate system. This principle of CBDR is stipulated in Article 3.1 of the UNFCCC. Although the interpretation of the CBDR and respective capabilities is not consistent across parties, there nonetheless seems to be several approaches to avoid a violation of Article 3.1. One option is to pursue an agreement that imposes more stringent mitigation commitments for developed countries than for developing countries. Assisting developing countries to reduce GHG emissions through multilateral funding mechanisms, technology transfer, capacity building and other types of assistance may be another option. This is already done in the case of the Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol). It is also currently being implemented under the UNFCCC framework.

### 3.1.3 COMPLIANCE AND IMPLEMENTATION OF THE AGREEMENT

If all states were able to put aside political differences to reach an agreement for a global commitment to reduce emissions, then ensuring compliance would be the next step. If states develop a treaty that has no power to ensure its own ratification, it is unlikely to achieve its objective of reducing global GHG emissions while also addressing emissions leakage. Compliance is at risk when the costs of participation exceed the benefits of non-compliance. In the case of the Kyoto Protocol, the United States signed the treaty but has not ratified it due to political hurdles in Congress. Similarly, Canada ratified the Kyoto Protocol in 2002 but declared its intention to withdraw in 2011, reasoning that the cost of compliance was too high<sup>13</sup> (BBC News, 2011). Given that any future mitigation agreement must be more stringent than the Kyoto Protocol in terms of emissions reduction targets, the likelihood of similar withdrawals will be even higher. Therefore, any effective agreement must be constructed with the correct incentives embedded within it and must include measures to prevent non-compliance and withdrawal from the agreement.

## 3.2 INTERNATIONAL AGREEMENT TO HARMONIZE PRICES OF GHG EMISSIONS

The harmonization of prices of GHG emissions is similar to that which calls for targets and timetables emissions reductions described above. This section explains the differences between these two agreement options.

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13 Canadian environment minister also mentioned the absence of two major emitters (the United States and China).

Harmonization of prices of GHG emissions would involve all states, but require states to implement the same policy to equalize GHG emissions reduction cost among states, instead of requiring states to commit to emissions reduction goals. Such a framework may be the most desirable economic option for international climate policy. This approach significantly lowers the cost of emissions reduction at the global level because it equalizes marginal abatement costs of emissions across all countries participating in the agreement. The uniform marginal abatement cost enables all states to minimize mitigation costs as a whole.

However, obtaining universal agreement would present great difficulties politically. Unlike the mitigation target approach, equalizing the marginal cost of GHG emissions reduction would require all states to adopt the exact same level of stringency of mitigation policy, without taking into consideration historical responsibility or capacity to act. Therefore, it is more likely to be against the principles of CBDR as laid out in Article 3.1 of the UNFCCC. Even if developed countries provide assistance, the burden on developing countries would still be high. Unless developed countries are able to provide unprecedented amounts of funding for the incremental costs of emissions reduction for developing countries it is unlikely that such a scheme would be accepted as fair and feasible. Those states that do not have an institutional capability to implement harmonized climate policy in general would oppose such an agreement. Further, there is no flexibility in the policy implementation tools so some states may not be able to pass domestic statutes in their legislative bodies to implement the policy.

### 3.3 SUMMARY

International climate change mitigation agreements applying to all states are able to effectively address emissions leakage as long as such agreements are well designed and universally agreed. The cost and effectiveness of such agreements vary in their architectures. While homogeneous prices on emissions among states are cheapest, heterogeneous prices on emissions can lower the cost if emissions trading between states is allowed. Harmonizing the cost of reduction is more effective in mitigating leakage than target- and timetable-type agreements. However, there are significant feasibility and enforcement concerns for these agreements. The harmonization of emissions prices approach is likely more difficult to realize than the targets and timetables approach. Furthermore, harmonization of the cost of emissions reduction may not comply with the CBDR principle, which is a key concern for developing countries. Nonetheless, these climate change mitigation agreements still have advantages vis-à-vis agreements with trade measures that will be discussed in the next section. They are less trade-distortional and provide greater certainty in the reduction of overall GHG emissions and emissions leakage.

## Section 4: Trade Measures Incorporated in an International Climate Change Agreement to Combat Emissions Leakage

### 4.1 OPTIONS FOR TRADE MEASURES INCORPORATED INTO INTERNATIONAL CLIMATE CHANGE AGREEMENTS

Trade measures to mitigate emissions leakage problems can be divided into two major categories: measures for imported goods and measures for exported goods. The first introduces a border adjustment measure, which imposes additional taxes on imported goods underneath a domestic emissions tax system or a measure that includes importers in a cap-and-trade scheme. The second category gives domestic firms an incentive to maintain the current level of production output, in particular for firms in energy-intensive industries. This measure includes tax rebates to domestic firms if a country has a GHG emissions tax system and free or output-based allowances if a country has a cap-and-trade scheme.

There are other tools available to mitigate emissions leakage related to international trade rules including requirements for labeling goods (i.e., disclosure of how much life-cycle GHGs are emitted) and procedural requirements (e.g. reporting GHG emissions of exported goods to importing countries). It is also theoretically possible for states to have an agreement imposing trade bans on products from certain countries, which is the most restrictive trade measure. Given the degree of impact an import ban would have for both importing and exporting states it is unlikely that this option would be pursued. This paper focuses on border adjustment measures for imported goods and measures for domestic products.

Trade measures may be pursued when more comprehensive international climate mitigation agreements discussed in Section 3 are not achieved but some countries are still willing to reduce GHG emissions. In that situation, even though some states try to reduce their emissions, global emissions reduction is likely to be significantly diminished due to emissions leakage. However, introduction of a border adjustment for imported goods based on GHG emissions associated with production increases the production cost of goods and puts prices indirectly on GHG emissions in countries without mitigation policy. Such measures function as an instrument to indirectly involve states that do not agree to reduce emissions in an international emissions reduction agreement.

## 4.2 EFFECTIVENESS AND REPERCUSSIONS OF TRADE MEASURES

### 4.2.1 EFFECTIVENESS OF BORDER ADJUSTMENT MEASURES

Border adjustment measures can address only part of the emissions leakage problem. They are able to reduce GHG emissions from imported goods by either imposing additional taxes on them or requiring importers to hold allowances under a domestic carbon tax system or cap-and-trade scheme. The effects of these measures are almost identical to the effects of introducing a domestic carbon tax or cap-and-trade scheme. Imposing these measures will reduce emissions in an economically efficient way when compared to a command-and-control and standard approach. These measures address not only emissions leakage caused by stringent mitigation policy (competitiveness-driven leakage – see Section 2.2) but also emissions leakage caused by other factors, such as trade driven leakage.

However, border adjustment measures cannot effectively mitigate emissions leakage caused by lower fossil fuel prices due to the anticipated fall in domestic consumption of fossil fuels in countries with stringent GHG mitigation policies. Lower prices for fossil fuels increases demand for fossil fuels at the global level. Border adjustment measures can impose taxes only on goods traded between two countries but they cannot reduce GHG emissions from goods that are produced in countries with no trade transactions with the countries that introduce border adjustment measures. Furthermore, these measures cannot decrease the consumption of fossil fuels in the production of goods for domestic consumption (non-traded goods). Given that emissions from domestic consumption are generally greater than those from traded goods (see Figure 2.3), border adjustment measures are not able to adequately address energy-price driven emissions leakage.

Internationally coordinated border adjustment measures can address the issue more effectively than when implemented unilaterally, because the number of countries and the volume of traded goods that multilateral border adjustment measures cover are much greater than unilateral measures. Therefore, multilateral measures are always more effective as long as they are crafted to encourage firms in countries with no mitigation policy to reduce GHG emissions and do not cause production shifts to more carbon-intensive goods. Furthermore, multilateral measures are always more favorable than unilateral ones from the perspective of international trade law.

### 4.2.2 EFFECTIVENESS OF TAX REBATES, FREE EMISSIONS ALLOWANCES AND EXPORT TAX REBATES

Measures that deal with domestically produced goods (as opposed to border adjustment measures which deal with imported goods) are also considered to mitigate emissions leakage because the measures allow domestic firms to maintain output levels after

the introduction of more stringent domestic mitigation policy. Tax rebates and free allowances to emit a specific amount of GHGs without cost are given to some specific domestically produced goods for both domestic purposes and for export. These measures reduce the costs of production caused by the adoption of mitigation policies and therefore maintain competitive advantage vis-à-vis firms in similar sectors in countries with no or less stringent mitigation policies in place. These measures can be an alternative to border adjustment measures on imports to address the emissions leakage issue.

The allocation of free allowances to mitigate emissions leakage — although sometimes focused not on emissions leakage but on mitigating the negative effects on competitive advantages — is already underway at regional level. For instance, the European Union Emissions Trading Scheme in Phase III (2013-2020) will give some sectors deemed to be exposed to a risk of carbon leakage free allowances up to 100 per cent (European Commission, 2011). Other sectors will receive lower percentages of allowances for free and such allowances will be reduced over time. However, although these measures may reduce emissions leakage and address competitiveness issues, they may lessen emissions reduction at the global level. In the case of tax rebates for specific sectors, for instance, domestic firms would not have an incentive to reduce GHG emissions as they are exempted from tax or allowance holding under a cap-and-trade scheme. GHG emissions from such exempted firms will not decrease since production costs stay the same, but rather may even increase since relative prices of energy-intensive products in the domestic market will decrease. Therefore, free allowances can defeat the purpose of mitigation policy.

A border tax adjustment for exported goods is a tax rebate for exported goods so that firms can maintain their price competitiveness in the global market. Therefore, it helps address emissions leakage driven by relocation of plants and domestic decreases in production for exporting. However, similar to tax rebates to energy-intensive sectors, it cannot reduce emissions from production of exported goods.

More importantly, while these measures may be able to reduce part of emissions leakage caused by domestic mitigation policy (i.e., preventing relocation of factories abroad due to an increase in the costs of production domestically), they cannot address emissions leakage driven by production shifts due to factors other than domestic mitigation policy (i.e., trade driven leakage). These internal measures cannot deal with emissions associated with domestic consumption. Considering the amount of emissions leakage driven by production shifts, tax rebates or allocation of free allowances may not be effective in addressing the emissions leakage issue.

These measures can be implemented with border adjustment measures. While imposing a tax on imported goods or requiring importers to purchase allowances, domestic energy-intensive industry can receive benefits so that such industry can actually increase competitive advantage. Moreover, a border tax adjustment for exported goods can also be implemented with a border tax adjustment for imported

goods. Not surprisingly, a border adjustment measure for both imported and exported goods (i.e., so-called “full border adjustment”) is more effective in reducing carbon emissions leakage than a border adjustment measure for imported goods by itself (Fischer and Fox, 2009; Monjon and Quirion, 2011).

Therefore, these measures should be implemented with border adjustment measures for imported products so as to increase the effectiveness of addressing emissions leakage. However, these measures will face legal challenges under WTO law as described in the following section.

#### 4.2.3 REPERCUSSIONS OF TRADE MEASURES

Implementation of border adjustment measures may create distortions of international trade. These distortions can be in violation of WTO rules because they increase prices of imported goods from countries without these measures, even though they are just *adjustments* of domestic climate policy as opposed to trade sanctions. Although trade-related retaliation for these measures may happen, if they are multilaterally implemented, then border adjustment measures are less likely to cause a trade war. Moreover, if a state that is affected by border adjustment measures is also a WTO member, they have to obey WTO law or risk incurring fines. It is therefore unrealistic for an individual state to impose mitigation policies involving border adjustments unilaterally. It is essential that they be agreed upon at the international level to avoid severe trade-related ramifications with other WTO members. One option for avoiding complications with the WTO is to implement domestic measures related to goods produced at home (tax rebates, free allowances and export tax rebates), which are less trade-distortional than the border adjustment measures because they do not raise prices of traded goods. However, if these measures are introduced with border adjustment measures, then these measures also have the same problem detailed in above.

#### 4.3 INTERNATIONAL TRADE STIPULATIONS WITHIN THE CLIMATE CHANGE REGIME

There are two climate change agreements with elements related to international trade embedded within them: the United Nation Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. Article 3.5 of the UNFCCC stipulates that, “measures taken to combat climate change, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination, or a disguised restriction on international trade.” It clearly expresses a concern that may arise due to a state’s climate change policy and tries to prevent distortion in international trade before the fact. Given the timing of adoption of this treaty in 1992, developing states may have harbored serious concerns that subsequent protocols under the UNFCCC might have included trade related provisions as other multilateral environmental

treaties do, such as the Montreal Protocol. Similarly, Article 2.3 of the Kyoto Protocol stipulates that, “Annex I countries shall strive to implement policies and measures in such a way as to minimize adverse effects, including ... effects on international trade.” This reiteration of the rules pertaining to trade demonstrates UNFCCC parties’ concern about the impacts of climate change policies on international trade.

Neither Article 3.5 of the UNFCCC nor Article 2.3 of the Kyoto Protocol mention trade-related emissions or the emissions leakage issue. The articles rather try to avoid raising conflict between international climate policy and international trade. The question is whether these articles affect the process of including trade measures in a future climate change agreement under the UNFCCC. First, it is not clear that the next climate change agreement, based on the Durban agreement, has to be based on the provisions of the Kyoto Protocol. Second, Article 2.3 of the UNFCCC has almost no impact on establishing a trade measure since any trade measure must not be a means of arbitrary or unjustifiable discrimination so as to be compatible with WTO law,<sup>14</sup> even if such a measure contributes to the mitigation of climate change. So it is in fact legally possible to design a mitigation policy related to trade within the UNFCCC provided it complies with WTO rules.

However, states remain highly skeptical. In 2010, at the COP16 in Cancun, parties to the UNFCCC reaffirmed that “measures taken to combat climate change, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade,” (UNFCCC, 2010; para.90). India further proposed an agenda, at COP17, which aims to expressly prohibit the use of unilateral trade measures on any ground (UNFCCC, 2011c). These stand as powerful examples that developing countries are wary of unilateral trade measures by developed countries. They believe such measures may adversely affect their economic development and are by nature discriminatory. Thus, it is likely that unilateral trade measures, such as border measures embodied in U.S. climate bills, will be strongly opposed by these countries for both political and legal reasons.

#### 4.4 BORDER ADJUSTMENT MEASURES COMPATIBILITY WITH WTO LAW

Trade measures embodied in an international climate change agreement have to be compatible with WTO law, specifically the 1994 General Agreement on Tariffs and Trade (GATT), given the fact that most major emitters are also WTO members. This would be the most significant barrier to trade measures being embedded within multilateral climate change agreements. Although there is no case at the WTO dispute settlement body directly related to measures to address emissions leakage, the WTO

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<sup>14</sup> Provisions of the GATT 1994 prohibit a measure that is arbitrary or unjustifiable discrimination or a disguised restriction on international trade. This applies even if a measure is exempted from GATT obligation by Article XX.



case law<sup>15</sup> does provide warnings on how to structure any potential trade-related emissions leakage agreements. Although there is much literature that addresses the question of whether trade measures are consistent with WTO law, most of them focus on unilateral trade measures, such as legal analyses of the U.S. climate bills and the EU-ETS. This section discusses the legal issues of the following two border adjustment measures, focusing on compatibility with the GATT 1994 regulations:

- (a) A border tax adjustment that imposes taxes on imported goods based on GHG emissions from the production of those goods, while imposing taxes on domestic products with the same method.
- (b) A requirement of emissions allowance holdings that obliges importers to hold emissions allowances in the same way in which domestic producers are required under a domestic cap-and-trade scheme.

The GATT 1994 agreement is the most relevant to this research as it has several components that directly relate to the limiting of trade measures. First, GATT Article I stipulates the most-favored-nation (MFN) principle. This provision prohibits members of the WTO from giving some states more favorable treatment than others. Once a WTO member decides a tariff level for a good under a schedule of concessions, the state has to apply the same tariff level to all other WTO members. Second, GATT Article II prohibits a WTO member from imposing tariffs above certain ceiling levels, which are determined by all WTO members through various rounds of negotiations. However, Article II:2(a) allows imposing on the importation of any product “a charge equivalent to an internal tax” if it is consistent with Article III:2. This means states can impose a higher tariff on imported products than the tariff ceilings under Article II. Third, Article III requires a WTO member to treat imported products and domestic as “like products” in a nondiscriminatory manner. Article III:2 prohibits a member of the WTO from imposing higher internal taxes or charges on imported products than on the same domestic products. Likewise, Article III:4 forbids a WTO member from treating imported products “no less favourable than “like” domestic products in the respect of laws, regulations, and requirements.” Lastly, Article XI prohibits WTO members from imposing quantitative restrictions on imported goods although there are a few exceptions where such restrictions are allowed. All of these rules and regulations within the GATT 1994 agreement indicate that it will be very complex to gain agreement on, ratify, and enter into force any trade-related measure to address emissions leakage. The following subsections will review consistency of a border tax adjustment and allowance requirement measure with these WTO provisions.

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15 Since legal status of dispute settlement and Panel reports prior to establishment of the WTO are significantly different from those under WTO, and some of Panel reports were not adopted and repealed later, this thesis focuses on cases after the establishment of the WTO.

#### 4.4.1 A BORDER TAX ADJUSTMENT FOR IMPORTED GOODS

A border tax adjustment that imposes taxes based on the amount of GHG emissions released in production might be inconsistent with Article I:1 and Article III:2 of the GATT 1994 agreement. Suppose there is a product that is produced in three different countries. Country A produces the product with X tons of CO<sub>2</sub> per product, country B produces a “like” product with the same amount of CO<sub>2</sub> per product, and in country C a “like” product is produced with 2X tons of CO<sub>2</sub> per product. If country A introduces a carbon tax on products purely based on CO<sub>2</sub> emissions, country A is thereby imposing a tax rate on a product imported from country C twice as high as that of a product imported from country B. Also, country A is imposing a tax rate on a product imported from country C twice as high as it imposes on a domestically produced product. In this situation it would be considered that country A is treating an imported product less favorably than a domestic “like” product. Also, it is giving a product imported from country B more favorable treatment than a “like” product imported from country C. This situation demonstrates that country A violates the MFN clause (Article I:1) and National Treatment clause (Article III:2) under regulations relating to “like” products. If any WTO member challenges this tax scheme in the WTO and the argument is accepted, country A may have to repeal such a tax scheme or incur considerable fines. However, if these products are not identified as “like” products because the differing levels of production-related GHG emissions are *different*, thus distinguishing the products, then the tax policy would be consistent with the abovementioned articles. Whether these products are regarded as “like” products depends on whether the WTO dispute settlement body allows country A to treat imported products differently based on GHG emissions released in production. A treatment of this type refers to a process and production method (PPM) measure.

It is important that we understand what exactly is meant by “like product” under WTO regulations. There are several legal precedents to which we can refer for clarification. The Appellate Body (1996b) in *Japan—Alcoholic Beverage II* mentioned general criteria for “like products”, which are shown in the Report of the Working Party on *Border Tax Adjustments*. Namely we can understand “like products” to be (i) the products’ end-use in a given market, (ii) consumers’ tastes and habits, (iii) the properties, nature and quality of the products, and (iv) the tariff classification of the products. These criteria have been used in many panel reports.<sup>16</sup> Although there are differences between imported and domestic products and among imported products in terms of GHG emissions released in production, they are rarely different from the viewpoint of the criteria listed above. However, the Appellate Body (*ibid.*) emphasized that determining whether products are *like* requires considering various characteristics of products in individual cases as well as legal provisions at issue (in this case, the definition of “like” products in Article III:2 is narrower than in Article III:4). The Appellate Body (2001a) in *EC—Asbestos* also supported this approach and stated that the criteria are “neither treaty-mandated criteria nor a close list of criteria that will determine the legal characterization of the products.”

16 After establishment of WTO, for example, US—Gasoline (Appellate Body, 1996a).

Article III:2 has two separate, distinct sentences that prohibit protection of domestic products. The Appellate Body (1997) in *Canada—Periodicals* clarified that to determine whether there is a violation of the first sentence, it is necessary to determine “(a) whether imported and domestic products are “like” products; and (b) whether the imported products are taxed in excess of the domestic products.” If either (a) or (b) is negative, then the second sentence must be reviewed. Imported and domestic products that are directly competitive or substitutable but not “like” products are covered by the second sentence of Article III:2.<sup>17</sup> WTO members cannot apply internal taxes or charges to imported or domestic products so as to afford protection to domestic products. Therefore, even if products are not like, they are still subject to constraints under the second sentence of Article III:2 if those products are directly competitive or substitutable.

While the definition of “like” products in Article III:2 is different from that of Article III:4, the definition of “like” products in Article I:1 should be the same of that in Article III (Hudec, 1998). In the case of internal taxes or charges, “like” products are subject to constraint to both Article I:1 and III:2. Also, in *Canada—Automobiles*, the Appellate Body (2000) found the prohibition of discrimination under Article I:1 to include both de jure and de facto discrimination; i.e., Article I:1 prohibits not only discrimination based on nationality but also the de facto discrimination. In *Japan—Alcoholic Beverage II*, the Appellate Body did not allow de facto discrimination (the tax was origin-neutral but in fact imported alcoholic beverages are treated less favorably than domestically produced ones) under Article III:2. Thus, violation of Article III:2 will be found if the group of “like” imported products are less favorably treated than the group of “like” domestic products (Appellate Body, 2001a). This is most likely to occur where the most efficient technology to produce a certain product is used in one country and the least efficient technology is used in another country.

Meanwhile, in *US—Superfund*, although the panel report was adopted before the establishment of the WTO, it was found that taxes on certain chemicals directly imposed on products is eligible for border tax adjustment and consistent with Article III:2 regulations (Panel Report, 1987). Since the Panel did not mention the likeness between imported goods produced with the chemicals and domestic goods produced without the chemicals — if this applies to the border tax adjustment for GHG emissions — a PPM-based taxation on both domestic and imported products should similarly not violate Article III:2. This WTO ruling allows legal space for potential tax-related emissions abatement policy. There are three major categories regarding PPM: (a) how produced standard, (b) government policy standard, (c) producer characteristics standard (Charnovitz, 2002). Among these, production standard is less likely to violate Article I or III. Indeed, the PPM at issue in *US—Superfund* was a “how produced” standard. This has important implications for the legality of tax related policy related to GHG emissions in production processes.

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17 See Text of Ad Article III of the GATT 1994.

### ***Calculation of tax rates***

Assuming, based on the above analysis, that it is technically legal to impose tax related emissions abatement efforts, we then need to determine how to calculate an appropriate and accurate tax rate linked to GHG emissions. How do we calculate tax rates based on GHG emissions in practice? This is a crucial question because it will determine whether a border tax adjustment is compatible with GATT obligations. An ideal method is that a tax rate is calculated based on actual emissions released from the production of a specific product. However, this requires that customs assess GHG emissions for each product precisely. This is not a realistic option because production methods and processes, the amount of energy used, the type of energy used, the efficiency of energy used and other factors vary widely, even among similar products. Customs cannot assess these factors at the border; therefore, alternative methods to calculate tax rates must be considered.

An alternative method is to apply a fixed single tax rate to all “like” imported goods. Some scholars have suggested that the tax rate could be calculated by what is known as the predominant method of production (PMP) tax or by the best available technology (BAT) approach (Tamiotti et al., 2009). Either method ignores variations of process and production methods among imported products, and assumes these would be produced using the same method and process. A tax rate based on the PMP would be higher than one based on the BAT, and therefore, the PMP method will reduce GHG emissions more than the BAT method does by better incentivizing change. In addition, there are two different ways to apply the PMP or the BAT; one is to choose the domestically predominant method of production or best available technology, and the other is to choose internationally predominant method of production or best available technology.

One clear problem of using a single standard is that there will be no reduction of tax rate even if foreign producers reduce emissions. Reduction of GHG emissions in production of exported goods does not bring any benefit to exporters or importers since the single tax rate will be applied to all similar products. With the incentive structure thus skewed, the effectiveness of a border adjustment approach is diminished. From the perspective of firms that produce goods more efficiently than the PMP, applying the PMP to them would seem unfair. Furthermore, assuming domestic firms pay a tax based on actual GHG emissions calculated by a certain method, imported products, which are produced by the most efficient method and the least GHG emissions intensive energy would have higher taxes imposed than domestically produced “like” products which consumed more energy in the production process. It is not merely unfair for imported goods but likely a violation of GATT Article III:2. The Appellate Body (1996a) in *US—Gasoline* confirmed that the baseline establishment rules, which allowed U.S. domestic refiners to use an individual baseline (established by the refiners) for qualities of gasoline while imposing a fixed statutory baseline from the Clean Air Act to importers of foreign gasoline (foreign refiners), was violating Article III:4. This ruling also found that it could not be justified under the chapeau of Article XX (discussed below). The Appellate Body (*ibid.*), at the same time, found it possible to use a statutory baseline only if data is not available. Therefore, allowing importers to use their own emissions data for establishing their individual baselines to reduce tax rates would be necessary in order to be consistent with

Article III. This holds true even in cases where a single standard of tax rate is applied to minimize discrimination between domestic and imported “like” products.

If an emissions tax scheme imposes the single tax rate on all “like” products regardless of GHG emissions released in production and of the origin of products, such taxes should be consistent with Article I and III:2, even if imported and domestic products are deemed “like” products under the WTO definition.<sup>18</sup> However, such tax schemes will not incentivize exporters in countries with no mitigation policy to reduce GHG emissions in place because reducing GHG emissions would not lower tax rates on their products. Thus, emissions leakage would continue to occur because relative prices between imported and domestic products would not change. Yet, as it increases the marginal costs of production, leading to an increase in prices of products and a decrease in consumption, it would eventually reduce production and consequently, to some extent, GHG emissions through production.<sup>19</sup>

### ***Exception Clause***

Even if a border tax adjustment is found to be in violation of these articles of the GATT 1994 at the WTO Panel and Appellate Body, there still remains an additional option given compliance that satisfies conditions of GATT Article XX. Article XX is an exception clause that allows measures to be exempted from GATT obligations if such measures satisfy one of the exceptions under Article XX. A measure must also be consistent with the “chapeau”, the introductory paragraph, of the article. A border tax adjustment measure designed to address emissions leakage and ultimately to combat climate change has relevancy under exceptions in Article XX(b) and (g). Paragraph (b) allows exception for a measure that is necessary for the protection of human, animal, or plant life or health. Paragraph (g) allows exception for a measure that is “relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption.” A border tax adjustment measure has to meet either paragraph stipulations in order to be exempted from the GATT 1994 and WTO regulations. The following sections review these two important exceptions as well as the Article XX “chapeau” in detail.

### ***GATT Article XX(b)***

This section explores the legal applicability of Article XX(b) exception clause under the GATT 1994 to border taxes as emissions mitigation policy. It is unlikely to be argued by the Appellate Court that climate change harms human, animal, or plant life or health. The challenge is with the wording of “necessary.” Threats of climate change, including temperature rise, sea level rise, and more severe natural disasters, will certainly damage human as well as animal and plant life and health. However, establishing whether a measure is “necessary” has been determined through a process of weighing and balancing a series of factors by the Appellate Body (Tamiotti et al., 2009). In *Brazil—Retreaded Tyres*, the Appellate Body interpreted “necessary” in a different way from previous cases.

<sup>18</sup> In this case, the tax will no longer be a GHG emissions-conjunction tax but rather a simple excise tax.

<sup>19</sup> Assuming that there is no substitution of the products that emits more GHG emissions.

It articulated that a measure must have contributed to the goal but does not have to be indispensable (Appellate Body, 2007). There only has to be a genuine relationship of ends and means between the objective pursued and the measure at issue, although “the contribution to the achievement of the objective must be material” and “the contribution of the measure has to be weighed against its trade restrictiveness, taking into account the importance of the interests or the values.” However, to what extent the Appellate Body considers “material” contribution remains unclear, as it did not seek further detail of the Panel’s theoretical measurement of impacts on the Brazilian measure (Van Calster, 2007). If such a measure is considered as necessary through the above analysis, then “this result must be confirmed by comparing the measure with its possible alternatives, which may be less restrictive of trade while providing an equivalent contribution to the achievement of the objective pursued” (Appellate Body, 2007). This is known as the least trade-restrictive test.

In the case of a border tax adjustment, states that introduce such a measure could argue that it brings a material contribution, which is a reduction of GHG emissions from traded goods, to the objective, which is global emissions reduction to mitigate damages from climate change. Also, its trade restriction — imposition of taxes on imported products under a domestic tax system — is much less distortional than the import ban considered in *Brazil—Retreaded Tyres*. Since emissions leakage spoils states’ mitigation efforts to tackle climate change, a border tax adjustment that reduces emissions leakage as well as global emissions may be weighed against its restriction, taking into account the importance of the interests (i.e., combating climate change). Then, alternatives to a border tax adjustment will be reviewed. Alternative measures that may be brought forward by complaining WTO members include international agreements to tackle emissions leakage and assistance for developing countries with no GHG mitigation policy. Therefore, before implementing a border tax adjustment measure, states may have to first seek these alternatives through international negotiations on climate change. Meanwhile, the weighing and balancing test remains unclear. To satisfy Article XX(b), a border tax adjustment must be designed to result in actual emissions reductions, which is likely to require potentially steep taxes on imported goods as well as the participation of major importing countries, such as the United States.

Finally, because a border tax adjustment is a PPM measure, there is a question as to whether a PPM measure is allowed under Article XX(b). In *US—Shrimp*, the Appellate Body implicitly permitted a PPM-based measure under Article XX(g) even though the measure was the most restrictive one — the import Ban (Hunter et al., 2010: p.1246). Indeed, later the Appellate Body (2001b) allowed the revised measure of the United States, which is still based on PPM. If this interpretation also applies to Article XX(b), a border tax adjustment is more likely to be allowed under Article XX(b). Although there is no relevant case in the WTO dispute settlement system so far to clarify this question, it would be difficult for the Appellate Body to prohibit a PPM measure if other conditions are met because the measure at issue is a border tax adjustment, which is a less trade-distortional measure.

**Article XX(g)**

This section explores the legal applicability of Article XX(g) exception clause under the GATT 1994 to border taxes as emissions mitigation policy. As noted above, paragraph (g) allows exceptions for a measure that is “relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption.” “Relating to” in Article XX(g) is generally considered to be a lower standard than Article XX(b)’s “necessary for” given that the Appellate Body in *US—Gasoline* made the distinction between these terms and stated that a necessity test should not be applied to XX(g) (Bordoff, 2009; Hunter et al., 2010: p.1238). Climate change policy is likely to fall within “conservation of exhaustible natural resource” as the Appellate Body in the *US—Gasoline* case affirmed that clean air is considered as an “exhaustible natural resources” (Appellate Body, 1996a). Next, “made effective in conjunction with restrictions on domestic production or consumption” is considered as “being promulgated or brought into effect together with restrictions on domestic production or consumption of natural resources.” Or, put another way, there is a “requirement of *even-handedness*,” as decided in *US—Gasoline* (ibid.). Thus, a border tax adjustment is likely to be considered acceptable as long as states implement a border tax adjustment together with their domestic tax scheme on GHG emissions. Furthermore, the case of *US—Shrimp* found a policy permissible under Article XX(g) even if it applied not only to sea turtles within the United States’ waters but also to sea turtles beyond its national jurisdiction (Tamiotti et al., 2009). This could also apply to a border tax adjustment based on the fact that GHG emissions from outside of states with domestic GHG emissions tax scheme have no less significance than emissions from elsewhere in terms of contribution to climate change. For this reason, a border tax adjustment is more likely to be consistent with Article XX(g). Considering that public health and welfare in states with mitigation policies will be adversely affected by GHG emissions from other states, it is plausibly allowable.

It is also important to consider whether or not a border tax adjustment is regarded as “relating to” the objective of conservation of a clean atmosphere (i.e., mitigating climate change). According to the report of the Appellate Body (1996a) in *US—Gasoline*, there has to be a “substantial relationship” between the means and the objective in order for a measure to be considered to be “relating to.” Here, it should be noted that the means are not just a border tax adjustment but also include a domestic carbon tax system (tax rates are determined based on GHG emissions associated with production). Similarly, in *US—Shrimp* “relating to” was interpreted as a “close and real relationship” between the means and the ends. There would be little problem to clarify that a border adjustment measure with a domestic tax system would satisfy this since a domestic mitigation measure reduces emissions. At the same time, a border tax adjustment reduces emissions leakage and GHG emissions by internalizing the negative externality of GHGs, while reduction of GHG emissions cannot be achieved without tackling emissions leakage. Finally, there is a concern regarding a PPM measure such as that in paragraph (b). As mentioned, a measure based on the PPM was allowed under Article XX(g) in the *US—Shrimp* case for the protection of sea turtles. As long as a border tax

adjustment is coupled with GHG emissions it will likely satisfy the above criteria, and is therefore less likely to be repealed on the grounds of a PPM violation according to a paragraph (b) stipulation that was also applied in the case of *US–Shrimp*.

### ***Chapeau of Article XX***

In the case that a border tax adjustment meets either paragraph (b) or (g) of Article XX, then it must additionally satisfy the requirement of not conflicting with the chapeau of Article XX. The objective of the chapeau is, in general, to ensure that the Article XX's exceptions are not abused by WTO members, and that "WTO Members' rights to avail themselves of exceptions are exercised in good faith to protect interests considered legitimate under Article XX, not as a means to circumvent one Member's obligations towards other WTO Members" (Appellate Body, 2007). How this is applied in practice has been reviewed by the Appellate Body (1998).

Firstly, a border tax adjustment must not be applied as "a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail." Arbitrary discrimination was found in *US–Shrimp* as the United States imposed a certain measure on other WTO members without taking into consideration the appropriateness of the measure for conditions prevailing in those states (*ibid.*). Furthermore, how the United States applied the measure and how they issued the certification, was deemed a "rigid and inflexible" measure, which constituted "arbitrary discrimination." Unjustifiable discrimination was also found in the case. Requiring exporting countries to adopt exactly the same policy (in this case, using a special fishing method) by exercising an embargo on their related good was considered as unjustifiable discrimination. The Appellate Body (*ibid.*) also found that excluding exported shrimp caught by the identical method in the jurisdiction of states not certified by the U.S. law is not consistent with the object of the measure, which suggests that it is more concerned with influencing other states to adopt the same regulatory regime. Furthermore, the Appellate Body (*ibid.*) pointed out that a failure to engage exporting states in serious and "across-the-board negotiations" to have bilateral or multilateral agreements for protection of natural resources is another aspect of unjustifiable discrimination. Moreover, negotiating seriously with some exporting states but not with others was also deemed unjustifiable (i.e., it is a form of MFN-related discrimination). The Appellate Body (1996a) in *US–Gasoline* similarly found it unjustifiable that the United States allowed domestic refiners to use an individual baseline while applying a statutory baseline to importers of foreign gasoline; i.e., foreign gasoline was treated less favorably than domestic gasoline (i.e., National Treatment-related discrimination). Finally, the Appellate Body (2008) in *Brazil–Retreaded Tyres* stated that whether application of a measure is arbitrary or unjustifiable depends on "the cause or rationale given for the discrimination." It found that a discrimination (between MERCOSUR countries and other WTO members) that goes against the objective of a measure is arbitrary or unjustifiable.

Additionally, the measure that satisfied one of the paragraphs of Article XX must not be applied in a manner that would constitute "a disguised restriction on international



trade.” The Appellate Body (1996a) in *US—Gasoline* clarified that disguised restriction includes “disguised discrimination” and that disguised restriction “may properly be read as embracing restrictions amounting to arbitrary or unjustifiable discrimination in international trade taken under the guise of a measure formally within the terms of an exception listed in Article XX.” This finding means that determination of disguised restriction takes the presence of arbitrary or unjustifiable discrimination into account (Appellate Body, 1998). Given the correlation, determination of disguised restriction is influenced by arbitrary or unjustifiable discrimination because the Appellate Body articulated that the baseline establishment rule is disguised restriction on international trade as well as unjustifiable discrimination. Unlike the import ban measures seen in the above cases, a border tax adjustment measure does not completely block importing goods and therefore is less trade restrictive than an import ban. Consequently, the probability of being permissible within the rules of Article XX is higher than for an import ban.

Furthermore, a multilateral border tax adjustment scheme is likely to be deemed less arbitrary and involve less unjustifiable discrimination than a unilateral policy. A multilateral measure is likely to achieve more emissions reduction from traded goods and thus have more impact on climate change. Hence, there is likely to be a more significant relationship between the measure and the goal of a border tax that is implemented multilaterally. Also, a border adjustment measure built into a multilateral climate change agreement at least builds consensus among some states and is accepted by a certain number of states. Through crafting an agreement, states naturally negotiate with other states and determine if there is another solution to combat the emissions leakage issue. Thus, it is expected that those states inevitably try to engage affected states in “across-the-board negotiations.” It is less likely to be deemed “unjustifiable discrimination” if such negotiations are not conducted in a discriminatory way. Moreover, apart from the legal reasons, repealing such a measure is, in practice, more difficult than repealing a unilateral measure because it is more logistically complicated.

### ***Article XXV:5***

There is one other way in which a border tax relating to GHG emissions may be accepted under WTO regulations. Article XXV:5 allows WTO members to waive the GATT obligations of other WTO members, if it is approved by a two-thirds majority of the votes cast.<sup>20</sup> However, this may be triggered only in “exceptional circumstances.” A multilateral border tax adjustment built into a multilateral climate agreement, which is presumably comprised of developed countries, is unlikely to be considered as an “exceptional circumstance.” If it were so, most climate change policy would also be regarded in the same way, which would render the GATT 1994 toothless. Furthermore, gaining the two-thirds majority votes is extremely difficult given the number of WTO members (153, as of February 2011 (WTO, 2011b)). Therefore, Article XXV:5 would probably not be an effective tool for justifying a border tax adjustments. Rather, such an approach needs to be compatible with general principles of the GATT 1994 or satisfy the requirements of Article XX.

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20 The two-thirds majority must comprise more than half of the WTO members.

#### 4.4.2 A REQUIREMENT OF HOLDING EMISSIONS ALLOWANCES FOR IMPORTERS UNDER A CAP-AND-TRADE SCHEME

Where there are some similarities in legal aspects between a border tax adjustment and a requirement of holding emissions allowances for importers (just like domestic producers must hold allowances) under a cap-and-trade scheme, there are also essential differences between architectures of the two measures.

One of the major differences is that emissions permit requirements for importers might be considered as a regulation as opposed to an internal tax. If one defines a tax as a compulsory contribution imposed by the government for which taxpayers receive nothing identifiable in return, the requirement of holding allowances for firms would also be deemed as “a tax” since those firms do not receive any identifiable return (benefit) from it. On the other hand, if one defines a tax as involving money on top of the above definition, and affected firms are given free allowances in a cap-and-trade scheme, requirements of holding allowances is unlikely to be regarded as a tax. Yet, if affected firms have to purchase allowances from the government (i.e., auction-based allocation), the requirement of holding allowances may fall within a tax.

Even if the measure is not considered a tax, Article II:2(a) allows a charge to imported products which is equivalent to an *internal tax* imposed consistently with Article III:2 “in respect of the like domestic product *or* in respect of an article from which the imported product has been manufactured or produced in whole or in part.” If a cap-and-trade scheme adopts auction-based allowances, the requirement of holding allowances is likely to fall within the charge. Therefore, the requirement of holding allowances, which is equivalent to a charge, under the absence of a relevant internal tax, would be inconsistent with Article II:2(a) and not permissible under WTO regulations. Pauwelyn (2007: note 54) provides an alternative interpretation regarding the language of Article II:2(a). Since the article not only refers to an internal tax but also cross-refers to Article III:2, one can argue that *internal tax* can be interpreted as “internal taxes or other internal charges of any kind.” In that case, the requirement of holding allowances for importers would be permissible because it is an equivalent internal charge (a requirement for domestic firms).

Meanwhile, if the requirement of holding allowances is not deemed a charge, which may happen if the cap-and-trade scheme allocates allowances free of charge, Article II will be irrelevant. In that case, the measure has to satisfy Article III:4 rather than Article III:2, which applies to an internal tax or charge. Article III:4 requires that imported products be treated “no less favorable than “like” domestic products of national origin in respect of all laws, regulations and requirements affecting their internal sale, offering for sale, purchase, transportation, distribution or use.” The definition of “like” products in this paragraph is different from that in paragraph 2. The Appellate Body (2001a) mentioned that the likeliness of products in Article III:4 is concerned with competitiveness relationships between and among products. This also affects the interpretation of paragraphs in Article XX in the case that an allowance

holding requirement is not consistent with basic articles of the GATT. Like the case for an internal tax, there will be an issue of interpretation of PPM measure regarding GHG emissions. Violation of Article III:4 will be found if “like” products from foreign countries are less favorably treated than “like” domestic products.

If the measure is not consistent with Article III:4, it will be subject to Article XI, the prohibition of quantitative restrictions. A regulation could be justified if it falls within the Agreement on Technical Barriers to Trade (TBT Agreement). However, since imported goods subject to a border adjustment do not contain any trace of process and production methods, the border adjustment may not fall within “technical regulation” under the TBT Agreement (Pauwelyn, 2007). In this case satisfying requirements under Article XX is the only way that allowance holding is permissible under the GATT 1994 regulations.

Generally speaking, it is unlikely that such regulation would be allowed under the GATT 1994 regulations. Requiring the holding of allowances is likely to be deemed a tax or charge since WTO law prefers price-based measures to regulations (*ibid.*). Therefore, in sum, a border adjustment under a cap-and-trade scheme is less likely to be compatible with WTO law than a border tax adjustment under a domestic tax system.

#### 4.5 COMPATIBILITY BETWEEN WTO LAW AND TAX MEASURES ON DOMESTICALLY PRODUCED GOODS

This section examines compatibility of (a) domestic tax rebates or free allowances for specific sectors, and (b) domestic tax rebates for exported goods, with that of border adjustment measures for imported goods.

##### 4.5.1 TAX REBATES OR FREE ALLOWANCES FOR SPECIFIC SECTORS

Tax rebates for and allocating of free allowances to specific domestic firms (i.e., firms in an energy-intensive and trade-exposed industry) brings benefits to them vis-à-vis foreign exporting firms when such measures are implemented with border adjustment measures. Therefore, there is a possibility that such measures are considered as “subsidies” under the Agreement of Subsidies and Countervailing Measures (SCM Agreement) within the WTO. Subsidies are not allowed except in specific circumstances under the WTO. Consequently, these must not be inconsistent with the SCM Agreement to be allowed under WTO law. Article 1 of the SCM Agreement defines a subsidy as a measure that meets three criteria. It is (a) a financial contribution, (b) by a government or any public body within the territory of a WTO member, and (c) confers a benefit. All these criteria must be simultaneously satisfied for a measure to be defined as a subsidy. Tax rebates to domestic firms meet these three criteria. Allocation of free allowances is also considered a subsidy if it is deemed a financial contribution because

such allowances have financial value in the allowance trading market. If such a subsidy is categorized in one of the specificities that are listed under the SCM Agreement, namely enterprise specificity, industry specificity, regional specificity, and prohibited subsidies, then it is subject to the SCM Agreement.

Export subsidies and local content subsidies are prohibited under Article III of the SCM Agreement. Export subsidies are subsidies contingent on export performance. Local content subsidies are subsidies contingent on the use of domestic over imported goods, and are also inconsistent with GATT Article III (National Treatment clause). Therefore, tax rebates and free allowances to domestic firms without condition upon export performance are categorized neither as export subsidies nor local content subsidies.

It is possible then, that these measures would be categorized in actionable subsidies that may be allowed under the SCM Agreement. However, they are subject to challenge within the WTO dispute settlement mechanism if they cause adverse effects to the interests of another WTO member. Such adverse effects are defined in Article 5 of the SCM Agreement. First, injury to a domestic industry caused by subsidized imports. Second, nullification or impairment of benefits accruing under the GATT 1994, in particular benefits regarding concessions under Article II of the GATT 1994. Nullification or impairment arises when the improved market access presumed to flow from a bound tariff reduction is undercut by subsidization. Third, when serious prejudice also harms the interest of another WTO member. This occurs when subsidies displace or impede the imports of a “like” product of another member into the market of the subsidizing member or in a third country market. It is more likely to be found than other adverse effects if free allowances are given to domestic firms (Bordoff, 2009). This is because imported goods are not given free allowance while domestically produced goods (“like” products) receive them so that exporting countries may argue that the imported goods are displaced. Tax rebates are even more likely to be applied since they are direct financial contributions. There is an argument that domestic firms raise prices by the amount of tax or prices of emissions permits and output of production does not change, and therefore tax rebates or free allowances do not damage imported goods in the market of the subsidizing country (*ibid.*).<sup>21</sup> However, whether they pass on the cost (including the opportunity cost accruing in a cap-and-trade scheme) to their consumers is still unclear as domestic firms may reduce prices of products to compete with “like” imported products. It is possible that a WTO member could claim damages caused by these measures and bring it to the WTO dispute settlement mechanism if the measures meet one of the criteria of serious prejudice under Article 6.1 of the SCM Agreement. Since the SCM Agreement does not have the exception clause included in Article XX of the GATT 1994, violation of the SCM Agreement cannot be justified by the agreement itself; therefore, the measure cannot be implemented if it is found inconsistent with the SCM Agreement.<sup>22</sup>

21 Bordoff discussed only impacts of free allowance but not impacts of tax rebates in his article.

22 There is no case so far where satisfying GATT Article XX exemption can be applied to the SCM Agreement.

#### 4.5.2 TAX REBATES FOR EXPORTED GOODS

Under WTO law, Article III of the SCM Agreement prohibits export-contingent subsidies. However, in certain circumstances tax rebates for exported products would be permissible under the GATT and the SCM Agreement. An exporting tax rebate is allowed under Article II:2(a) if a carbon tax imposed on domestic firms, a border tax adjustment is imposed on imported good, and they fall within Article III:2 (i.e., if the “like” products issue is resolved) and therefore satisfy requirements of Article II:2(a) as an internal tax, (Pauwelyn, 2007). The country that imposes what is considered a domestic tax has the right to rebate a tax on domestic products that are exported to other countries. Thus exported goods will not be disadvantaged vis-à-vis goods produced in importing countries under the imposition of domestic tax. Since exported goods taxed in exporting countries are taxed again in destination countries where a similar domestic tax applies, this is particularly important for trades between countries with a domestic tax.

Tax rebates for exporting goods are also allowed in the case of the introduction of a requirement of allowances holding to importers with a cap-and-trade scheme if such an adjustment is considered as a charge, and satisfies both Article III:2 and Article II:2(a). However, if a cap-and-trade scheme and its requirement for importers to hold allowances is not regarded as a tax, but rather a regulation, exporting rebates would no longer be exempted from the SCM Agreement. The SCM Agreement does not allow WTO members to use a border adjustment for exported goods based on a domestic regulation but only based on taxes or duties (ibid.). It is likely to violate the SCM Agreement given that tax rebates for exported goods are very likely to fall within the definition of subsidies. Furthermore, it would be considered an export-contingent subsidy and therefore not allowed under WTO law.

In summary, whether or not tax rebates for exporting goods are allowed under WTO law depends on whether a domestic mitigation measure is considered a tax and if a tax based on the PPM satisfies GATT Article III:2. Like the permissibility of border adjustment for imported goods under the GATT articles, tax rebates for exporting goods based on a domestic GHG emissions tax is more likely to be permitted than a tax regulation based on a cap-and-trade scheme.

#### 4.6 SUMMARY

While trade measures cannot address the emissions leakage issue fully, they are able to partly mitigate emissions leakage without the consent of affected countries. In terms of emissions reduction between several different potential trade measures, border adjustments for imported goods are more effective than tax rebates or the allocation of free emissions allowances to domestic products. Compatibility with WTO law is the biggest concern when states implement trade measures. Although the interpretation of “like” products and the PPM is not clear, carefully designed border adjustment

measures incorporated in an international climate change agreement could be compatible with GATT and WTO obligations. Even if the measure is not consistent with GATT articles, it would satisfy the exception requirements of GATT Article XX, given that they are multilateral in approach and that the trade restriction at issue is related to financial restrictions. This contrasts with unilateral trade measure or a quantitative restriction.

Tax rebates and free emissions allowances with border adjustment measures are subject to the SCM Agreement. It is unclear whether these measures are consistent with the agreement and it depends on the significance of the tax rebates. Tax rebates for exported goods with a border tax adjustment for imported goods are likely to be exempt from the SCM Agreement. It is, however, less clear whether tax rebates with a requirement of allowance holding for importers under a cap-and-trade scheme would be permissible under the SCM Agreement. It would only be compatible with the SCM Agreement if a cap-and-trade scheme were considered an internal tax.

# Section 5: Possible International Climate Change Agreements to Address Emissions Leakage

## 5.1 INTERNATIONAL CLIMATE CHANGE AGREEMENT IN WHICH ALL STATES PARTICIPATE

### 5.1.1 ARCHITECTURE OF THE AGREEMENT

Taking into consideration political feasibility as well as the difficulty of implementation in practice, there is little possibility that all countries will agree and comply with an international framework that harmonizes domestic mitigation policies. Such schemes as a global carbon tax or cap-and-trade scheme will be logistically and politically difficult to agree on, even if some developing countries are exempted from the emissions reduction commitment. Given this reality, the second best option is to pursue an agreement that requires all states to commit to emissions reduction targets but allows them decide on target levels and how to achieve them. Although the challenge of putting together such an agreement is significant, it is not unthinkable, as discussed in Section 3.

Were such an agreement to be adopted and signed by states, ensuring compliance would be an important additional challenge, even if states were to sign a legally binding agreement. Although imposing monetary fines on parties that fail to comply with the agreement would be one option, the party may not pay the fine as there would be no judicial system to force them to do so. Prohibiting access to relevant funding mechanisms or other beneficial mechanisms for states that do not comply with the agreement may be another useful incentive. However, it requires sufficient funding to ensure the payoff of compliance exceeds that of non-compliance. Although this is not impossible, it may discourage some states from participating in the agreement, as they would likely be required to contribute to those funding mechanisms. Lastly, states may choose to utilize trade measures to address compliance issue. Unlike a monetary punishment, a trade measure does not require a non-party to accept the penalty. It also does not need to make concessions for parties, unlike funding mechanisms, to maintain incentives to secure compliance with the agreement. The following subsection outlines the ability of trade measures to help ensure compliance with an agreement.

### 5.1.2 TRADE MEASURES TO REINFORCE THE AGREEMENT

Trade measures in multilateral environmental agreements, in general, have three major functions. These functions are (Brack and Gray, 2003: p.7):

- “To provide a means of monitoring and controlling trade in products where the uncontrolled trade would lead to or contribute to environmental damage. This may extend to a complete exclusion of particular products from international trade.
- To provide a means of ensuring compliance with Multilateral Environmental Agreement (MEA) requirements.
- To provide a means of enforcing the MEA, by forbidding trade with non-parties or non-complying parties.”

The first function of trade measures in multilateral climate change agreements is to address trade-related emissions and the emissions leakage issues as discussed in the previous section. The second function is to ensure that parties comply with the agreement. For example, the Montreal Protocol requires parties to reduce consumption of ODS (Ozone Depleting Substances), which includes imported ODS. Trade measures must be available to control imported ODS. If targets of GHG emissions reduction in international climate change agreements include not only domestic emissions but also imported emissions (i.e., consumption-based reduction targets are set), this function of trade measures will be essential to control imported emissions. The third function is to enforce and strengthen MEAs so that such agreements are able to address the environmental concerns at issue more effectively. Due to the nature of international law, even a legally binding treaty cannot force its parties to comply with commitments in the treaty. Hence, a multilateral environmental agreement has to be self-enforcing to be effective. In the case of a climate change mitigation agreement, it is even more significant to have such enforcement mechanisms, largely because the costs of compliance are much higher than for any other MEA currently in existence.

The subsections below explore two different but similar effects of this function – involvement of countries and compliance of parties to the agreement.

#### ***Involvement of non-parties***

While trade measures can directly address the emissions leakage issue and contribute to global GHG emissions reductions, they can also do so indirectly by increasing the number of participants in such agreements. If an MEA has a provision that imposes trade measures on non-parties to decrease the incentive of free riding, the probability of having more numbers of parties in the framework will increase. Barrett (1997) argues this idea applies to the trade sanction in the Montreal Protocol. Trade measures decrease the payoff of being a non-party. Furthermore, the more states involved in such a framework, the higher the payoff for a participating state because the volume of GHG emissions reductions will increase, thereby mitigating damages caused by climate change.



Utilization of trade measures is not uncommon in the history of development of international environmental agreements. The Montreal Protocol has trade provisions that impose restrictions on international trade of ODS on parties to the Protocol. Article 4 of the Montreal Protocol prohibits parties from trading ODS and products containing ODS with non-parties. There is an exception that a party to the Montreal Protocol can export ODS to a non-party only if the non-party complies with the Protocol.<sup>23</sup> The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) regulates trade in species that are in danger of extinction. CITES allows parties to trade these species only with parties, unless non-parties have relevant measures that are equivalent to provisions in CITES (Article X). Similarly, the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Disposal (Basel Convention) also has a provision that prohibits trade of hazardous wastes between parties and non-parties. Article 4.5 prohibits parties from trading hazardous wastes with non-parties. Article 11.1 allows parties to trade hazardous wastes with non-parties only if these parties and non-parties enter into bilateral or multilateral agreements that do not deteriorate environmentally sound management of hazardous wastes as required by the Basel Convention. Although both CITES and the Basel Convention have a provision that allows trade between parties and non-parties, they allow this only if non-parties have taken equivalent measures to the treaties.<sup>24</sup> Therefore, such provisions do not harm environmental quality. Furthermore, they reduce the incentive of states to be a non-party as they minimize the difference in payoffs between participation and non-participation. While objectives for having trade measures vary between treaties, trade measures have a similar effect.

Some multilateral environmental treaties have already incorporated trade measures as a means to increase effectiveness. Some treaties go so far as to impose trade bans with non-parties – the most restrictive trade measure available. Many of these provisions are likely to violate general principles of the GATT 1994<sup>25</sup> and other agreements under the WTO. Nonetheless, no WTO member (or GATT contracting party before the establishment of the WTO) has so far brought the issue to the WTO dispute settlement body. This may not be because trade restrictions in these treaties are compatible with WTO law, but because most parties to these treaties are also WTO members. That said, an international climate change agreement with trade measures would benefit from replicating some of the characteristics of those treaties that already have trade-related restrictions in place.

### ***Compliance of parties***

Trade measures can also be used as an incentive tool to discourage withdrawal and encourage compliance by existing parties. Non-compliant parties are subject to trade provisions. These trade provision in turn decreases the payoff of non-compliance.

23 Exporting ODS to non-parties cannot be subtracted from consumption of home country.

24 The Montreal Protocol has a similar provision but it is less flexible than CITES or the Basel Convention.

25 As to the Basel Convention, there is an issue whether certain wastes are included in the definition of products in the GATT 1994.

However, trade restrictions for non-compliance are rare in MEAs (OECD, 1999: p.179). For example, in the case of the Montreal Protocol, non-compliant parties cannot trade with parties and this is just “one of a set of possible options for dealing with non-compliance” (ibid.). This is largely because parties have a concern that such sanctions will cause non-compliant parties to withdraw from the Montreal Protocol (Hunter et al., 2010). To avoid withdrawal, the Montreal Protocol has a mechanism that assists non-compliant parties through funding mechanisms to help them comply with their commitments under the protocol. It is also possible to use such financial assistance for a climate change treaty, but trade measures would still be needed because financial assistance on its own is unlikely to be sufficient for incentivizing compliance.

### 5.1.3 TRADE MEASURE DESIGN AND LEGAL ISSUES

The purpose of a trade measure in this climate agreement is not achieving emissions reduction directly but to ensure compliance and diminish incentives to exit from the agreement. It should not impact parties in the agreement since all parties have mitigation targets and policies. Products imported from both non-parties and non-compliant parties should be subject to additional taxes at the border. To maintain an incentive to stay in the agreement, however, the levels of additional tariffs on goods from non-compliant parties should be lower than from non-parties and should be flexible in individual cases of non-compliance.

A border measure in this climate change agreement differs essentially from those measures discussed in the other sections. It is not a border adjustment measure because some parties can impose higher tariffs on imported goods from non-parties or non-compliant parties, even if these parties do not have any domestic GHG emissions tax system or charge (e.g. parties can implement command-and-control type policies to reduce emissions). Thus, a border measure does not link to the domestic mitigation policy of parties.

Practically speaking, given that a vast majority of countries would need to sign the agreement, there would be little concern relating to the violation of WTO law. Even if a border measure in the agreement were violating the GATT 1994, few states would bring the issue to the WTO dispute settlement system. Furthermore, even if some states were to do so, it is difficult for the Panel and the Appellate Body to order a defendant state to repeal its border measure based on a multilateral climate agreement, as doing so affects all parties. In this case we can assume more than one hundred countries would be parties to the agreement. Therefore, this paper does not examine the details of the design of trade measures that would be compatible with WTO law.

## 5.2 INTERNATIONAL CLIMATE CHANGE AGREEMENT WITH TRADE MEASURES

If building a consensus among states to establish the abovementioned agreement fails, then states may seek alternatives to combat emissions leakage and realize global emissions reduction. States willing to reduce domestic GHG emissions can negotiate and establish a multilateral framework where participating states agree with emissions reduction targets (the targets and timetable approach) as well as border adjustment measures to mitigate emissions leakage and trade-related emissions.

As discussed in the previous section, trade measures incorporated in international climate agreements might conflict with WTO law. However, carefully crafted measures with internationally collaborative actions can be compatible with such law. If states jointly introduce a border adjustment measure based on a multilateral climate agreement, the measure is more likely to be accepted by the WTO dispute settlement body. First, such a measure is less likely to be recognized as an arbitrary or disguised protectionist policy as it is a multilateral trade measure as opposed to a unilateral measure. Second, it is more effective than unilateral border adjustments in terms of emissions reductions so is more likely to satisfy Article XX (b) or (g) because of the closer relationship between the means and the end.

Under such an agreement, states could introduce either a domestic tax on GHG emissions or a cap-and-trade scheme to justify a border adjustment measure (i.e., applying a domestic tax or cap-and-trade scheme on imported products).<sup>26</sup> Although harmonizing a domestic mitigation policy among states in this type of climate change agreement is preferable in terms of consistency and transparency, factors such as domestic politics make it difficult for states to agree. For example, the United States historically has had difficulty with increasing tax rates and the introduction of new tax schemes in general. In the case of an emissions tax, it is even more difficult than other tax schemes given the current political situation in the United States. The European Union has also had political difficulty in introducing a carbon tax because doing so requires unanimity in the European Council (i.e., it needs all WTO members' votes). Nevertheless, states struggling with a budget deficit might prefer a carbon tax system or full auctioning cap-and-trade system. Therefore, it may be necessary to allow states to choose between these two mitigation policies both to increase the feasibility of creating such an agreement and to include as many participants as possible. However, whether a cap-and-trade scheme falls within a tax or charge is unclear as discussed in Section 4, requiring participants to adopt auction-based allocation of allowances under a cap-and-trade system as opposed to free allowances will increase the likelihood of consistency with the GATT regulations. Lastly, like the case of an international climate change agreement in which all states participate, there are concerns regarding compliance with and withdrawal from the agreement, even though the agreement utilizes trade measures. Any such agreement should address the issue of enforcement.

<sup>26</sup> Command-and-control or voluntary agreement approaches cannot be used since they cannot be justified as a border adjustment measure.

Depending on the treatment of non-parties to the agreement, the design of border adjustment measures in an international climate change agreement can be divided into two approaches. The first is to apply a border adjustment for imported goods from only non-parties; the second is to apply a border adjustment for all imported goods.

***(a) An agreement that applies a border adjustment to only imported goods from non-parties***

This type of border adjustment imposes taxes only on imported products from states that do not participate in the agreement. Therefore, it will be deemed discriminatory, as it discriminates between “like” products from different states, and will thus be considered a violation of GATT Article I (the MFN clause). To avoid a violation of the GATT 1994 regulations, such measure must satisfy requirements of Article XX and be exempt from GATT obligations. Article XX is detailed in Section 4. There are some key features that a new international climate change agreement must have to fall under Article XX, and in particular, its chapeau. These include, but not limited to, the following:

- *Pursuing an international climate change agreement before implementing a border adjustment measure*

Before states pursue a multilateral climate change agreement that implements a border adjustment measure to non-parties, they must negotiate a better (i.e., a less trade restrictive) multilateral climate change agreement. Therefore, states should first seek an international climate agreement in which all states participate.

- *Including as many countries as possible in the agreement*

This is essential to increase overall effectiveness of border adjustment measures to mitigate emissions leakage. If the measure is effective and widespread, it is less likely to be recognized as disguised protectionism. Also, it demonstrates a close causal relationship between the means (i.e., a border adjustment) and the end (i.e., reduction of emissions leakage and climate change), which is necessary to satisfy both Article XX(b) or (g).

- *Allowing importers to use their own individual emissions data to determine tax rates on products, while applying a tax rate based on PMP practices*

For practical reasons, this border adjustment has to use the predominant method of production — either an internationally predominant method or predominant method among parties. At the same time, given that domestic products are taxed based on actual emissions, not allowing imported goods to be taxed based on actual emissions (which should be less than the emissions calculated by the PMP) would be considered as arbitrary or an unjustifiable discrimination between domestic and imported products.

- *Not applying a border adjustment measure to non-parties which have a mitigation policy that is comparable in effectiveness to the mitigation policy of parties*

A border adjustment measure should not be applied to countries that do not participate in the agreement but take serious actions to address the issue through their own

domestic policies, even if they do not have a GHG emissions tax system or a cap-and-trade scheme. A border adjustment measure does not aim to distort trade activities but to reduce trade-related emissions and emissions leakage. It should allow countries to be non-parties as long as they also attempt to reduce emissions earnestly. Discrimination based merely on differences between parties and non-parties could be considered “arbitrary” or “unjustifiable” discrimination under Article XX. The Appellate Body (2001b) in *US—Shrimp* confirmed that conditioning market access on the adoption of a program comparable in effectiveness can avoid arbitrary or unjustifiable discrimination.

- *Setting transparent procedures regarding the determination of tax rates, certifying non-parties to the agreement that have comparably effective measures, and providing an opportunity to hear claims from these states*

This also aims to avoid the measure being viewed as arbitrary or unjustifiable discrimination. The *US—Shrimp* case clarified that violation of Article X:3 of the GATT 1994, in particular a lack of transparency of procedures for certification, can find a measure arbitrarily discriminatory (Appellate Body, 1998). Determination of tax rates will depend on each participating country. Though there will be some minimum standards that will be determined by parties, it is necessary to ensure transparent and reasonable procedures. Compatibility with the agreement of policies for non-participants should also be discussed at the conference of the agreement in a transparent manner.

- *Taking into consideration conditions affecting non-parties in determining the scheme*

There are arguments that parties might have to consider (such as economic development levels or the CBDR principle under the UNFCCC) when implementing a border adjustment (Pauwelyn, 2007; Bordoff, 2009<sup>27</sup>). On the other hand, using a PMP standard to determine tax rates is likely to be more favorable for countries where inefficient process and production methods are used. Furthermore, the Appellate Body (1998; 2001b) in *US—Shrimp* did not mention that the United States must consider the economic development levels of affected countries or relevant international environmental treaties. Also, a border adjustment is not an embargo but a financial measure. Even non-parties with no mitigation policy are able to export products to parties. Therefore, it is not necessary to apply a border measure to non-parties based solely on their economic development levels or historical GHG emissions. Nonetheless, parties should make efforts to make procedures of determination “comparable in effectiveness” as flexible as possible to ensure compatibility with GATT Article XX.

- *Encouraging states to adopt an auction-based allowance allocation system under a cap-and-trade scheme (in the event that they cannot introduce emissions tax policies)*

This is to increase the probability of satisfying requirements under Article XX. A cap-and-trade scheme with auction-based allocation is more likely to be considered a tax or a charge, rather than a regulation. However, coercing states to adopt such allocation

27 Pauwelyn (2007) mentioned economic development levels and Bordoff (2009) mentioned the CBDR principle.

systems may decrease the number of states wanting to participate in the agreement. Therefore, it is important to balance these benefits.

As noted above, in addition to concerns over compatibility with WTO and GATT regulations, this type of agreement also faces enforcement challenges (i.e., non-compliance and withdrawal). A feasible international climate change agreement would provide non-parties incentives to join the agreement because of a difference in treatment between imported products from parties and non-parties. Participation in the agreement could eliminate the imposition of tax on their exports or inclusion of importers in a cap-and-trade scheme. Therefore, this agreement may be able to reduce GHG emissions not only in traded goods but also non-traded goods due to domestic policies. Moreover, there is also a concern of compliance with the agreement. To avoid non-compliance, a border adjustment measure may be needed. Again, such punishment should be less stringent than a border adjustment measure applied to non-parties.

***(b) An agreement that applies a border adjustment on imported goods from all countries***

This border adjustment approach either imposes taxes on imported products from all states or requires allowance holdings for importers of goods from all states depending on domestic policy. This approach operates regardless of participation in the agreement and existence of a domestic climate mitigation policy. Since goods traded between parties will be taxed twice — in both the home and the importing country — this will require exporting tax rebates to avoid double taxation or no country will be willing to participate in the agreement. A remarkable difference from the above agreement option (a) is that there is no discrimination based on distinction between parties and non-parties (i.e., likely to fall within the MFN clause). Accordingly, as long as goods produced with different GHG emissions are not considered “like” products by the WTO dispute settlement body, this measure is likely to be compatible with the GATT obligations.

It may raise a question regarding the necessity of the agreement in the first place, since states can introduce such measures unilaterally without having the agreement and there is no incentive to participate in the agreement, both for states with and without domestic a mitigation policy. Despite this issue, the above detailed international climate change agreement still has merits. First, if the measure is found violating basic articles of the GATT, it would be easier to define as an Article XX exception as it is not a unilateral but multilateral measure. Second, the agreement would increase the effectiveness and certainty of a border adjustment measure by increasing the number of states that introduce the same measure. Also, states in the agreement could limit more extreme border measures that distort international trade. Moreover, such an agreement would encourage states that face domestic opposition toward mitigation policies (due to competitiveness concerns) to adopt a domestic mitigation policy with the border adjustment measure.

On the other hand, this measure must be subject to the SCM Agreement. Tax rebates for exported products are likely to be considered subsidies. In the case of tax rebates under a domestic tax system on GHG emissions, these can be exempt from the SCM Agreements as discussed above. On the other hand, if participants adopt a cap-and-trade scheme with free allowance and it is judged a regulation, tax rebates will probably violate the SCM Agreement because such rebates are likely to be categorized as export-contingent subsidies. Thus, under a cap-and-trade scheme, parties would have to adopt an auction-based allocation of allowances. However, under this scenario it is still possible that such a cap-and-trade scheme could be regarded as a regulation. Whereas this agreement is more likely to be compatible with the basic articles of the GATT 1994, it is likely to violate the SCM Agreement. Although it is more likely to be compatible with the SCM Agreement if all states in the agreement adopt a domestic tax scheme on GHG emissions, the agreement might then have fewer willing participants given the difficulty of introducing such a tax system in some states. Consequently, the effectiveness of the agreement could be significantly diminished. Therefore, agreement (a), described above, is the preferred approach.

### 5.3 SUMMARY

In order to effectively address the leakage issue, states should pursue an international climate agreement that obliges all states to reduce GHG emissions. However, given the core features of the climate change problem, the agreement must have enforcement mechanisms to increase the incentive for parties to comply with and remain in the agreement. Trade measures have been successfully used for this purpose in other multilateral environmental agreements. A trade measure that imposes additional taxes on imported goods from non-compliant parties and non-parties and thereby reduces the payoffs of non-compliance and withdrawal from the agreement is a potent option.

In the case that states cannot reach an agreement, those willing to reduce emissions can and should seek an alternative approach. An international climate agreement with trade measures that mitigate emissions leakage is one option. Border adjustment measures can be imposed on imported goods from either all states or only non-parties. Since such an agreement must comply with WTO law, states would be more successful in pursuing an agreement that imposes border adjustment measures only on imported goods from non-parties. Such border adjustment measures should also be imposed on imported goods from non-compliant parties to address the enforcement issue.

## Conclusion

The adverse effects of emissions leakage on both global emissions reduction and the functions of international climate change agreements have been overlooked in the discourse on international climate mitigation policy. The scope of emissions leakage currently discussed in the literature is overly limited and does not address trade-related emissions. This is particularly important because trade is the area in which most emissions leakage takes place. This paper thus proposes a more comprehensive definition of emissions leakage that includes significant trade-related emissions. It defines emissions leakage as emissions that are intended to be limited by mitigation commitments, but that are in actuality continuing through various other channels. Since these trade-related emissions substantially affect global GHG emissions, the design of both international and domestic policies must take into consideration the effects of emissions leakage in order to be effective. This research determines that despite an unfortunate lack of focus on this issue in international climate negotiations, it is essential to address the leakage issue if we are to ensure an effective international climate change agreement or effective domestic climate policies.

This research paper has proposed and analyzed several policy approaches that could mitigate emissions leakage and achieve global emissions reductions. Among these, an international agreement that limits emissions with commitment from all states would be the most effective in realizing these goals. Although the global harmonization of prices for emissions would minimize abatement costs, the targets and timetables approach is more politically feasible and more likely to be agreed upon by states. This is because the targets and timetables approach enables parties to choose their own policy approach for reducing emissions, with the level of emissions targets being differentiated between states. Any such global GHG mitigation agreement must include incentives for states to comply with commitments and to remain in the agreement because incentive to free ride will be high. A border measure to increase tariffs for imported goods from non-compliant parties would provide such an incentive, since deviation from the agreement would negatively impact the parties.

In the event that an international climate agreement involving all states cannot be achieved, the next-best option to address emissions leakage while reducing global GHG emissions would be to craft an agreement among willing states that would incorporate a trade measure such as a border adjustment measure. Compatibility with WTO law would be the most critical problem for any such an agreement. However, this analysis has demonstrated that such an approach could be compliant with WTO regulations. Given the constraints of domestic policy in the agreement, a border adjustment measure should focus on imported goods and should be applied only to goods imported from non-parties to the agreement.



This paper further identifies several key trade-related policy options that are compliant with WTO regulations and that states can pursue to decrease emissions leakage. In the case of a border tax adjustment, states that introduced such a measure can argue that it brings a material contribution, which is a reduction of GHG emissions from traded goods, to the objective, which is a global emissions reduction to mitigate damages from climate change. This analysis details the ways in which a border adjustment under a cap-and-trade structure is less likely to be compatible with WTO law than a border tax adjustment under a domestic tax system. Like the permissibility of border adjustment for imported goods under the GATT articles, tax rebates for exporting goods based on a domestic GHG emissions tax is more likely to be permitted than a tax regulation based on a cap-and-trade scheme. Finally, if states jointly introduce a border adjustment measure based on a multilateral climate agreement, it is more likely to be accepted by the WTO dispute settlement body. First, such a measure is less likely to be recognized as an arbitrary and disguised protectionist policy as it is a multilateral trade measure as opposed to a unilateral measure. Second, it is more effective than unilateral border adjustments in terms of emissions reduction. Therefore, it is more likely to satisfy Article XX (b) or (g) because of the closer relationship between the means and the end.

Trade measures are not a perfect tool to address emissions leakage. They have the potential to violate international trade law and to adversely affect trade activities. Nevertheless, if cautiously designed and applied, trade measures can considerably reduce significant trade-related emissions, mitigating climate change and emissions leakage, while incentivizing adherence to and enforcement of a more successful international climate change agreement.

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