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Leveraging Trade Agreements to Reduce Greenhouse Gas Emissions in Accordance with the Paris Agreement

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Leveraging Trade Agreements to Reduce Greenhouse Gas Emissions in Accordance with the Paris Agreement

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Abstract

Climate change is the most obvious and pressing impairment of the biological, physical, and chemical systems. To help mitigate this unprecedented problem, I present heads of state, policymakers, and members of civil society with a set of new provisions that they can include in their trade agreements to drive emissions reduction from countries inside and outside of their trade agreements, maintain their ability to compete in an increasingly globalized world, and comply with international trading rules. Ultimately, I seek to demonstrate the untapped potential for leveraging trade agreements to reduce emissions in the midst of an international system that lacks concerted climate action. In light of humanity's inadequate efforts to address the immense threats posed by a changing climate, decentralized efforts, such as these, are increasingly essential to reduce emissions.

Chapter 1 Introduction

Climate change increases the scarcity of resources on which humans depend for existence and is a product the international system's struggle to overcome global collective action problems. In the past 40 years alone, climate change-causing greenhouse gas (GHG) emissions (henceforth called emissions), including carbon dioxide (CO2), methane (CH4), nitrous oxide (NOx), and fluorinated gases, have increased nearly 100 percent (Steffen et al. 2015, 347). The increase in CO2 equivalent has been driven by a dramatic increase in atmospheric concentrations of CO2, which grew from around 280 parts per million before the Industrial Revolution to over 412 parts per million in March 2019 (CO2 Earth 2018). If emissions continue growing at current trends, overall concentrations of carbon dioxide in the atmosphere will reach between 750 and 1300 parts per million by 2100 (IPCC 2014, 8).

The Increasingly Dire Impacts of Climate Change

Emissions have increased global temperature, which includes land and ocean surface temperatures, approximately one degree Celsius (°C) from 1880 to 2012 (Stocker et al. 2013, 3). Assuming current emissions trends continue, global temperature is estimated to rise between 3.7 and 4.8 °C by 2100 (IPCC 2014a, 8). Increasing average temperatures understate the warming that some locations will experience because not all locations will

experience warming (Stocker et al. 2013, 77-78). For example, these temperatures do not reflect the rising frequency of climate change-exacerbated extreme heat events that have already killed tens of thousands of people (IPCC 2014b, 20). These events have already produced significant deaths and health costs for vulnerable populations, like the homeless and farmers, and will only wreak more havoc in the future (IPCC 2014b, 60) Many societies that will be increasingly harmed by warming will experience a magnification of this harm due to decreased precipitation (Stocker et al. 2013, 3). Furthermore, because these societies are some of the most productive agricultural zones, shifts in heat and precipitation will require the location, manner, and type of agricultural production to change, which will produce new infrastructure costs and may generate social unrest (IPCC 2014b, 20).

The increased temperatures and reduced precipitation from human actions have already reduced global crop yields for staple crops, such as wheat and maize, and those negative impacts are expected to increase in tropical and temperate areas (IPCC 2014b, 4-5, 17-18). Decreased reliability and quantity of food production will continue to drive food insecurity, especially in the poorest parts of the world, and harm the stability of global food delivery systems (IPCC 2014b, 13, 19, 60, 70–71). Additionally, rising global temperatures are already reducing water storage in mountain glaciers and seasonal snowpack, which provide fresh water that is integral to sustaining human life throughout much of the world (IPCC 2014b, 383). The ability of glaciers and snowpack to store fresh water is vital to regions like California, the Andean region of South America, and much of South and East Asia (IPCC 2014b, 143-45, 232, 243).

Rising global temperatures are leading to rising global sea levels because warmer temperatures melt more major ice fields around the world, warmer water melts more ice, and warmer water expands (Stocker et al. 2013, 24). A temperature increase of close to 4 °C by 2100 would mean a sea level rise of approximately two feet across the planet (Stocker et al. 2013, 21). A two-foot rise would cause significant economic harm to low-lying coastal zones where many of the world's largest cities are located, as well as to densely populated delta areas like the Mekong Delta in Southeast Asia, the Nile Delta in Egypt, and Bangladesh (IPCC 2014b, 59, 364-366).

Rising sea levels are increasing flood risks for hundreds of millions of people who already live in flood-prone areas. Without additional coastal protection, which is costly for even the most developed countries, between 72 and 187 million people will likely be displaced due to land loss due to submergence and erosion by 2100 (IPCC 2014b, 382). Important economic and cultural infrastructure, such as agricultural zones, ports, airports, roads and rails, power plants, sewer systems, places of worship, and entire cities and neighborhoods will also be harmed rising sea levels and would be extremely expensive to replace or irreplaceable (IPCC 2014b, 383). Small island states in the Pacific and Indian Oceans are already being consumed by rising sea levels--a reality that will become increasingly common (IPCC 2014b, 20). The economic impact of sea level rise on cities and infrastructure could cost up to nine percent of projected global GDP by 2100 (IPCC 2014b, 383).

Ocean acidification from higher CO2 levels coupled with increasing ocean temperatures is already harming coral reefs and other important ocean ecosystems that sustain global fisheries (IPCC 2014b, 16). Increasingly acidic waters and declining coral

reefs will reduce the population of commercially valuable sea creatures, like shellfish, which will harm economies that are dependent on selling these organisms for income (IPCC 2014b, 133, 464). If present emissions trends continue, oceans will lose up to nine percent of their net productivity by 2100 (IPCC 2014b, 415). In addition to the negative economic consequences, losing these fisheries has grave consequences because oceans provide around 17 percent of the animal protein consumed by the world's human population (IPCC 2014b, 417).

The consequences of climate change, or, more accurately, the consequences of human actions, are immense. Climate change already causes 300,000 excess deaths per year, a number that will only increase (Annan 2009, 11). Climate change will strip access to food, clean water, security, and health services from tens of millions of people (Guzman 2013, 12-14). Lack of access to these basic needs will increase the risk of disease and food insecurity, thereby fueling increased harm and unrest from climate change (Guzman 2013, 63).

Climate change is increasing the risk of violence (Guzman 2013, 1). The growing disruption of natural systems to which human economies are inextricably tied has already led to the displacement of people, which produces instability (IPCC 2014b, 20). As people fight for access to shrinking or moving resources, suffering is inevitable (IPCC 2014b, 20, 65). For instance, the Middle East and parts of South Asia are already plagued by water scarcity that have generated regular transboundary wars over the past 100 years (Biber 2017, 21). Because climate change is already causing large reductions in fresh water sources that feed major rivers, like the Jordan and the Indus, increased conflict over shrinking water supplies seems likely (Guzman 2013, 140-161). The increasing scarcity

of resources on which humans depend for survival and flourishing, like livable climates, precipitation, food, and land, may cause the political, social, and economic systems on which the modern world depends to erode, and in some places, collapse (Guzman 2013, 11).

Climate Change in the Context of the Anarchic International System

Solving climate change requires developed and developing countries to collaborate to overcome the anarchic nature of the international system. The international system is anarchic because no global government exists to manage the affairs for and enforce the global agreements of the 195 countries operating today. The framework for the modern international system was constructed by the 1648 Treaty of Westphalia (Frieden, Lake, and Schultz 2016, 8). According to this Treaty, countries are sovereign and have the fundamental right of political self-determination, countries are legally equal, and countries are free to manage their internal affairs without the intervention of other countries (Nordhaus 2015, 1340). The current Westphalian system requires that countries voluntarily join international agreements, which essentially renders all international agreements voluntary (Vienna Convention on the Law of Treaties 1969, 341).

While heads of state are generally able to mitigate domestic situations that result in domestic costs that outweigh domestic benefits, the international system struggles to overcome similar instances. For instance, when an international public good (e.g. a stable climate) is being depleted by human activities around the world, each head of state has an incentive to continue depleting the public good while other heads of state take steps to mitigate their respective country's contributions to the demise of the public good. In light

of the lack of global government, “free riding” occurs because countries seek to obtain the benefits of a public good without contributing to the costs. In the case of the international climate change policy, heads of state have an incentive to let other heads of state reduce emissions without requiring their own economy reduce its emissions (Nordhaus 2015, 1339). Temporal free riding also exists because the present generations benefit from not paying for the negative externalities of emissions-intensive industries, while future generations will pay for those emissions through high adaptation costs, reduced consumption, and decreased natural beauty (Nordhaus 2015, 1339).

Robust commitments to reduce climate change-causing emissions have been limited because most economies are heavily dependent on fossil fuel energy sources and natural resource extraction (Frieden, Lake, and Schultz 2016, 533). The former produces emissions when combusted and the latter releases emissions by destroying carbon sinks, like forests and grasslands. The prices most governments, businesses, and individuals pay when engaging in emissions-intensive activities generally do not include the multifaceted ramifications of climate change—including increasing rates of extreme weather events, sea level rise, agricultural land loss, and biodiversity loss.

Governments and businesses have an incentive not to reflect the damages from climate change in the price of emissions-intensive activities for the following reasons: i) the global nature of climate change is such that the benefits of emissions reduction are diffuse and small for the entirety of the human race, which means that most people will not work to ensure their government implements emissions reduction policies because, at an individual level, the costs in time are greater than the benefits they achieve from their individual actions; ii) a country that reduces emissions by passing legislation to scale

back emissions-intensive activities or invests in technologies that make emissions-intensive activities cleaner or more efficient may lose its ability to compete with other countries that have economies benefiting from inexpensive emissions-intensive activities; and iii) more developed countries, which are generally wealthier, have the economic means to adapt to climate change and absorb the cost of climate change policy (Thompson 2006, 11).

Even though all countries would be better off if they cooperated to reduce emissions, the anarchic nature of the international system is such that countries have an incentive act in a self-interested manner that does not take global collective action problems, like climate change, into account. Notwithstanding this dilemma, countries have been able to jointly overcome numerous national conflicts and spillovers through international agreements because being jointly committed to achieving outcomes that the group holds as valuable will be in the self-interest of each country (Nordhaus 2015, 1340). Over 560 UN-registered treaties have been created, all of which seek to improve global welfare by aligning incentives for cooperation (United Nations, 2018). Although a robust, top-down global treaty would be the best way to address the immense collective action problem presented by climate change, such an agreement is unlikely to occur before the impacts of climate change become catastrophic.

The Aim of Subsequent Chapters

To continue this analysis, chapter 2 details the history of climate change negotiations and investigates the extent to which regional trade agreements (RTAs) and preferential trade agreements (PTAs) can be used to reduce emissions. Chapter 3 illustrates how the World

Trade Organization's dispute settlement mechanism helps its members overcome the anarchic nature of the international system, and it argues that countries can reduce the payoffs from ending or delaying climate change policies by insulating them in RTAs and PTAs and establishing RTA- and PTA-based dispute settlement mechanisms (DSMs). Chapter 4 asserts that transparency frameworks coupled with RTA- or PTA-based DSMs are integral to enabling countries that are adhering to the Paris Agreement to coerce their trading partners that are violating the Agreement into compliance. Chapter 5 argues that countries reducing emissions in accordance with the Paris Agreement can improve the levelness of the trading field by providing side payments to their preferential trading partners because doing so the increases the feasibility of successful policy reforms and emissions reduction. Chapter 6 considers the failure to liberalize trade of environmental goods and services at the multilateral level and asserts that environmental goods and services should be liberalized through RTAs and PTAs in order to drive innovation and diffusion that yield significant emissions reduction. Chapter 7 concludes with a reflection on the importance of leveraging trade agreements to reduce emissions in accordance with the Paris Agreement.

Chapter 2 The Nexus Between Climate Negotiations and International Trade

Progress towards addressing climate change at the international level has been severely inadequate. The following paragraphs will show that a robust, legally binding global treaty is unlikely to occur in the foreseeable future. In light of this reality, decentralized efforts that build collective action for emissions reduction must be swiftly considered and implemented. This chapter considers (1) the history of global climate change negotiations; (2) how these negotiations resulted in the Paris Agreement, and the extent to which the Paris Agreement can overcome the anarchic nature of the international system; (3) the history of regional trade agreements (RTAs) and preferential trade agreements (PTAs) in the context of the World Trade Organization; (4) the use of RTAs and PTAs to initiate progress beyond the World Trade Organization's framework; (5) the integration of provisions to mitigate climate change in RTAs and PTAs; (6) the unsatisfactory emissions reductions that have stemmed from climate change provisions in RTAs and PTAs; and (7) how including RTA- and PTA-based provisions that reiterate commitment to the Paris Agreement and establish a DSM will increase the ambition of the climate-trade nexus.

I. History of Global Climate Negotiations

While climate change has been in the international spotlight since it rose to scientific and political prominence in 1979, most developed and developing countries have not taken adequate actions to mitigate their contributions to climate change (Gupta 2010, 636). Between 1979 and 1997, the international community created and thrice held Conferences of the Parties (COPs), established and twice received reports from the Intergovernmental Panel on Climate Change (IPCC), created the United Nation Framework Convention on Climate Change (UNFCCC), and convened a number of other high-level meetings (Gupta 2010, 637). The UNFCCC, which was adopted in 1992 and has since been ratified by 197 parties, calls for the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system" (UNFCCC 1992, 4). However, the UNFCCC does not specify emissions reduction goals to achieve this objective, which initiated negotiations to create a protocol stipulating mitigation targets for developed countries (Droge et al. 2018, 10).

Eighteen years of hard work culminated in the Kyoto Protocol at COP 3 in 1997. Following the example of the successful international ozone layer depletion agreement set forth in the 1987 Montreal Protocol, climate negotiators envisioned that the Kyoto Protocol would set increasingly ambitious, top-down emissions reduction targets for developed countries (Falkner 2016, 1110). To provide development flexibility for developing countries, the Kyoto Protocol exempted them from similar commitments and postponed mitigation action for an unspecified time (Falkner 2016, 1110). While some developed countries were able to comply with the Montreal Protocol's provisions, the Protocol did little to slow the rise in global emissions. The United States opposed the

Protocol because it exempted most LDCs, thus reducing the relative competitiveness of American producers (Frieden, Lake, and Schultz 2016, 544). Without the support of the United States, the Protocol failed because other emissions-intensive countries, like Canada, Japan, and Russia, dropped out of the protocol to regain competitiveness with the United States. As a result, the Protocol ultimately did not reduce the collective action problem contributing climate. Ultimately, the Kyoto Protocol was unsuccessful at reducing emissions in accordance with IPCC recommendations (Falkner 2016, 1110).

In 2009, negotiations to implement the second phase of the Montreal Protocol failed in Copenhagen at COP 15 and the Protocol became defunct at the end of the first phase in 2012 (Seo 2016, 125). The COP 15 negotiations, however, resulted in the passage of the Copenhagen Accord, which did not require countries to reduce emissions in accordance with IPCC recommendations but did created a system of voluntary emissions reduction pledges as the basis for future climate action (Falkner 2016, 1111). The voluntary nature of the pledge system toppled the divide between developed and developing countries, which enabled major emitters from the developed and developing world to begin working collectively to address climate change. The Accord facilitated innovative and collaborative efforts between developed and developing countries, like the Green Climate Fund in which developed countries provided developing countries with climate change mitigation and adaptation financing (Falkner 2016, 1111).

Efforts to produce an effective successor treaty to the Kyoto Protocol continued in COP 16 in Cancun. At COP 16, all 197 UNFCCC members agreed that the global temperature should not increase more than 2 °C above pre-industrial levels (Seo 2016, 125). At COP 17 in Durban, the UNFCCC members agreed to create an international and

legally binding framework by 2015 at COP 21, in which all members would share mitigation responsibility (Seo 2016, 125). COP 21 in Paris in 2015 produced the Paris Agreement, a landmark international agreement in which every UNFCCC member agreed to reduce its emissions in accordance with IPCC recommendations. As of September 2018, the Paris Agreement was ratified by 180 of the 197 UNFCCC members, which account for nearly 90 percent of global emissions (Climate Analytics 2018). The United States, which was a key negotiator and supporter of the Agreement, has since become the only nation to reject the Agreement.

II. The Culmination of Past Climate Negotiations: The Paris Agreement

The Paris Agreement reflects a shift from the top-down, rigid approach championed in the Kyoto Protocol to a bottom-up, dynamic approach previewed in the 2009 Copenhagen Accord, 2010 Cancún Agreements, and 2011 Durban Platform. The legally binding emissions reduction targets of the Kyoto Protocol were exchanged for non-legally binding nationally determined contributions (NDCs), which allow countries to determine their respective emissions reduction goals and the mechanisms through which they will achieve this reduction (van Asselt 2017, 11). Although the NDCs themselves are non-binding, countries are legally required to submit and update NDCs, take mitigation measures to achieve NDCs, and regularly report emissions reduction progress (van Asselt 2017, 11). The Agreement is predicated on the assumption that a broad and flexible initial platform will create collective action that enables opportunities for increased emissions reduction over time.

To facilitate emissions-reducing sustainable development, Article 6 of the Paris Agreement identifies voluntary approaches towards the most effective mitigation measures. This article recognizes that parties may engage in cooperative, international approaches to achieving their NDC (Dong et al. 2018, 4). Articles 6.1 and 6.2 set out the need to ensure environmental integrity and transparency, robust accounting, and the avoidance of double counting; Articles 6.2 and 6.3 establish that cooperative approaches can result in "internationally transferred mitigation outcomes", such as linked emissions trading systems; and Article 6.4 establishes a "mechanism to contribute to the mitigation of greenhouse gas emissions and support sustainable development" (Droge et al. 2018, 16). Trade is directly and indirectly entangled in most NDCs because reducing emissions generally requires that parties tax, subsidize, or regulate national economic activities. For instance, a first analysis shows that 90 parties to the Paris Agreement plan on using international market mechanisms to achieve their NDCs (Droge et al. 2018, 15).

The Agreement consists of the following four elements. First, it contains long-term goals to stay below 2°C, and 1.5 °C if possible, warming, and achieve a balance between emissions by sources and removals by sinks of GHGs in the second half of the century. Second, a five-yearly cycle of submitting NDCs starting in 2023. Third, a two-yearly cycle of policy implementation reporting through a transparency framework staring in 2022. Fourth, the provision that new NDCs are more ambitious than previous ones and that they reflect the highest level of ambition that each country believes it can achieve (van Asselt 2017, 11).

Although the Paris Agreement is a victory compared to previous global climate change treaties, its implementation approach will likely facilitate decentralized activities

(i.e. activities of bilateral or limited multilateral scope) between UNFCCC members, many of whom already collaborate to enhance the collective wellbeing of their citizens. The Agreement's quasi-decentralized approach, which stems from its global scale and bottom-up approach that drives bilateral or limited multilateral collaboration, has two likely benefits. First, it drives social, legislative, and technological innovation, and experimentation and collaboration because countries strive to find solutions that maximize the benefits and minimize the costs of addressing climate change. Second, it facilitates methods for assessing the benefits and costs of particular strategies adopted in one setting and comparing these with results obtained in other settings (Ostrom 2010, 555-556). The quasi-decentralized nature embodied by the Agreement also has two likely pitfalls. First, it does not level the trading field, thereby failing to address the emissions and jobs leakage that already harm countries that are reducing emissions. Second, current NDCs would put the world on track to a temperature rise of around 2.7 °C to 3 °C by 2100, far from the 2 °C target the Paris Agreement defines as the upper ceiling (Clemencon 2016, 13).

III. International Trade and the World Trade Organization

The lack of a global treaty that adequately addresses climate change has spurred countries around the world to codify climate objectives through new and existing bilateral efforts. One effort that is gaining traction is the addition of climate-related provisions in regional trade agreements (RTAs) and preferential trade agreements (PTAs), which the overwhelming majority of countries use to enhance the collective wellbeing of their citizens. These agreements are negotiated, notified, implemented, and resolved according

to the World Trade Organization (WTO n.d. a) rules, but they differ in key ways from trade that is solely under the auspice of the WTO but not part of an RTA or PTA (WTO n.d. a). RTAs, which are reciprocal in nature, are either free trade agreements or customs unions (WTO n.d. a). As of June 2016, all WTO members have an RTA (WTO n.d. b). PTAs are non-reciprocal trade agreements in which (typically developed) countries grant preferential tariff liberalization to developing countries after receiving a waiver from the WTO General Council (WTO n.d. a).

RTAs have existed since the General Agreement on Tariffs and Trade (GATT), which came into effect in 1947 (Bacchetta et al. 2011, 51). The leaders who established GATT envisioned a world unified under a global free trade agreement, but also included Article XXIV, which allows for RTAs. PTAs have existed since GATT signatories signed into effect the "Differential and More Favourable Treatment Reciprocity and Fuller Participation of Developing Countries" clause in 1979 (WTO n.d. c). GATT, which proliferated the multilateral trade system until it was subsumed by the WTO in 1995, did not diminish the attraction of regional or preferential trade approaches. Rather, it enabled groups of countries to go beyond the broader GATT system in order to manage trade integration across a more comprehensive trade agenda (Bacchetta et al. 2011, 51).

The 164 WTO members have agreed on a set of uniform trade rules, including rules that govern goods, services, intellectual property rights, investment measures, barriers to trade, rules of origin, subsidies and countervailing measures, a dispute settlement mechanism, and a trade policy review mechanism (WTO n.d. b) (WTO n.d. a). Currently, 20 countries are "WTO Observers," meaning they are in the process of becoming members, and 12 countries are not WTO members (Amadeo 2018). Although

initial trade negotiations under GATT were devoted to reducing tariffs on goods, later negotiations broadened the scope to non-tariff barriers, which include non-tariff-related trade restrictions, like local content requirements and dumping (Droge et al. 2018, 11). While the WTO does not have the power to fine its members for violating rules, members can file disputes with the WTO-based dispute settlement mechanism (DSM) if they consider other members' policies to be in violation of WTO rules. During the DSM adjudication process, members initially go through consultation and mediation to seek a resolution, but if this stage is unsuccessful, then the violating member should offer compensation or expect to face a suitable response (WTO n.d. d). Later chapters will detail how the DSM creates a reality in which self-interest drives members to comply with trade rules, which is the primary explanation as to why members of the WTO are often able to overcome the anarchic nature of the international system.

Four GATT articles are of particular importance for the intersection of trade agreements and climate change. Article I sets up the most-favored-nation (MFN) obligation, which requires WTO members not to favor one trading partner over another (WTOb n.d. b). RTAs and PTAs, however, are exceptions to this principle because members can negotiate terms that yield more favorable market access, like reduced tariffs and non-tariff barriers on goods and services, as long as these terms do not create more trade restrictions than exist at the WTO level (WTO n.d. b). Article III requires that imported products be treated equally with "like" domestically produced goods (Droge et al. 2018, 21). In the event that a WTO member has an internal tax on a product, Article II allows a WTO member to set a tariff on a "like" imported product that is equivalent to an internal tax as long as the tax does not serve protect to domestic industries (Droge et al.

2018, 21). Article XX lays out exceptions to non-discrimination, two of which directly relate to environmental concerns: if discrimination is "necessary to protect human, animal, or plant life or health" (Article XX b) or if it relates to "the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production and consumption" (Article XX g). For an exception to be granted, a provision must pass the test of "arbitrary or unjustifiable discrimination" and disguised trade restrictiveness (Droge et al. 2018, 21). In many cases, however, internationally-focused climate policies have failed to pass WTO muster because they tend to act contrary to the maintenance of the multilateral trading system (Droge et al. 2018, 27).

IV. Leveraging RTAs and PTAs to Incite Progress Beyond the WTO

Countries trading under RTAs or PTAs generally behave differently from countries solely trading under the WTO in three ways. First, a more nuanced and collaborative approach to trade exists at the RTA and PTA level because a smaller number of trading partners can more easily collaborate on the adoption of stronger policy standards and coordinate to address deficiencies in the WTO legal framework, including market failures that lead to negative externalities. Thus, RTAs and PTAs can help mitigate externalities in the face of inaction on climate change at the WTO level (Chauffour and Maur 2011, 22). Second, the smaller number of members in RTAs and PTAs enables them to accelerate trade liberalization faster than trade liberalization efforts at the WTO level. Third, successful RTA- and PTA-level initiatives may be taken up as WTO initiatives (Bacchetta et al. 2011, 44-45). Diffusion of these initiatives is driven by the nature of

RTAs and PTAs, which includes low transaction costs due to the smaller number of participating countries and difficulty of free riding. While the desire to increase market access certainly plays a role in the establishment of RTAs and PTAs, these three characteristics suggest that PTA and RTA members also value the opportunity to make progress on issues not being addressed at the WTO level (Chauffour and Maur 2011, 17).

The United States and the European Union were the first entities that leveraged RTAs and PTAs to drive environmental progress. In 1994, the North American Free Trade Agreement (NAFTA) created a strong precedent in the environment-trade nexus by including a side-agreement (the North American Agreement on Environmental Cooperation), with other US trade agreements following suit (Jinnah and Morgera 2013, 324-331). Momentum and precedent for US trade agreement preferences primarily stems from 1) the creation of the North American Agreement on Environmental Cooperation 2) President Bill Clinton's 1999 Executive Order 13141 that required the United States Trade Representative to conduct environmental reviews of all US trade agreements, and 2) section 2102 of the 2002 Trade Act that encouraged consultation between parties on issues in the environment-trade nexus (Jinnah and Morgera 2013, 327-228).

The 2004 Chile and Singapore RTAs were the first United States RTAs to include full-scale environmental sections--a trend that has continued in the country's subsequent trade agreements (Jinnah and Morger 2013, 228). Such "Environmental Chapters" often include the creation of environmental consultation procedures to settle disputes; the reaffirmation of commitment to multilateral environmental agreements; requirements for public participation; the criteria for selecting experts to serve as panelists for dispute resolution; and the establishment of councils to oversee the implementation the Chapter's

contents (Jinnah and Morger 2013, 228-229). The US Congress has managed to implement innovative environmental provisions when renegotiating some of its trade agreements. For instance, when Democrats regained control of Congress in 2006, they renegotiated RTAs with Peru, Colombia, South Korea, and Panama to include provisions codifying the parties' commitment to a list of multilateral environmental agreements (e.g. CITES and the Montreal Protocol) and creating a dispute settlement mechanism that could be used if one or more parties was not fulfilling its commitments (Jinnah and Morgera 2013, 229). While the United States is a pioneer in establishing the environment-trade nexus, it has yet to ratify a trade agreement that includes climate change provisions (Porterfield, Gallagher, and Schachter 2017, 53-54). It did, however, refer to climate change in the environmental side-agreement of its 2004 RTA with Australia (Morin and Jinnah 2018, 559).

The European Union, which negotiates and signs trade agreements as a bloc, has incorporated environmental provisions in its trade agreements with third countries since the mid-1990s. In 2006, the European Union adopted the Global Europe Strategy, which solidified the environment-trade nexus in the EU's trade agreements (Durán and Morgera 2012, 51). The primary rationale for deeping this nexus stemmed from concerns of competitiveness that occur when weak or unenforced domestic environmental standards create an unfair competitive advantage (Durán and Morgera 2012, 50). Through the inclusion of provisions that prevent such behavior and enhance and harmonize environmental standards, the EU seeks to establish a level trading field in its RTAs and PTAs (Durán and Morgera 2012, 50). Such provisions include, specialized bodies that oversee implementation of the provisions, procedures for settling disputes, requirements

that environmental experts be involved in the provision creation and dispute settlement process, and integration of public participation (Durán and Morgera 2012, 139-140).

Climate change provisions in EU RTAs and PTAs have emerged not only as the key cooperation priority common to most EU agreements but also as a distinct and ambitious area of environmental cooperation (Durán and Morgera 2012, 136). All EU trade agreements post 2006 have at least one environmentally-focused chapter that includes climate provisions (Jinnah and Morgera 2013, 325). For instance, the 2010 revision of the Cotonou Agreement, which establishes what is now a reciprocal trade framework between the EU and African, Caribbean, and Pacific countries, illustrates the extent to which the EU seeks to establish an ambitious climate-trade nexus. The revised Cotonou Agreement mandates that climate mitigation and adaptation efforts are central components to be integrated at every level of the partnership (Durán and Morgera 2012, 87). Among other mandatory provisions that are aimed at ensuring ACP countries integrate climate change considerations into their decision making processes, the Agreement establishes cooperation in development of and participation in a carbon market, integration of domestic climate change and development policy, and provision of financial and technical support for mitigation and adaptation technologies (Durán and Morgera 2012, 88).

EU RTAs and PTAs negotiated after the Paris Agreement, including its agreements with Singapore, Vietnam, and Japan, will contain stronger and more detailed climate provisions that (i) reiterate a shared commitment to effective implementation of the Paris Agreement, (ii) commit the parties to close cooperation in the fight against climate change, (iii) and commit the parties to agree on and carry out joint actions

(European Commission 2018, 12). Furthermore, EU officials said the EU would not sign trade agreements with countries that have not ratified the Paris Agreement (Stone 2018).

V. The Climate-Trade Nexus

Between 1990 and 1995, 12 percent of new RTAs and PTAs included at least one climate change provision, but that number increased to 55 percent between 2010 and 2015 (Morin and Jinnah 2018, 555). These numbers are expected to grow in existing and new RTAs and PTAs because countries can leverage the relationships they have established with their current or new trading partner to take action on climate change (van Asselt 2017, 13).

Three broad types of environmental and climate provisions exist in RTAs and PTAs. First are the provisions that indirectly and directly reference climate change. Such provisions generally stipulate that parties create, improve, or enforce environmental protections, which has been aided in the US-Chile, US-Peru, and US-Jordan trade agreements through the establishment of environmental ministries (Martínez-Zarzoso 2018, 8, 16-17). These provisions may also reaffirm each party's commitment to multilateral agreements, like the UNFCCC, the Kyoto Protocol, and the Paris Agreement (Droge et al. 2018, 26).

The second type of provisions explicitly seek to expand trade in climate-friendly goods and services, which can be found in the EU-Singapore RTA (Droge et al. 2018, 26). In addition to reducing tariffs on such goods, Article 7.4(a) of the agreement urges parties to reduce non-tariff barriers in renewable energy trade and investment, like "refrain[ing] from adopting measures[...] affecting the other Party's products, service

suppliers, investors or investments" (European Commission 2018, 75). In collaboration with this requirement, Article 12.11.3 of the agreement includes a provision on reducing trade distortions from fossil fuel subsidies, stating that "the Parties share the goal of progressively reducing subsidies for fossil fuels" (EU-Singapore trade and investment agreements, 280).

The third type of provision is aimed at spurring climate change cooperation between trading partners, including the enhancement of capacity building for climate-related policies and technologies (Droge et al. 2018, 26). For instance, the Korea-Peru RTA includes provisions that enhance collaboration on energy efficiency, renewable energy, technologies of carbon dioxide capture, innovative environmental technologies, food security, conservation of biological diversity, and measures for evaluating the vulnerability and adaptation to climate (Droge et al. 2018, 26).

The three types of provisions illustrate that countries are already leveraging RTAs and PTAs to reduce emissions domestically and emissions from their trading partners. The rationale for including these climate provisions in RTAs and PTAs is three-fold. First, it is in the economic interest of countries that are already reducing emissions because these provisions help create a level trading field among trading partners, which enables emissions-reducing countries to maintain their competitiveness and reduce employment and emissions leakage. Second, it enhances cooperation and brings down the cost of reducing emissions by liberalizing trade of environmental goods and services, harmonizing regulatory standards, and disseminating technical information. Third, it helps countries efficiently reduce emissions in line with the goal they ratified under the Paris Agreement. Fourth, it helps heads of state obtain or maintain a good domestic and

international reputation. While the implementation of these provisions bodes well for humanity's capacity to mitigate the catastrophic impacts of climate change, these provisions generally lack the legal rigor and policy entrepreneurship required to reduce emissions in accordance with the Paris Agreement.

VI. Overcoming the Inadequate Nature of Climate Provisions in RTAs and PTAs

While RTAs and PTAs offer an opportunity for decentralized climate action, glaring inadequacies exist within current RTA- and PTA-based environmental provisions. Morin and Jinnah (2018, 561) analyzed all 688 trade agreements in force under the WTO (all 296 RTAs and 392 PTAs) and found that climate provisions are uncommon and existing climate provisions are weak in terms of legalization, replication, and emissions reduction. While 86 percent of these agreements include at least one provision relating to the environment, only 14 percent have incorporated provisions that address issues related to climate change (Morin and Jinnah 2018, 554). Only ten percent of climate provisions have specific targets, meaning they generally lack legal accountability. Furthermore, 70 percent of the agreements with at least one climate-related provision do not contain a DSM and only a fraction of those that do establish a process that will adjudicate possible trade rule violations (Morin and Jinnah 2018, 552). As the subsequent chapter will show, trading partners need an RTA- or a PTA-based DSM to hold each other accountable to the climate provisions they have established. When an RTA or a PTA member is adhering to climate provisions, but another member is not, the former may fail to coerce the latter into compliance if the former does not have access to a DSM through which it can credibly threaten and impose costs.

The replication of climate provisions in RTAs and FTAs has been limited compared to the replication of other environmental provisions, like biodiversity. For instance, one or both of the Convention on Biological Diversity (1992) and Basel Convention (1989) are referenced in six percent of RTAs and PTAs, while one or both of the UNFCCC (1992) or Kyoto Protocol (1997) are referenced in two percent of RTAs and PTAs (Morin and Jinnah 2018, 556). Finally, with the exception of the European Union, distribution of climate provisions in RTAs and PTAs is limited. Of all EU RTAs and PTAs, 38 percent contain climate provisions, a number that has climbed to 100 percent since 2008. Since the adoption of the UNFCCC in 1992, EU RTAs and PTAs contain an average of 2.6 climate provisions, and many its most recent agreements contain more than seven such provisions. Excluding EU RTAs and PTAs, other countries have an average of 0.2 climate provisions since 1992 (Morin and Jinnah 2018, 557, 559).

While governments around the world have been increasingly willing to include climate provisions in their RTAs and PTAs, limited information about the impact of these provisions exits (Martínez-Zarzoso 2018, 7). To date, Martínez-Zarzoso (2018, 7, 15) report that only two studies, Ghosh and Yamarik (2006) and Baghdadi et al. (2013), are known to address the relationship between RTAs and PTAs and environmental quality, with only the latter focusing on CO2 emissions. After controlling for other variables, emissions are around 0.3 percent lower in countries that have RTAs or PTAs with environmental provisions, whereas the effect is not statistically significant for countries with RTAs and PTAs without environmental provisions (Martínez-Zarzoso 2018, 7, 15). Thus, existing climate provisions do little to reduce emissions. The following chapters present novel opportunities for harnessing the emissions-reducing potential of RTAs and

PTAs in a legally sound manner that benefits countries that are and are not currently reducing emissions in accordance with the Paris Agreement.

The following chapters will show that the pitfalls of the Paris Agreement, namely its failure to level the trading field and sufficiently reduce emissions, and the inadequacies of RTA- and PTA-based climate provisions can be minimized by i) reiterating commitment to the Paris Agreement in RTAs and PTAs, ii) constructing other emissions-reducing provisions, and iii) creating an RTA- and a PTA-based DSM. A trade agreement that reiterates commitment to the Paris Agreement and includes an effective DSM will increase the legalization of each trading partner's commitment to the Paris Agreement. Countries that have ratified the Agreement but are not adhering to it may suffer from domestic and international reputation costs. These costs, however, have not prevented a large portion of countries from ignoring their commitment to the Agreement (Mooney 2018). By creating an RTA- or a PTA-based DSM, the costs that trading partners would experience by violating their commitment to the Agreement would increase significantly. Instead of merely being subjected to reputational disdain, violators could be required to pay adherents for the lost competitiveness that adherents experience when violators continue to be reliant on inexpensive, emissions-intensive activities.

A trade agreement that reiterates commitment to reducing emissions in accordance with the Paris Agreement and includes an effective DSM will spur replication. As soon as one country or bloc levels the trading field in its RTAs and PTAs through harmonized or decentralized emissions reduction efforts, that country or bloc will significantly mitigate lost competitiveness and jobs and emissions leakage. As a result, its trading partners will stand to benefit if they do the same in their RTAs and PTAs because

they would benefit from ensuring that their trading partners are also reducing emissions in accordance with the Paris Agreement. Establishing and adhering to such provisions will also decrease the possibility that a country or bloc can be subject to economic sanctions and reputation costs.

Catalyzing emissions reduction throughout the 164 WTO members, all of which are members of RTAs or PTAs, would have a significant impact, as they collectively produce around 94 percent of global emissions (Amadeo 2018) (Muntean et al. 2018, 23). Emissions reduction can be induced by including RTA- and PTA-based provisions that reiterate commitment to the Paris Agreement and establish a DSM. Because such provisions increase the costs of not adhering to the Agreement and increase the number of countries benefiting from adherence to the Agreement, emissions reduction will be in the self-interest of WTO members.

Chapter 3 Using the Dispute Settlement Mechanism to Catalyze Emissions Reduction

To date, 179 countries and the European Union, representing nearly 90 percent of emissions, have ratified the Paris Agreement—the preeminent global climate treaty that establishes a goal of keeping warming below 2°C, and 1.5°C if possible—and have thus committed themselves to actions that will reduce emissions in accordance with this goal (Climate Analytics 2018). To meet this goal, 87 countries, representing 56 percent of global emissions, have stated that they either are planning to use or considering the use of carbon pricing mechanisms (CPMs), such as an emissions trading system or a carbon tax (Ramstein et al. 2018, 33). Similar to existing CPMs, new and proposed CPMs may be negatively impacted by uncertainty from a lack of political support demonstrated by new heads of state.

Because heads of state have not historically faced significant domestic and international repercussions for ending a CPM, the benefits of doing so have appeared to sometimes outweigh the costs. The economic and political benefits from ending or delaying CPMs appear significant because doing so has cost business and ratepayers billions of dollars. Given that emissions covered by CPMs are scheduled to almost triple in the near future, the development of strategies to prevent leaders from ending or delaying CPMs become increasingly integral to achieving the goal set forth by the Paris

Agreement. This chapter suggests a novel approach to significantly reducing the payoffs from ending or delaying CPMs—insulating CPMs in RTAs and PTAs.

This chapter will consider (1) the means by which members of RTAs and PTAs have been able to overcome the anarchic nature of the international system; (2) the history of climate provisions in RTAs and how they have failed to overcome the anarchic nature of the international system; (3) the promise of CPMs to overcome the anarchic nature of the international system, but how they fall short at this task; (4) how CPMs can be insulated in RTAs and PTAs without breaking WTO rules and the ramifications of doing so; and (5) how insulating CPMs in RTAs and PTAs prevent members from violating CPM provisions and can thus overcome the anarchic nature of the international system. This chapter will argue that leaders who are serious about establishing robust CPMs should leverage the significant domestic and international costs that accompany adjudication and retaliation from using RTA- and PTA-based dispute settlement mechanisms (DSMs) to help dissuade future leaders from ending or delaying CPM implementation.

I. The Role of Dispute Settlement Mechanisms in RTAs and PTAs

Since the WTO was established, its dispute settlement mechanism (DSM) has been the primary means by which members of the WTO have overcome the anarchic nature of the international system. Between 2007 and 2016, members requested consultations for disputes 169 times, leading to the establishment of 149 panels over 90 percent of which found that the defendant's measure was in violation of at least one provision of WTO rules (Vidigal 2018, 928, 938). Some RTAs contain strong DSM provisions, including

the Dominican Republic—Central America—United States Free Trade Agreement (CAFTA-DR), the North American Free Trade Agreement (NAFTA), the Common Market of the South (Mercosur), the European Union (EU), and a number of African RTAs (Vidigal 2018, 928). While parties to the European Union and African RTAs and PTAs frequently use their DSMs to adjudicate disputes, only two disputes were adjudicated under RTA-based DSMs in the Americas (Vidigal 2018, 928, 930).

Disputes have historically been adjudicated at the WTO-level rather than the RTA or PTA level for the following reasons: i) predictability of the WTO dispute settlement procedure, including confidence that a high-quality report will be issued in a short and consistent period of time; ii) some RTAs and PTAs do not contain a DSM that is robust enough to satisfy the needs of the complainant; iii) while RTA- and PTA-based DSMs are compulsory in principle, they can be blocked by a defendant if the defendant's cooperation is required for composing the adjudicating panel, which is not the case with the WTO-based DSM; and iv) WTO dispute resolution provides international versus regional surveillance and shame of non-compliant members (Vidigal 2018, 932-933, 935). Thus, by using the WTO-based DSM, members have a way to impose large and credible costs on violators that are violating WTO rules.

The process of using a DSM is as follows: if a member believes that a violation of WTO rules has taken place, it must raise the matter with the violator; if these negotiations are unsuccessful it can resort to adjudication under the WTO (or the RTA or PTA if a DSM exists); and if the panel judging the dispute finds that the alleged violator is in violation of rules, then the harmed party can lawfully retaliate against the violator (Vidigal 2018, 935-936). While the whole procedure seems to be a means for retaliation,

retaliation is rarely used when authorized. This is largely due to the fact that retaliation penalizes the penalizer (Nordhaus 2015, 1351). For example, if China is violating WTO dumping rules by exporting solar panels to the European Union at a price lower than the price it normally charges on its own home market, the European Union can put tariffs on Chinese solar panel manufacturing firms, but doing so is likely to raise energy prices in the European Union and hurt European consumers, and China may be tempted to respond tit for tat (i.e. retaliating without receiving WTO permission), which will only further raise energy prices in the European Union, hurt European consumers, and lead to political backlash.

When members do retaliate, they generally do so to coerce the violator into compliance rather than to seek reparations from the violators (Vidigal 2018, 936). The ability to induce compliance primarily depends on the retaliating member's market size, the market size of any allies it has in the dispute, and the domestic and international costs the violator may suffer if it continues violating WTO rules (Vidigal 2018, 936). Because trade flows are high between RTA members and exports are high for developing countries in PTAs, threats of retaliation, which can be applied directly (e.g. tariffs on goods violating the trade rules) or indirectly (e.g. tariffs on goods other than those violating the trade rules), carry costs that generally far outweigh the current benefits received from violating the trade rules.

A leader who is violating the trade rules, but ignores a retaliatory threat and is subsequently retaliated against will not only face economic sanctions but also may face the wrath of voters and political opponents who are frustrated that the leader has increased the cost of living, decreased exports, or tarnished the country's honor and

reputation by making empty commitments. If citizens are unaware of trade politics, however, they will be unable to punish their unruly leaders. Leaders in other countries might doubt future commitments made by these leaders, which may decrease their role in negotiating future international agreements of all sorts, not only those regarding climate change (Frieden, Lake, and Schultz 2016, 115). A decreased negotiating role is likely to render leaders unable to achieve their international priorities, which could decrease domestic support and make a re-election bid more difficult.

Members of the WTO, all of which are party to at least one RTA or PTA, have successfully used the WTO's DSM, and to a lesser extent RTA- and PTA-based DSMs, to ensure adherence to WTO trade rules. Retaliatory threats and actions have often provoked adherence because the costs from retaliation generally outweigh the benefits received from continuing to violate trade rules. As a result, DSMs create a reality in which self-interest drives members to comply with trade rules, which is the primary explanation as to why members of RTAs and PTAs have been able to overcome the anarchic nature of the international system.

II. The Inadequate Nature of RTA- and PTA-Based Climate Provisions

This section will consider the history of climate provisions in RTAs and PTAs and how they have failed to overcome the climate change-driving anarchic nature of the international system. In 1994, NAFTA created a strong precedent for the environment-trade nexus by including a side-agreement on environmental standards and disputes--the North American Agreement on Environmental Cooperation (Jinnah and Morgera 2013, 324-331). Momentum and precedent for US environmental trade agreement preferences

primarily stems from 1) the creation of the North American Agreement on Environmental Cooperation 2) President Bill Clinton's 1999 Executive Order 13141 that required the United States Trade Representative to conduct environmental reviews of all US trade agreements, and 3) section 2102 of the Trade Act of 2002 that encouraged consultation between trading parties on issues in the environment-trade nexus (Jinnah and Morgera 2013, 327-228).

The 2004 Chile and Singapore RTAs were the first US RTAs to include full-scale environmental sections--a trend that has continued in the United States' subsequent trade agreements (Jinnah and Morgera 2013, 228). The US Congress managed to implement innovative environmental provisions when renegotiating some of its trade agreements. For instance, when Democrats regained control of Congress in 2006, they renegotiated RTAs with Peru, Colombia, South Korea, and Panama to include provisions codifying the parties' commitment to a list of multilateral environmental agreements (e.g. CITES and the Montreal Protocol). The United States, however, has yet to ratify a trade agreement that includes climate change provisions (Porterfield, Gallagher, and Schachter 2017, 53-54).

The European Union began incorporating environmental provisions in its trade agreements in the mid-1990s, and all recent EU trade agreements include provisions on climate change (Jinnah and Morgera 2013, 325) (European Commission 2018, 12). In 2006, the European Union adopted the Global Europe Strategy, which created a more thoroughly ingrained environment-trade nexus in EU trade agreements (Duran and Morgera 2012, 51). The primary rationale for deepening this nexus stemmed from concerns of self-interest, namely the European Union's lack of competitiveness relative

to its trading partners with weak, unenforced, or non-existent environmental standards (Duran and Morgera 2012, 50). Through the inclusion of trade agreement provisions that prevent such behavior and enhance and harmonize environmental standards, the European Union seeks to establish a level trading field with its trading partners (Duran and Morgera 2012, 50).

Climate change provisions in EU trade agreements have emerged not only as a key cooperation priority but also as a distinct and ambitious area of environmental cooperation (Duran and Morgera 2012, 136). For instance, the 2010 revision of the Cotonou Agreement, which establishes what is now a reciprocal trade framework between the European Union and African, Caribbean, and Pacific countries, illustrates the extent to which the European Union seeks to establish an ambitious climate-trade nexus. While the Agreement itself is not a trade agreement, it provides the objectives, principles, and procedures for the implementation of future trade agreements (Duran and Morgera 2012, 92). Among other mandatory provisions that are aimed at ensuring African, Caribbean, and Pacific countries integrate climate change considerations into their decision making processes, the Cotonou Agreement calls for cooperation in development of and participation in a carbon market, integration of domestic climate change and development policy, and provision of financial and technical support for mitigation and adaptation technologies (Duran and Morgera 2012, 88).

While RTA- and PTA-based climate provisions seem to offer an opportunity for joint climate change mitigation, members have largely failed to create provisions that compel unilateral and collaborative actions to mitigate emissions. The lack of specificity of these provisions and the paucity of robust DSMs provide little incentive for members

that are not already reducing emissions to do so because the members that are already reducing emissions generally have inadequate means with which they can credibly threaten free riders. Thus, environmentally progressive members will likely not be able to leverage weak provisions to impose costs that are significant enough to ensure compliance by free riders. By implementing legally binding climate provisions and effective DSMs in RTAs and PTAs, the benefits of following through on such provisions are far more likely to outweigh the costs. Such provisions seem to be in the best interest of environmentally progressive members, so these members—especially those with market power (e.g. the European Union and Canada)—would benefit from making their implementation a high-priority. Until this occurs, however, RTA- and PTA-based climate provisions will continue to be strawmen that stand no chance of defeating the anarchic nature of the international system.

III. Using DSMs to Unleash the Potential of Carbon Pricing Mechanisms

This section will consider the promise of carbon pricing mechanisms (CPMs) to overcome the anarchic nature of the international system, but how they fall short in this task. Global enthusiasm for CPMs is immense. To date, 51 regional, national, and subnational jurisdictions have or are scheduled to implement CPMs, including 25 emissions trading systems (ETSs) and 26 carbon taxes, which cover about 20 percent of global emissions (Ramstein et al. 2018, 8). The Paris Agreement has catalyzed CPM excitement. Emissions covered by CPMs are scheduled to almost triple in the near future, as 87 countries, representing 56 percent of global emissions, have stated that they either

are planning to use or considering the use of CPMs to meet to the goal laid out in the Paris Agreement (Ramstein et al. 2018, 33).

While the main objective of implementing CPMs is to stimulate cost-effective emissions reduction, such initiatives help countries achieve a number of broader outcomes (Ramstein et al. 2018, 25). For example, the officials familiar with ETSs in China, the Republic of Korea, and Quebec, and the carbon tax in Singapore mentioned the stimulation of low-carbon innovation as a key reason their jurisdictions implemented a CPM (Ramstein et al. 2018, 25). Furthermore, officials familiar with the Chinese emissions trading system (ETS) mention the importance of increased industrial efficiency and reduced air pollution (Ramstein et al. 2018, 25). In Argentina, the carbon tax was the result of tax reform and fiscal rationalization (Ramstein et al. 2018, 25). Officials familiar with Chile's carbon tax have also noted its importance in reducing the negative environmental and health impacts from fossil fuel use (Ramstein et al. 2018, 25). Other officials have mentioned the importance of using revenues generated from CPMs to fund broader social and environmental initiatives (Ramstein et al. 2018, 25).

To facilitate ambitious, cost-effective sustainable development, Article 6 of the Paris Agreement encourages countries to engage in cooperative, international approaches to reduce emissions, like harmonizing emissions trading actions and rules. Articles 6.1 and 6.2 set out the need to ensure environmental integrity and transparency, robust accounting, and the avoidance of double counting; Articles 6.2 and 6.3 establish that cooperative approaches can result in "internationally transferred mitigation outcomes," such as linked emissions trading systems; and Article 6.4 establishes a "mechanism to

contribute to the mitigation of greenhouse gas emissions and support sustainable development" (Droge et al., 2018, 16).

The flexible, bottom-up nature of the Paris Agreement has also resulted in the concept of carbon market clubs. Nordhaus (2015) proposes the "Climate Club," in which participating countries agree to undertake harmonized emissions reduction and penalize non-participants by imposing uniform percentage tariffs on their imports (Nordhaus 2015, 1341). His calculations suggest that a relatively low tariff rate—between one and five percent—will induce high participation as long as the international emissions price is between $12.50 and $50 per ton (Nordhaus 2015, 1341, 1358). While such a proposal makes sense in theory, Nordhaus admits it would appear to collide with a number of WTO rules because such tariffs would discriminate against products and production methods and lack justification received from a DSM at the WTO or RTA and PTA level (Nordhaus 2015, 1341, 1349). To make these institutions compatible with WTO rules, he suggests proposing a set of "climate amendments" to international trade law; however, commentators have deemed a Sisyphean task (Das et al. 2018, 16-22).

Even if carbon market clubs find a way to achieve compliance with WTO rules, these frameworks and all other existing and proposed CPMs are likely to be negatively impacted by uncertainty stemming from political turnover. Politicians who have run for election on CPM-repeal-platforms, such as Ontario Prime Minister Doug Ford and Australia Prime Minister Tony Abbott, have had luck repealing or delaying implementation of CPMs because the messages that CPMs hurt domestic industries and consumers resonate with citizens. The consequences from repealing or delaying implementation of CPMs have not been overtly negative because other countries have not

had access to mechanisms through which they can credibly threaten and impose burdensome costs. While countries could theoretically impose punishments outside of a DSM, doing so may lead to a collapse of WTO norms (e.g. tit-for-tat retaliation) that ultimately harms all members. Given that emissions covered by CPMs are scheduled to nearly triple in the next few years, the development of strategies to prevent leaders from ending or delaying CPMs become increasingly integral to achieving the goal set forth by the Paris Agreement.

To date, some regional CPMs, like the Western Climate Initiative (WCI)[1], and unilateral CPMs, like Australia's carbon tax, have been unable to overcome political animosity that has hampered and ultimately ended these CPMs. WCI is a group of seven US states and four Canadian provinces that embarked on a multi-year effort to build consensus among WCI partner jurisdictions about cap-and-trade, allowances, offsets, mandatory reporting of emissions, and market linkage (Western Climate Initiative 2011). As an incorporated entity that does not claim to give legally binding advice to WCI partner jurisdictions, WCI does not violate the US Constitution's Treaty Clause (Jackel 2017).

WCI has produced the successful ETS between California and Québec, which was established in 2014. Ontario was part of the ETS from January 1, 2018, to June 15, 2018, but ended its participation when current Premier, Doug Ford, who campaigned on ending the ETS with the goal of reducing energy and gas prices for consumers and businesses, was elected (Walsh 2018). The move came as a shock to many Ontario-based businesses,

[1] The "Western" in Western Climate Initiative does not mean the West Coast of the United States.

which had collectively accumulated between $2.6 billion and $3.8 billion worth of emissions allowances auctioned by the ETS (Paddon 2018). The Environmental Minister announced the province would not compensate firms for the allowances, which illustrates the economic harm that can occur if political turnover results in the termination of a CPM (Walsh 2018). The cost resulting from these stranded assets was apparently not sufficient to outweigh the short-term economic and political benefit Ford accrued from terminating the ETS. If the costs of terminating the ETS were significantly higher, the chance that Ford would have campaigned or followed through on ETS termination would have likely been lower.

Uncertainty about the future of Australia's carbon tax deterred domestic and international investment for years, which had a number of adverse impacts on Australian utilities and ratepayers (Jotzo, Jordan, and Fabian 2012, 14). Nelson et al. (2010) found that investment in sub-optimal capital stocks (i.e. fossil-fuel energy production in the case that the carbon tax remained intact) could increase retail electricity prices up to six percent (Nelson et al. 2010, 461). A further study found that if firms subjected to the carbon tax expected the carbon tax to be introduced, delaying introduction by four years would add $1 billion to electricity generation costs due to investment in more expensive and less efficient generation plants (SKM 2011, 2). Another study estimated that the cost of uncertainty in the electricity sector may be $1-2 billion per year in the short- to medium-term and as much as $5 billion per year in the longer term (Department of Resources, Energy, and Tourism 2011, 85). Nevertheless, the costs of uncertainty evidently did not outweigh the benefits Australian leaders saw in delaying and eventually dismantling the country's carbon tax.

Without mechanisms that enable countries to threaten and impose significant costs on countries that end or delay a CPM, uncertainty will hamper the ability of countries to use CPMs to reduce emissions in line with the goal established by the Paris Agreement. A strategy to reduce the payoffs from ending or delaying CPMs is discussed in the remainder of this chapter.

IV. Insulating CPMs in RTAs and PTAs without Violating WTO Rules

As was discussed earlier, DSMs enable WTO members to ensure the potential costs of violating WTO rules outweigh the benefits, which creates a more stable international system. Because WTO rules are rigid, however, enacting policies that are in accordance with, and are thus protected from adjudication and retaliation under, WTO rules is difficult (e.g. how Nordhaus' uniform percentage tariffs violate WTO rules). To date, no unilateral CPM has been shown to violate WTO rules largely because they target emissions from domestic industries, thereby avoiding issues directly relating to international trade. Questions arise as soon as a CPM targets emissions from international polluters through a border carbon tariff that i) discriminates against products produced in countries without a CPM and ii) provides domestic producers with a subsidy when they export to countries without a CPM to account for the competitiveness effects of the domestic CPM.

When RTAs and PTAs contain provisions that seek to preclude members from using the WTO-based DSM in an attempt to enable members to act contrary to WTO rules, such provisions have proven toothless because Article 23 of WTO's Dispute Settlement Understanding mandates exclusive jurisdiction of the WTO DSM over the

violations of WTO provisions (WTOf). For example, Mexico submitted a complaint to the WTO regarding US labeling rules for "dolphin-safe" tuna. Following Mexico's submission, the United States argued that under NAFTA Article 2005(4) this type of dispute could only be considered under NAFTA's DSM and requested Mexico to move its claim to NAFTA's dispute settlement mechanism. Mexico disagreed and decided to pursue its complaint at the WTO, which ruled in favor of Mexico (Molina and Khoroshavina 2018, 6).

Domestically-focused CPMs avoid WTO disputes that may arise with internationally-focused CPMs. The rationale for internationally-focused CPMs is to create a level trading field for commerce in the international system, which reduces the likelihood of emissions leakage and harm to domestic job markets that occur when firms move their operations to countries where it is less expensive to operate (i.e., countries with less stringent climate change regulations). The framework being proposed in this chapter takes advantage of four factors that reduce the likelihood of emissions leakage and harm to domestic job markets *without* establishing internationally-focused CPMs.

1. Trade flows between RTA members comprise a large portion of their total trade. For instance, the United State is party to 14 RTAs with 20 countries, which make up 26 percent its total trade (27 percent of its exports and 25 percent of its imports) (Soroka 2016, 5) (U.S. Department of State 2017). In PTAs, trade flows from developing nations, which have less resources available for addressing climate change, to developed nations are generally high.
2. RTA members and RTA members, in some cases, are governed by the same rules, which results in a level trading field for trading members. For example, a CPM

insulated in an RTA or PTA would require each member to adopt a domestic CPM. As a result of the first and second factor, the competitiveness effects of CPM implementation will be small compared to a scenario in which only one member of an RTA or a PTA implemented a CPM.

3. If a firm moved its operations to a country with which it did not share an RTA or PTA, it would likely lose a significant portion of market access (inferred from the first factor).
4. If one economically powerful country or bloc of countries (e.g. the United States of European Union) is or will be reducing emissions through a CPM, ensuring that as many of its fellow RTA or PTA members as possible have the same emissions reductions standards will be in its best interest. (The negotiation tactics needed to establish a provision that requires each member to have a domestic CPM are beyond the scope of this chapter, but, based on the innovative nature of RTAs and PTAs, it should be possible). If the standards are not the same, emissions leakage and harm to domestic job markets may occur because firms have an incentive to relocate to other RTA or PTA members because they would still have access to the RTA's or PTA's market but would not be required to pay the costs that accompany the CPM. The upshot of one powerful country or trading bloc successfully implementing CPM provisions in all of its RTA and PTAs is significant. This is because all members of CPM-bearing RTAs will do all they can to ensure that the RTAs and PTAs to which they are a party are also CPM-bearing because preventing lost competitiveness and jobs and emissions leakage is in their own self-interest. Thus, if one country or trading bloc is able to create

CPM provisions in all of its RTAs and PTAs, a self-interest-driven domino effect may drive all 164 WTO members to insulate a CPM in their RTAs and PTAs.

V. Increasing Climate Ambition by Insulating CPMs in RTAs and PTAs

This final section will describe how insulating CPMs in RTAs and PTAs prevents members from violating CPM provisions and can thus help overcome the anarchic nature of the international system. CPM provisions implemented in an RTA and a PTA will need to contain a DSM that is capable of adjudicating CPM-related disputes. Based on the previous analysis of an RTA- and PTA-based DSM, such mechanisms may seem ineffective because of the historical superiority of using the WTO-based DSM and the ramifications of Article 23. The context of RTA- and PTA-based CPMs is different. Assuming domestically-focused CPM provisions do not violate WTO rules, ignoring the requirements of a CPM will not violate WTO rules. As a result, parties to RTAs and PTAs will need a DSM to hold each other accountable to the rules laid out in their respective CPM provisions. If a CPM-adherent in an RTA or PTA does not have access to a mechanism through which it can credibly threaten and impose retaliation on a trading partner that is violating the CPM, the adherent may fail to coerce the violator into compliance. To generate compliance, the costs of violating must outweigh the benefits of violating. CPM provisions help achieve compliance by ensuring that acting against CPM is less likely to be in the self-interest of trading partners.

As has been previously noted, preventing emissions leakage and harm to domestic job markets is in each adherent's self-interest. The following retaliatory framework seeks to prevent violation of an RTA- or PTA-insulated CPM by taking advantage of the fact

that, according to the WTO, a violator should expect to face a response equivalent to the damages its violation has caused (WTO n.d. d). Suppose the following scenario exists: the CPM covers all types of emissions and is economy-wide, a member is found to be violating 11 percent of its CPM obligation (i.e. the firms within it are not purchasing emissions permits or paying the emissions fee), seven percent of the violation is from a natural gas utility and four percent of the violation is from a cement manufacturer, and the trading partner in which these firms operate has been notified multiple time that these firms are violating the CPM but has not required the firms to comply. The members complying with the CPM can then resort to adjudication under the RTA- or PTA-based DSM and if the panel judging the dispute finds that the alleged violator is in violation of CPM rules, then the harmed parties can lawfully retaliate against the violator. A sensible retaliation based on the previous scenario would be as follows: adherents would place tariffs on imports consisting of or constructed using gas from the violating utility and cement from the violating manufacturer that are equal to the difference between the price each violating firm is currently paying and the price it would have paid if it were adhering to the CPM provisions. Such tariffs would continue for the duration of the violation. This retaliatory framework nullifies the benefits a violator would receive by dodging the requirements of an RTA- or PTA-insulated CPM.

Furthermore, the leader of a violating country and the country itself would likely be subject to domestic and international reputation costs due to the fact that support for addressing climate change is significant and rising. According to a Pew Research Center poll, majorities in all 40 countries polled say climate change is a serious problem, and a median of nearly 80 percent support the idea of their country limiting emissions as part of

an international agreement (Stokes, Wilke, and Carle 2015, 4). This widespread support was a large reason that leaders throughout the world felt comfortable signing and ratifying the Paris Agreement.

Global support for climate action means that leaders who have committed to the Paris Agreement may face domestic and international reputation costs if they fail to work towards reducing emissions in accordance with the 2°C goal. Such leaders may face anger from voters and political opponents for their empty commitments that sap the country's honor and reputation (Frieden, Lake, and Schultz 2016, 115). Furthermore, their role in negotiating future international agreements may decrease because they lack the trust of other leaders, which may harm their ability to achieve domestic priorities in the international realm. Furthermore, leaders who do not support the Agreement are already costing their countries billions of dollars because EU officials said the European Union will not sign trade agreements with countries that have not ratified the Agreement (Stone 2018). If the European Union sticks to this commitment, the current trade talks with the United States will not come to fruition unless the United States reenters the Agreement.

Based on the analysis of the Paris Agreement, violating the CPM provisions will negatively impact the violator because the possible economic and reputational cost from the imposition of tariffs would negate any benefit derived from continued violation. Every RTA and PTA with climate provisions also ought to include a robust DSM so adherents can credibly threaten and impose costs to generate compliance. While members could theoretically impose punishments outside of a DSM, doing so may lead to a collapse of norms that ultimately leads to anarchy and harms all members. Reiterating the

point of DSMs here is worthwhile: DSMs lend credibility to the threat of retaliation, which helps coerce violators into compliance before retaliation occurs.

Adherence to RTA or PTA and WTO rules is an act of self-interest. With regards to CPMs, ensuring that CPM-violators comply with CPM requirements is in the self-interest of CPM-adherents. Ensuring that the threats of CPM-adherents are not carried out is in the self-interest of CPM-violators. Thus, DSMs create a reality in which self-interest drives members to comply with trade rules. If leaders are want to reduce emissions in accordance with the Paris Agreement but are worried about harming their economy's ability to compete in an increasingly globalized world, they should do all they can to insulate a DSM and climate provisions, like a CPM that drives emissions reduction in accordance with the Paris Agreement, in their RTAs and PTAs. Doing so will likely i) provoke other leaders to do all they can to insulate similar provisions in their RTAs and PTAs and ii) reduce the payoffs that future leaders in all RTA- and PTA-linked countries would receive from ending or delaying emissions reduction efforts—an increasingly integral aspect to achieving the goal set forth by the Paris Agreement.

Chapter 4 The Importance of Climate Policy Transparency in RTAs and PTAs

The benefits that countries obtain by free-riding on other countries' emissions reduction efforts provide an incentive to violate emissions reduction commitments. The previous chapter illustrates that the anarchic nature of the international system, which drives free-riding, can often be mitigated by WTO- and RTA-based dispute settlement mechanisms (DSMs). Nevertheless, for DSMs to be effective at levying domestic and international costs sufficient to deter a violator from continuing to violate, violated parties must have access to information that shows the violator is violating WTO or RTA rules. Effective transparency frameworks, which include monitoring, reporting, and verification of progress on particular commitments, are integral to creating trust between countries. The probability of detecting violations of a commitment increases as the transparency framework becomes more effective, which reassures compliant countries by deterring countries that may be predisposed to violating from violating (Aldy 2014, 3). Thus, the incentive for countries to violate commitments creates an incentive for other countries to monitor (Barrett 2003, 150). To ensure DSMs can be used to coerce potential or current violators into not violating, a rigorous transparency framework is required. This chapter will argue that an effective DSM and transparency framework are integral to creating a reality in which the trading field can be leveled.

This chapter will consider (1) the function of the Trade Policy Review Mechanism (TPRM), which is the WTO's transparency framework; (2) the TPRM's lack of requirement for transparency on policies that impact a country's ability to achieve its emission reduction goal under the Paris Agreement; (3) the ability of Paris Agreement's transparency framework to mitigate the emissions reduction uncertainty left by the TPRM; and (4) the benefits of reiterating commitment to the Paris Agreement in RTAs and PTAs when this commitment is accompanied by an RTA- or PTA-based DSM; and (5) how effective RTA- or PTA-based DSMs and provisions reiterating Paris Agreement commitment will bolster efforts to limit global temperature rise to 2°C, and 1.5°C if possible, above pre-industrial levels.

I. WTO's Trade Policy Review Mechanism

Since its introduction in 1989, the Trade Policy Review Mechanism (TPRM) has required increased transparency between WTO members by instituting reviews of the trade policies and practices of individual members (Laird and Valdes 2012, 1-2). Upon review, a member must provide information about the transparency of trade policies, discriminatory treatment of its trading partners, stability and predictability of trade policies, protectionist policies, and participation in dispute settlement, and it must also respond to questions that fellow WTO members raise about these topics (Grollier 2017, 2-3). In addition to the review, the WTO Secretariat must prepare a report on the member under review that typically covers adherence to WTO rules and the economic conditions and institutions related to trade agreements (Grollier 2017, 3). Review frequency depends on a member's portion of trade in goods and services, with reviews conducted every two

years for the four biggest traders, every four years for the next 16 biggest traders, every six years for other members, and a longer period for least developed members (Chaisse and Debashis 2007, 162).

The transparency produced by the TPRM improves the conditions of trade in three important ways. First, transparency enables members to evaluate each other's trade policies and practices and their impact on and alignment with WTO rules (Chaisse and Debashis 2007, 159). Second, it provides members, both the reviewers and reviewees with an opportunity to improve their understanding of WTO rules. Third, it results in actions to harmonize national policy with WTO rules (Chaisse and Debashis 2007, 160). While reviews cannot be used as evidence for adjudication under the DSM, members have revised domestic legislation after reviews showed it violated WTO rules. Thus, revisions appear to be prompted by domestic and international pressure and threats to collect admissible evidence for DSM adjudication. Presumably, had these reviews not been published, the violators would have continued to violate WTO rules. While reviewees could leave information out of the review, doing so would be risky because the WTO Secretariat may find and publicize the violation and the violator's attempt to cover up the violation. The coercive nature of the TPRM has led some WTO scholars to assert that the TPRM is an extended wing of the DSM (Chaisse and Debashis 2007, 161). Thus, the transparency that is induced by the TPRM helps overcome the anarchic nature of the international system by encouraging WTO members to cooperate for enhanced international welfare (Laird and Valdes 2012, 4).

The non-DSM admissible nature of reviews creates an opportunity to explain and discuss compliance of policies, seek information from reviewees and WTO officials

about compliance, and express concerns on a largely informal and educational basis (Laird and Valdes 2012, 6). Members have noted how reviews have helped them strengthen interagency discussion and cooperation and obtain technical knowledge to pursue policy reforms (Laird and Valdes 2012, 19). Reviews offer resource-constrained countries that may be violating WTO rules the opportunity to rely on experts from developed countries and the WTO who have experience creating policies that adhere to WTO rules. Because retaliatory tariffs due to a WTO rules violation could both cripple a resource-constrained economy and tarnish its domestic and international reputation, these members have an incentive to learn the most they can from these reviews. Reviews also offer countries that have put resources into aligning their policies with WTO rules an opportunity to ensure that other countries do not receive an unfair competitive advantage by violating WTO rules. Retaliatory threats and actions have often ensured adherence to WTO rules because the costs from retaliation often outweigh the benefits received from continuing to violate the rules. As a result, the TPRM, which acts as an extension of the DSM, creates a reality in which self-interest drives WTO members to comply with trade rules, thereby demonstrating the role of transparency in helping to overcome the anarchic nature of the international system.

The TPRM currently lacks a requirement for transparency on policies that impact a country's ability to reduce its emissions. According to Das et al. (2018, 24), repeated calls have been made for the TPRM to include policy relating to climate change. To this point, climate advocates have argued that reviews should include the impact of international trade agreements on national climate interests and policies (Das et al. 2018. 24). In light of the emissions reduction commitment that 179 countries and the European

Union ratified under the Paris Agreement, a better argument for why climate policy transparency should be included in reviews exists.

The absence of an effective transparency framework to document progress on the Paris Agreement is likely to cultivate free-riding. Without this framework, few countries are likely to reduce emissions because doing so often requires the passage of legislation that is not only costly to develop, implement, and enforce but also creates an initial drag on the economy by requiring businesses to scale back emissions-intensive activities or invest in technologies that make emissions-intensive activities cleaner or more efficient. In the absence of this framework, most countries will refrain from reducing emissions because doing so allows them to continue to benefit from inexpensive emissions-intensive activities. If countries do pass emissions reduction policies, they may lose their ability to compete with countries that have unregulated economies. Failing to compete with other countries (i.e. not maintaining or increasing exports) in an increasingly globalized market may ruin political careers and parties due to frustration over decreasing economic opportunity. With this reality in mind, government officials and political parties in countries that are reducing emissions in accordance with the Agreement should work to include an effective climate policy transparency framework is included in the TPRM so their countries enjoy a more level trading field.

Any attempt to create TPRM changes at the WTO level, however, is difficult and unlikely to happen in the short term (Das et al. 2018, 25). Even though no legal basis exists for mandatory inclusion of climate change policy in the TPRM, countries that are already reducing emissions in accordance with the Paris Agreement would benefit if their trading partners were required to be transparent about the extent to which their policies

are reducing emissions. This requirement can be realized by implementing a climate policy transparency framework in RTAs or PTAs that are also equipped with robust DSMs. Information obtained through RTA- or PTA-based transparency mechanisms could be used to credibly threaten countries that are not reducing emissions in accordance with the Agreement with large retaliatory costs. Furthermore, countries in compliance with the Agreement could leverage the domestic and international reputation costs that would likely surface if a country is not reducing emissions in accordance with its commitment under the Agreement. Thus, rigorous transparency frameworks ensure that DSMs maintain their ability to coerce potential or current violators into not violating their commitment.

II. The Paris Agreement's Transparency Framework

The Paris Agreement offers an effective transparency framework in addition to its ambitious emissions reduction goal that has been ratified by countries constituting nearly 90 percent of global emissions (Climate Analytics 2018). At COP24 in 2018, UNFCCC members agreed to enhance the Agreement's transparency framework. Unlike the current approach in which developed and developing countries have different reporting requirements, the enhanced framework requires all countries that have ratified the Agreement to provide a detailed report of their emissions reduction progress every two years starting in 2022 (Waskow et al. 2018). The three-year implementation period for the enhanced transparency provides a grace period for resource-constrained nations to create and deploy emissions monitoring, reporting, and verification institutions. Furthermore, all governments agreed to use the latest IPCC methodologies to estimate

emissions, and countries with less capacity to gather emissions data can receive help from an expert committee (Waskow et al. 2018).

The Agreement's transparency framework seeks to hold nations accountable to their emissions reduction commitments, build capacity for robust climate policy by comparing and learning from successful and unsuccessful policies, and facilitate trust and agreement among countries (Aldy 2014, 15). With such a framework in place and a global community that is increasingly supportive of climate action, leaders who fail to reduce emissions in accordance with the 2°C, and 1.5°C if possible, goal laid out under the Agreement may face the wrath of voters and political opponents who are frustrated that the leader has tarnished their country's honor and reputation by making an empty commitment. Additionally, leaders in countries that have kept their commitments might doubt commitments made by leaders who violate this commitment, which may decrease the latter's role in negotiating future international agreements (Frieden, Lake, and Schultz 2016, 115). If leaders are caught trying to "cook the books" in their reports, the domestic and political backlash may be even larger than the backlash they would have experienced by failing to make sufficient progress on their commitment. Thus, the domestic and international reputation costs that arise from an effective transparency framework help deter leaders from violating their commitments.

III. Integrating the Paris Agreement into RTAs and PTAs

While the Paris Agreement's transparency framework reduces the commitment problems that may arise without such a framework, countries that are already taking significant steps to reduce emissions would benefit from taking steps to integrate this

framework in their RTAs and PTAs. Between now and 2022, countries will have little way of knowing the progress other countries are making on their respective emissions reduction commitment. This lack of transparency increases the incentive to free ride, which, if it happens, is likely to reduce the competitiveness of countries that are on track to achieve their commitment. In the midst of a rapidly expanding global economy, this free pass could be enough to augment the competitiveness of free riding countries, thereby giving them a competitive advantage over countries that are already transparently reducing emissions. With this in mind, countries that are already reducing emissions and reporting these reductions could provide resources (e.g. financial and technical support) to countries with which they trade to ensure the former countries do not receive an unfair competitive advantage in the years leading up to 2022. The following paragraphs will describe how integrating the climate policy transparency framework laid out by the Paris Agreement in RTAs and PTAs may help level the trading field.

EU agreements negotiated after the Agreement contain provisions that reiterate a shared commitment to effective implementation of the Paris Agreement (Stone 2018). Based on the analysis by Durran and Morgera (2012, 50), the primary rationale for reiterating this commitment stems from concerns of self-interest, namely the European Union's lack of competitiveness relative to its trading partners with weak or unenforced environmental standards. Another factor contributing to this reiteration likely includes a recognition by EU government leaders that majorities of their constituents are demanding action on climate change, meaning inaction could cost them their positions of power (Stokes, Wike, and Stew 2015, 5).

Article 16.4 section four of the EU-Japan RTA, which was signed in 2019, states, "The Parties reaffirm their commitments to effectively implement [...] the Paris Agreement, done at Paris on 12 December 2015 by the Conference of the Parties to the UNFCCC at its 21st session" (EU-Japan Economic Partnership Agreement 2019, 434). This text illustrates that both members are committing themselves to reduce emissions in accordance with the Agreement's 1.5°C to 2°C goal in addition to the Agreement's other provisions, like its transparency framework. The EU-Japan RTA also includes a DSM composed of a "panel whose decisions[...] shall be final and[...] unconditionally accepted by the Parties" (EU-Japan Economic Partnership Agreement 2019, 515). In the case the panel's decisions are not heeded, the injured party receives permission from the panel to retaliate against the violating party at a level equivalent to the injury (EU-Japan Economic Partnership Agreement 2019, 523). By including provisions that reiterate the Paris Agreement and establish an effective DSM, the European Union and Japan are opening themselves up to coercion and retaliation if one member has evidence proving the other member is not reducing emissions in accordance with the Paris Agreement's goal.

The consistent monitoring, reporting, and verification called for in the Paris Agreement, coupled with the integration of this framework in an RTA or PTA, creates a transparency framework that is more effective than requiring climate change policy to be included in an RTA- or PTA-based TPRM. These benefits are twofold. First, all countries are required to submit biennial reports, which generates consistent transparency without having to negotiate a TPRM provision. While countries could negotiate TPRM provisions in RTAs and PTAs that would require annual or biennial climate policy reviews, doing so

would be a waste of political capital because such a mechanism already exists under the Agreement. Second, countries could use reports as admissible evidence for coercion and adjudication, rather than using information gathered in a TPRM review to find other information that may be admissible. While information from reviews could be used for coercion, the credibility of the threat may not be sizable because the information cannot be used to adjudicate through the DSM.

To ensure that information from the biennial reports required by the Paris Agreement can be used to credibly threaten and, thus, coerce a violator into compliance, an RTA- or a PTA-based DSM must be created. No reason exists to believe that violating the emissions reduction and transparency commitments laid out by the Paris Agreement would violate WTO rules, so disputes about these commitments could not be adjudicated under the WTO-based DSM. As a result, members to RTAs and PTAs that are worried about competitiveness and reputation costs from emissions reduction will need an RTA- or PTA-based DSM to hold other members accountable to their emissions reduction and transparency commitments. Because some trade agreements already contain strong DSM provisions, including those maintained by governments in North and South America, the European Union, and Africa, these countries could likely use their DSMs to credibly threaten retaliation in the case a violator does not respond to their threats.

Most countries have ratified the Paris Agreement and all 164 WTO members have RTAs or PTAs. Countries that are currently adhering to the Agreement and have RTAs or PTAs would benefit from integrating a provision that reiterates their commitment to the Agreement in their trade agreements because, coupled with an effective DSM, they could use this provision to coerce parties violating the Agreement into emissions reduction and

climate policy transparency compliance. In other words, without an RTA- or PTA-based DSM, countries will not be able to leverage the information that each country must publish in accordance with the Agreement's transparency framework to seek compensation for lost competitiveness. Conversely, a DSM without a transparency framework would be worthless, because the DSM would not have any information with which to enforce commitments. Thus, an effective DSM and an effective transparency framework are integral to creating a reality in which the trading field can be leveled.

IV. Bolstering the Paris Agreement Through RTAs and PTAs

Over the next three years, government leaders who are adhering to their Paris Agreement commitments should consider how they can help leaders in other countries do the same. In an optimal scenario, adherents would not have to threaten adjudication to achieve compliance with the Agreement. While the procedure of threatening to bring a dispute to the DSM seems to be a means to achieve economic retaliation, retaliation is rarely used when authorized. This is largely due to the fact that retaliation penalizes the penalizer (Nordhaus 2015, 1351). As noted in the previous chapter, if the European Union puts a tariff on Chinese solar panels because China is found to have violated WTO rules, doing so would i) increase the price of solar panels for EU consumers unless subsidies are created to offset the increased price and ii) likely cause China to respond tit-for-tat, which may hurt the EU economy and EU politicians by reducing EU exports.

With the EU-China example in mind, Paris Agreement adherents could benefit from providing financial and technical resources to trading partners that do not have the means to monitor and reduce emissions in accordance with the Agreement. Doing so

would help level the trading field, reduce emissions, and avoid domestic costs that arise when retaliation penalizes the penalizer. Fellow trade agreement members, as opposed to non-trade agreement members, should receive these resources because doing so could generate an emissions reducing domino effect. In the case that an RTA or a PTA member is able to help fellow trade agreement members (recalling that 179 countries and the European Union have ratified the Agreement) build monitoring, reporting, and verification institutions that can provide information required by the Agreement's biennial and other reports, these members will be able to credibly relay their emission reduction progress. If their progress is not in line with the 1.5 °C to 2 °C commitment, these members would open themselves up to economic and reputation costs. Furthermore, because countries are likely to have multiple trade agreements, several countries, which may or may not share a trade agreement, could end up threatening and eventually coercing a violator into compliance.

If a country's emissions reduction progress is in line with the Paris Agreement, it will be concerned about whether countries in its trade agreements are violating the commitment and, thus, receiving an unfair competitive advantage. They will then benefit from working to ensure that i) their trade agreements reiterate the commitments under the Paris Agreement and ii) their trading partners have monitoring, reporting, and verification institutions that can provide information required by the Agreement's biennial and other reports. If the other members do not report progress in line with the 1.5 °C to 2 °C commitment, they would risk economic and reputation costs from members in multiple trade agreements--all of whom want to level the trading field to the greatest extent possible. Such costs may be enough to coerce violators into compliance, which would

drive them to be concerned about competitiveness as well. If one country or trading bloc is able to integrate the Agreement into its RTAs and PTAs, a self-interest-driven domino effect may drive all 164 WTO members to integrate the Agreement in their RTAs and PTAs, thereby driving massive emissions reduction. Thus, the pitfalls of the Paris Agreement, namely its failure to level the trading field and sufficiently reduce emissions, and the inadequacies of RTA- and PTA-based climate provisions, namely their weak legalization, replication, and emissions reduction, can be minimized by i) reiterating commitment to the Paris Agreement in RTAs and PTAs and ii) creating an RTA- and a PTA-based DSM.

Chapter 5 Using PTA-Based Climate Side Payments to Induce Emissions Reduction

Limiting global temperature rise to 2°C, and 1.5°C if possible, above pre-industrial levels requires both developed and developing countries to allocate large amounts of money to reducing emissions. In 2009, the United Framework Convention on Climate Change introduced the Green Climate Fund, which "promote[s] the paradigm shift towards low emission and climate-resilient development pathways by providing support to developing countries to limit or reduce their greenhouse gas emissions and to adapt to the impacts of climate change" (Climate Focus 2016, 1). While the Paris Agreement does not directly refer to the Fund and the amount of funding each country that has ratified the Agreement must contribute, the Agreement states that, "the Financial Mechanism of the [UNFCC...] shall serve as the financial mechanism of this Agreement." One of the Agreement's implementation documents strongly urges developed countries to scale up their financial support for the Fund to achieve the UNFCCC's goal of jointly providing $100 billion annually for mitigation and adaptation by 2020 (Climate Focus 2016, 1).

To date, only $10.3 billion of the $100 billion is pledged to the Fund, $9.3 billion of which comes from developed countries (Green Climate Fund 2019). While the Fund is one of several climate finance mechanisms (e.g. those maintained by the World Bank and Asian Development Bank), allocation of money to these mechanisms is still far from

enabling countries to achieve the 2°C, let alone the 1.5°C, goal to which they committed by ratifying the Paris Agreement (Bodnar et. al 2018, 369-370). This chapter will use the Fund, which is the world's preeminent climate finance fund, to i) exemplify the public sector's failure to mobilize funds for climate change and ii) examine alternative funding methods that may encourage more public sector investment. Without augmenting climate finance contributions, climate change will increasingly impede current and future generations' access to a thriving natural world and economy. This chapter will consider (1) the inadequate levels of climate finance; (2) the notion of side payments; (3) the Montreal Protocol's Multilateral Fund as an example of successful side payments; (4) the potential to integrate climate side payments in preferential trade agreements (PTAs) to increase climate finance; (5) the extent to which PTA-based climate side payments coincide with the takeaways from the Montreal Protocol; and (6) how PTA-based climate side payments differ from existing climate finance mechanisms. Ultimately, this chapter will argue that a decentralized, PTA-based climate side-payment framework could help overcome the inadequate state of climate finance.

I. A Dearth of Climate Finance

The UNFCCC defines climate finance as the allocation of funds to efforts at the local, national, or transnational level that support mitigation of and adaptation to climate change (UNFCCC 2019). Current and projected volumes of climate finance are inadequate to prevent a 2°C rise over pre-industrial levels (Bodnar et al. 2018, 369). While the Organisation for Economic Co-operation and Development predicts that climate finance will increase from $45 billion in 2014 to $67 billion in 2020, this number

falls far short of the International Energy Agency's estimation that an annual average of $1.1 trillion from 2015 until 2030 will need to be spent on mitigation and adaptation to meet the 2°C goal (OECD 2015). Limiting warming to 1.5°C above pre-industrial levels will cost roughly 1.5–2.1 times more than the 2°C goal (Rogelj et al. 2015, 525).

While the Fund's role in climate finance is cemented in the Paris Agreement, the Fund lacks the ability to address the problem of insufficient financing because it cannot require countries to make contributions (Cui and Huang 2017, 373). The money that has been collected to date was collected through voluntary country pledges without clarity about how the financing burden should be distributed (Cui and Huang 2017, 373). While this strategy may be pragmatic for accumulating short-term contributions, it will likely lead to disputes among contributors and between contributors and non-contributors that obstruct the Fund's ability to reach its goal of raising $100 billion per year by 2020 (Cui et al. 2014, 291). Establishing a clear method for allocating finance responsibilities has been unfruitful thus far, partly because some developed countries prefer to free ride on the public good created when other countries contribute to the Fund or other climate finance instruments (Cui and Huang 2017, 373).

II. Side Payments: Lessons from the Montreal Protocol

The previous two chapters have examined how countries that are reducing emissions in accordance with the goal laid out by the Paris Agreement would benefit from ensuring that other countries also reduce emissions in accordance with this goal. By creating a level trading field, the former countries can reduce worries about losing their ability to compete with other countries that would have continued using cheap, emissions-intensive

energy sources. In the midst of a rapidly expanding global economy, countries that are not heavily invested in reducing emissions have an incentive to violate the Agreement because doing so could give them a competitive edge over countries that are already transparently reducing emissions. To prevent such behavior from occurring, adherents may have to offer potential violators a "carrot" in the form of a side payment, which can be thought of as an inducement or a compensating payment (Barrett 2005, 336-337).

A successful climate side payment provides potential violators with an incentive sufficient enough to make them uphold a commitment that they would otherwise be unwilling to accept (Barrett 2005, 337). Side payments are generally viewed as an exchange between agents with different degrees of concern about or resources to combat an issue. Thus, climate side payments would occur between developed and developing countries because of the asymmetries that exist in their capacities to enact climate change mitigation policies or the extent to which they benefit from climate change mitigation policies (Hovi et al. 2015, 677, 683). A country that is reducing emissions in accordance with the Paris Agreement can use the expected net benefits it receives from establishing an equal trading field to cover some portion of a potential violator's incremental cost of reducing emissions in accordance with the Agreement. Thus, Agreement-adhering countries may be able to use side payments to encourage potential violators to become adherents--an idea on which the next section will expand.

In 1974, two US-based chemists published a paper suggesting that stratospheric ozone could be destroyed by releases of chlorofluorocarbons (CFCs), a class of human-made chemical that was widely used in as an aerosol propellant, a refrigerant, an insulator, and a solvent (Barrett 2005, 222). The potential negative consequences of

ozone depletion were immense, including more skin cancers and eye cataracts, lower yields in agriculture and fisheries, quickened decay of plastics used outdoors, and increased concentrations of ground-level ozone (Barrett 2005, 222). In 1977, at the request of the states that were already acting unilaterally to reduce CFCs, an International Conference on the Ozone Layer was called by the United Nations Environment Programme (Barrett 2005, 222). The conference recommended that a global framework to protect the ozone layer be implemented, and treaty negotiation began shortly afterward (Barrett 2005, 222).

The Vienna Convention was adopted in March 1985, but it served as a framework agreement in which nations agreed to develop a CFC protocol by 1987 that would require CFC reductions in line with scientific recommendations (Benedick 1998, 45). The Montreal Protocol was adopted in 1987 and went into effect in 1989 (Barrett 2003, 226-227). As agreed in Montreal, the Protocol would only take effect after being ratified by at least 11 countries that made up at least two-thirds of global CFC consumption--goals that were easily achieved because the 29 countries and the European Union that initially ratified the Protocol accounted for 83 percent of global CFC consumption (Barrett 2005, 227).

The Protocol required ratifying countries to cut CFC production and consumption in half from their 1986 levels by 1999 and also stabilize production and consumption of other ozone-depleting substances at their 1986 levels (Barrett 2005, 225). The Protocol also notably banned the trade of ozone-depleting substances and products containing these substances between signatories and non-signatories (Barrett 2003, 313). This strategy sought to deter non-participation, thereby making the trade ban simultaneously

prevent free-riding and sustain full cooperation (Barrett 2003, 314). Without trade restrictions, leakage would have shrunk the market for ozone-depleting substance substitutes, thus reducing the incentives to develop effective substitutes (Barrett 2005, 321). While questions about whether the trade restrictions would satisfy Article XX of the GATT, which allows parties to take measures "necessary to protect human, animal or plant life or health" or "relating to the conservation of exhaustible natural resources," existed, no WTO member has challenged the restrictions (Barrett 2005, 312). As a result, the parties to the Protocol have endorsed the restrictions, which is more significant than a legal opinion in the anarchic international system.

The negotiators of the 1987 agreement renounced side payments (Barrett 2005, 346). Some argued that developed countries, which consumed and produced more ozone-depleting substances than developed countries, stood to gain more from ozone layer protection than developing countries because depletion was less severe near the equator (Barrett 2003, 339). Thus, the objective of the 1987 negotiations was to ensure the participation of developed countries, meaning developing countries were largely left out of the negotiations (Barrett 2005, 346). The Protocol successfully reduced consumption and production of these substances in developed countries to the point that the costs of participation increased relative to the benefits received from reduction (Barrett 2005, 346). Furthermore, the large number of developing countries that had not yet ratified the Protocol continued to trade the substances between each other, unscathed by the trade restrictions.

Developed countries recognized they could capture more benefits from ozone-depleting substance reduction and level the trading field between themselves and

developing countries by creating incentives for developing countries to ratify the Protocol (Barrett 2005, 346). Because developing countries had a less enticing benefit-cost ratio to undertake ozone-depleting substance abatement, the original treaty was amended in 1990 to include a provision that compelled developed countries to allocate side payments to cover developing countries' incremental costs of participation (Barrett 2005, 231, 347). The parties to the Protocol agreed to create a "Multilateral Fund" with $160–$240 million for financial assistance between 1991–1993 and then apportioned this cost according to a UN assessment scale (Barrett 2005, 348). After negotiations about whether contributions to the Fund should be mandatory or voluntary, parties agreed that "The Multilateral Fund shall be financed by contributions from [industrial countries...] on the basis of the United Nations scale of assessments." While the text did not prescribe a penalty for failing to contribute to the Multilateral Fund, it required developed countries to decide on their contributions each fiscal year (Amendment 1990, 11). This language was sufficient to generate contributions to the Multilateral Fund because compliance of this aspect of the treaty was nearly full from 1991 through 1995 (Barrett 2005, 349). After the 1990 amendment was negotiated and the Multilateral Fund was established, the number of developing country parties to the Montreal Protocol shot up from below 60 to nearly 120 by the end of 1993 (Barrett 2005, 348).

While knowing the exact extent to which the Multilateral Fund drove developing countries to ratify the Protocol is impossible, evidence suggests that it was more successful than trade restrictions alone. For instance, trade restrictions without side payments may not have been enough to encourage countries with large domestic markets like China and India to ratify the Protocol (Barrett 2005, 324). Furthermore, developing

countries that received financial assistance from the Multilateral Fund risked having their assistance terminated if they failed to file data on ozone-depleting substance consumption and production to the Protocol's secretariat. Without financial assistance, some developing countries would have failed to uphold their commitment, which likely would have subjected them to domestic and international reputation costs. The coercive nature of the threat to end assistance can be observed in the following scenario. The secretariat failed to obtain data from Mauritania on multiple occasions and decided to recommend that the country be reclassified as ineligible for assistance until it met the treaty's reporting requirements (Barrett 2005, 150). Shortly after the recommendation was made, Mauritania submitted the required data and was quickly made eligible for assistance (Barrett 2005, 150).

Four takeaways from the Protocol are relevant for the consideration of climate finance that will take place in the following sections. First, side payments in the highly asymmetric structure of the Protocol appear to have proven successful at generating ozone-depleting substance consumption and production reduction in developing countries. The side payments shifted the Protocol from solely focusing on encouraging developed countries to reduce their emissions to one that also encouraged developed countries to pay developing countries to reduce their emissions (Barrett and Stavins 2003, 361).

Second, had the benefits of reducing ozone-depleting substance consumption and production in developing countries not outweighed the cost of side-payments in developed countries, the 1990 amendment would not have been implemented in the Protocol. Similarly, if the cost of reducing ozone-depleting substance consumption and

production outweighed the side-payments for developed countries, they would have been unlikely to ratify the Protocol. As shown in a study commissioned by Canada's environmental agency 1997, the benefits of eliminating ozone-depleting substances were $459 billion (only accounting for avoided damages to fisheries, agriculture, and materials, not human health benefits of ozone protection) while the costs of implementing the phase-outs were $235 billion (Barrett 2003, 237). While the $1 billion that developed nations allocated to the Multilateral Fund is a pittance compared to the net benefits they received from the phase-out, they only needed to cover the incremental cost of the phase-out to encourage developing countries to ratify the Protocol (Barrett and Stavins 2003, 361).

Third, side payments must be used efficiently. Thus, side payments should be linked to performance, which requires institutions to create, implement, and enforce policies, and a transparency framework to hold these institutions accountable. To cultivate high performance, communication between the experts in the funding body and appropriate staff in the recipient government should frequently occur (Barrett and Stavins 2003, 361-362).

Fourth, a combination of carrots and sticks is more likely to attract participation and compliance than one of these mechanisms in isolation. The carrot of side payments ensured that no developing country could lose by ratifying the Protocol (Barrett 1999, 216). The stick of trade restrictions ensured that any country that did not ratify the Protocol would not receive significant benefits if leakage occurred (Barrett 1999, 216).

Prior to considering how these takeaways can be applied to climate finance, the differences between ozone depletion and climate change must be addressed. Both issues

are global in the sense that all countries emit ozone-depleting substances and greenhouse gases, all are affected by such emissions, and effective management of these issues requires cooperation involving most countries (Barrett 1999, 192). The importance of ozone-depleting substances, however, pales in comparison to the vast dependence on fossil fuels exhibited by every economy. By late 1998, 165 countries had ratified the Montreal Protocol due in part to the relatively low cost of reducing ozone-depleting substance consumption and production (Barrett 1999, 195-196). By allocating around $1 billion worth of side payments over ten years, developed countries managed to generate widespread compliance, thereby mitigating the most of harmful effects from these substances and trade leakage.

To address climate change, an annual average of $1.1 trillion until 2030 will need to be spent on mitigation and adaptation to meet the 2°C target (OECD 2015). Limiting warming to 1.5°C will cost roughly 1.5–2.1 times more than a 2°C scenario (Rogelj et al. 2015, 525). Estimates about the cost of unmitigated emissions vary widely, with some suggesting costs between five and 20 percent of gross domestic product every year, while others suggest costs between 0.5 and two percent (Mendelsohn 2008, 45). Estimates about the cost of abatement in accordance with the 2°C target range from one percent to 16 percent of GDP (Mendelsohn 2008, 45). Thus, the costs of climate change mitigation are far larger than ozone-depleting substance mitigation and, unlike mitigation of the latter, uncertainty exists about whether the costs will be outweighed by the benefits of global emissions reduction in accordance with the target laid out by the Paris Agreement. Concerns about competitiveness over emissions reduction are far higher than concerns about competitiveness over ozone-depleting substances because the former affects most

of a country's production and consumption patterns whereas the latter only affects a small portion of these patterns. For these reasons, the Montreal Protocol was able to quickly gain traction and largely phase out the use of ozone-depleting substances, while climate change negotiations have floundered for nearly three decades.

The Paris Agreement, however, marks the most concerted effort to address climate change yet--with 179 countries and the European Union committed to keeping warming below 2°C and 1.5°C if possible. Already, a number of countries and trading blocs, like Japan and the European Union, are doing all they can to demonstrate their leadership on this commitment. Working in this commitment unilaterally, however, likely hurts their ability to compete with countries that have not been reducing emissions in accordance with the Agreement. As will be argued later this chapter, the different scale of ozone depletion and climate change does not detract from the applicability of the four Montreal Protocol takeaways to climate finance. By scaling climate finance--in the form of side payments through preferential trade agreements (PTAs)--in line with these takeaways, ambitious countries and trading blocs, like Japan and the European Union, can mitigate worries about competitiveness, demonstrate climate leadership, and create collective emissions reduction that guarantees the benefits of emissions reduction outweigh the costs.

III. Foreign Aid in Preferential Trade Agreements

Foreign aid is commonly viewed as an indispensable instrument for poverty alleviation, which tends to overshadow its use as a side payment for policy reform (Bueno de Mesquita and Smith 2009, 309-310). Bueno de Mesquita and Smith (2009, 310-311) find

that all Organisation for Economic Co-operation and Development countries transfer aid according to the political interests of donor and recipient government leaders. As a result, humanitarian need is a poor indicator for aid allocation because the most disadvantaged countries do not receive the most aid, rather aid is often directed at countries in which policy reform can be purchased at an affordable price (Bueno de Mesquita and Smith 2009, 336).

If side payments for policy reform did not contribute to the stability of a political leader's regime in both donor and recipient states, then most leaders would lack an incentive to participate in such deals (Bueno de Mesquita and Smith 2009, 336). Generally, these side payments improve the welfare of citizens in donor countries because achieving policy reform (e.g. reducing emissions in accordance with the Paris Agreement) aligns with their social and economic desires (e.g. a level trading field). Citizens in recipient countries are generally harmed by these side payments for two reasons: i) they require compliance with new or existing policies, which is often resources-intensive; and ii) they can be used by the government in corrupt ways that do not improve overall well-being (Bueno de Mesquita and Smith 2009, 336).

Side payments as a form of foreign aid are particularly relevant to considerations of preferential trade agreements (PTAs)--the non-reciprocal trade agreements in which (typically developed) countries grant preferential trade liberalization after receiving a waiver from the WTO General Council. In PTAs, developed countries generally provide developed countries with tariff and non-tariff barrier reduction in exchange for policy reforms that would otherwise be too costly to be implemented in developing countries. The importance of this exchange is underscored by the US International Trade

Administration's statement that ''[t]rade agreements are[...] a tool for promoting fair competition and encouraging foreign governments to adopt open and transparent rulemaking procedures [...and] commitments on issues of concern along with the reduction and elimination of tariffs'' (Baccini and Urpelainen 2012, 934). If the PTA structure already enables policy reform, why allocate side payments as well? The rationale lies in addressing the two issues mentioned in the previous paragraph.

Although empirical evidence illustrates that policy reforms, including policies that invest in clean energy or price emissions, may produce economic benefits in the long run, they are generally accompanied by costly adjustments that are harmful to the most vulnerable parts of society in the short run. While increased unemployment and production standstills may be partially offset by tariff and non-tariff barrier liberalization, developing economies, as a whole, do not generally benefit from PTAs (Baccini and Urpelainen 2012, 934). Furthermore, powerful industry leaders who stand to lose from PTAs are likely to put pressure on their government to compensate them or face their political opposition. Corruption in the form of unsanctioned payments may ensue to win back the support from the industry leaders, which helps the industry and political leaders but is an inefficient use of funds from a societal perspective. By providing their preferential trading partners with side payments and helping them develop administrative frameworks to implement and enforce policy reforms, developed countries could ensure better compliance with these reforms (Baccini and Urpelainen 2012, 935)

IV. Integrating Climate Side Payments in PTAs

Reducing emissions from developing countries is of increasing importance, as developing countries are responsible for approximately 60 percent of current emissions--a number that is slated to grow dramatically as these countries develop (Center for Global Development 2015). While most developing countries have committed to reducing emissions in accordance with the Paris Agreement, they generally lack the required financial and technical resources to achieve these reductions. Climate change policy is harmful to most economies in the short run because it is expensive and difficult to enforce. Combining this lack of resources with the enticing prospect of continuing to use cheap fossil fuels creates a scenario in which violation of the Agreement is likely. Leaders facing this scenario would have an incentive to violate because they would improve the competitiveness of domestic industries compared to competing industries, and they would not be subject to political backlash from citizens and domestic and international industry leaders who would likely be harmed by the adhering to the Agreement. An added benefit of violating the Agreement may be that violators would attract emissions-intensive businesses that are seeking lower operating costs--a phenomenon known as emissions leakage. Empirical evidence supports the existence of emissions leakage, as developing countries have had an influx of emissions-intensive businesses that once operated in developed countries but have relocated to developing countries due to lower operating costs (Peters et al. 2017).

Integrating climate side payments in PTAs could be essential to combatting the incentives that may drive a country to violate the Paris Agreement. Developed countries that are reducing emissions in accordance with the Agreement would benefit from ensuring that their preferential trading partners are also reducing emissions in accordance

with the Agreement. To create a level trading field, Agreement-adhering countries could use the expected net benefits it would receive from establishing an equal trading field to cover some portion of a potential violator's incremental cost of reducing emissions in accordance with the Agreement. Insofar as a developed country pays a portion of the reform cost sufficient for its developing trading partner to begin reducing emissions in accordance with the Paris Agreement, the former countries would be able to maintain their competitive advantage and mitigate emissions and employment leakage because emissions-intensive businesses would be less likely to emigrate to the latter countries if emissions cost are relatively similar.

Two benefits of a successful PTA-based climate side-payment framework are worth underscoring. First, in light of a more level trading field, businesses would likely have an incentive to reduce emissions due to the high cost associated with their current emission levels. While businesses could emigrate to countries that are not party to a PTA in which members have committed to reducing emissions in accordance with the Paris Agreement, doing so may be unappealing because their relative ability to compete in the PTA's market would likely decrease. Second, paying a sufficient portion of the incremental reform cost would also reduce the extent to which the country adhering to the Paris Agreement would contribute to political uncertainty and turnover in their developing trading partners, mitigate the economic harm the former causes in the latter countries, maintain or improve the former's domestic and international reputation, and mitigate the impacts from climate change by facilitating more emissions reduction. Thus, the former countries can improve the levelness of the trading field by providing side

payments to their preferential trading partners because doing so the increases the feasibility of successful policy reforms and emissions reduction.

If enough Paris Agreement-adhering countries and their trading partners integrate climate-related commitments in their PTAs, the incentive for emissions-intensive businesses to come to these developing countries will likely decrease, which would make cleaner, costlier substitutes and the industries that produce them more competitive. The anticipated transition to cleaner substitutes may offset concerns shared by governments and citizens that the operation of emissions-intensive businesses will continue contributing to harmful health impacts. As the number of effective climate provisions in PTAs increases, all Paris Agreement-adhering countries will be faced with an increasingly favorable benefit to cost ratio because the cost of compliance will fall as the price of cleaner, costlier substitutes falls and policy creation, implementation, and enforcement frameworks are streamlined.

V. PTA-Based Climate Side Payments and the Montreal Protocol Takeaways

As no PTA-based climate side payments are currently in effect, the following paragraphs will consider their potential to reduce emissions by investigating the extent a PTA-based climate side-payment framework mirrors the takeaways from the Montreal Protocol. PTAs are defined as a non-reciprocal trade agreement that is generally between a developed and a developing country. Thus, PTA members will likely have asymmetries in i) their capacities to enact climate change mitigation policies and ii) the extent to which they benefit from these policies. Developing countries generally lack the financial and technical resources required to enact effective climate policies, whereas developed

countries generally have these resources. So, an asymmetry exists in their capacities to enact climate change mitigation policies. The analysis for the extent to which they benefit from climate change mitigation policies can be divided into i) benefits from decreased warming due to emissions reduction and ii) benefits from paying for policy creation, implementation, and enforcement. With regard to i), while developing countries are generally more susceptible to damages from climate change because of their geographical location and inability to fund adaptation efforts, they receive less benefit from enacting climate policies because their per capita emissions contribution is generally far smaller than the per capita emissions contribution from developed countries. With regard to ii), because developing countries generally have far fewer resources they can allocate to policy creation, implementation, and enforcement, the relative benefit of doing so is generally far smaller than it is for developed countries. Asymmetries exist in the extent to which PTA partners benefit from these climate policies, which suggests that climate side payments satisfy the first takeaway from the Montreal Protocol.

Paris Agreement-adhering countries should be able to negotiate PTA provisions that require their preferential trading partners to implement climate policy reforms in exchange for side payments that cover some part of the incremental cost of the reforms. Agreement-adhering countries would benefit from providing their preferential trading partners with a climate side payment consisting of their expected net benefit from a level trading field up until their partner's incremental cost of compliance. Based on evidence from the Protocol, developing countries will accede to implementing PTA-based climate policy provisions requiring them to reduce emissions in accordance with the Paris Agreement if they are offered side payments that cover their expected incremental costs

of acceding. Assuming that Agreement-adhering countries will seek to ensure other countries reduce emissions in accordance with the Agreement, in cases when more than one Agreement-adhering country shares a PTA with one developing country, the Agreement-adhering countries would benefit from splitting climate side payments among themselves. Doing so would allow Agreement-adhering countries to spend money to help other countries reduce emissions in accordance with the Agreement by mitigating scenarios in which the side payments are significantly greater than the incremental costs. These side payments should be able to satisfy the second takeaway from the Protocol if they can cover the incremental costs of adhering to the Paris Agreement to the point where doing so benefits both parties.

Climate side payments that are allocated and used efficiently will benefit the most stakeholders. Efficient use of climate side payments will benefit recipients because they will maximize their capacity to mitigate the cost of emissions reduction and emissions themselves, which will minimize the negative economic impact of emissions reduction on the economy, political backlash from domestic stakeholders, and rebuke from donors and other international stakeholders. Donors benefit from efficient use of climate side payments because each dollar's contribution to creating a level trading field is maximized, which benefits their ability to compete in an increasingly globalized world, builds domestic political will for further use or development of climate side payments in PTAs and other settings, and establishes their international standing as pragmatic climate leaders. To ensure side payments are used efficiently, they should be linked to adequately ambitious and transparent performance goals that have been laid out in the Nationally Determined Contribution that the Paris Agreement requires each country to submit. Thus,

a PTA provision that ties climate side payments to performance of the goals laid out under the Paris Agreement should be sufficient to incentivize efficient use of funds. Furthermore, efficacious policies require institutions to create, implement, and enforce policies, and a transparency framework to hold these institutions accountable. As a result, Agreement-adhering countries that want to assuage incentives for their preferential trading partners to violate the Agreement could allocate financial and technical resources to the creation and maintenance of these institutions. Thus, a climate side-payment framework could be constructed to satisfy the third takeaway from the Protocol, which encompasses the importance of efficiently using side payments.

Based on the Protocol's effective combination of carrots and sticks, a climate side payment-framework that includes a combination of carrots and sticks is more likely to attract participation and compliance than one of these mechanisms in isolation. To create a stick that can adequately catalyze participation and compliance, a PTA-based dispute settlement mechanism (DSM) should be negotiated by trading partners. Because the WTO lacks rules on foreign aid, including climate side payments, a DSM would be required to settle disputes over the allocation and use of these side payments. Developing countries would benefit from a PTA-based DSM because they would be able to hold their developed PTA partners accountable for providing them with a previously agreed on amount of money for reducing emissions in accordance with the Paris Agreement. If these funds are not provided, the countries expecting the funds could threaten retaliation through the DSM to be compensated for the funds their trading partners failed to provide. Developed countries would benefit from a PTA-based DSM because they would be able to leverage credible threats to ensure the funds are used efficiently. In the event the funds

are not used efficiently (e.g. corrupt payments to industry leaders or fake projects), a developed country could threaten retaliation through the DSM to be compensated for funds that have been used inefficiently. A climate side-payment framework that successfully integrates both carrots and sticks could be constructed to attract more participation and compliance than one of these mechanisms in isolation, thus satisfying the fourth takeaway from the Protocol.

VI. PTA-Based Climate Side Payments vs. Existing Climate Finance Mechanism

The Green Climate Fund and other existing climate finance mechanisms exhibit the first and third but not the second and fourth takeaways from the Montreal Protocol. Regarding the first takeaway, existing climate finance mechanisms generally collect money from developing countries and allocate that money to developing countries, which have asymmetries in their capacities to enact climate change mitigation policies or the extent to which they benefit from these policies. Regarding the second takeaway, climate finance mechanisms do not cover the incremental cost of reducing emissions in accordance with the Paris Agreement. Rather, they cover the incremental cost of particular mechanisms that have helped countries move marginally closer to reducing emissions in accordance with the Agreement. While marginal progress may lay the groundwork for substantial progress in the future, the severely inadequate levels of climate finance suggest that the ideal of substantial progress in the future may not occur unless new climate finance approaches are facilitated.

Regarding the third takeaway, even though existing mechanisms are not always efficient, no apparent reason exists to believe that they would be demonstrably less

efficient than PTA-based climate side payments. Fourth, existing mechanisms are not endowed with a stick that can catalyze participation and compliance. As a result, donors and recipients have no means to credibly issue retaliatory threats and retaliate if adherence does not ensue. Without a DSM, the benefits a government expects from violating the Paris Agreement are more likely to outweigh the potential domestic and international reputation costs of violation. Without a DSM, donor countries have a greater incentive to stop providing climate side payments when doing so is politically expedient because their preferential trading partners cannot credibly threaten economic retaliation. As a result, the lack of a stick creates a reality in which self-interest may not encourage donors and recipients to act in the interest of reducing emissions in accordance with the Agreement. Based on these considerations, PTA-based climate side payments present a viable option to increase climate finance ambition but should not be considered a panacea.

PTA-based climate side payments also differ from existing climate finance instruments because they allow preferential trading partners to negotiate three key components. First, deliberation about the extent to which side payments are used for the outcomes or inputs required to transparently reduce emissions in line with the Paris Agreement can occur. The outcomes or inputs must be quantifiable but the means by which this quantification occurs along with the policies, training programs, use of outside consultancies, forms of management, and policy reforms are subject to negotiation. Second, progress toward the agreed outcomes or use of inputs should be subject third-party verification paid for by developed countries, but funders and recipients should have leeway to negotiate the verification structure. Third, the negotiation process, the PTA

provision that emerges from the negotiation process, the use of funds, and the impact of the funds can be transparent and easily accessible for citizens in participating countries. This may help ensure that the members fulfill their commitments by improving accountability to the public, and it may encourage interest in climate change beyond PTA-related developments (Birdsdale, Savedoff, and Mahgoub 2012, 19). Thus, PTA-based climate side payments are more flexible than existing climate finance mechanisms because they enable members to negotiate terms that fit their distinctive and mutual needs. The flexibility and direct oversight provided by this form of side payment offers a decentralized alternative to multilateral climate finance mechanisms that may help overcome the inadequate state of climate finance, drive more emissions reduction, and increase the speed with which successful emissions reduction efforts are replicated.

Chapter 6 Liberalizing Trade of Environmental Goods and Services Through RTAs and PTAs

Environmental goods and services broadly refer to goods and services that have an environmentally beneficial outcome (Jacob and Møller 2017, 1). Two primary rationales for reducing trade barriers to environmental goods and services exist. First, doing so will reduce their price, thereby catalyzing adoption, innovation, technology transfer, and, most importantly, emissions reduction. Second, access to lower cost emissions reduction technologies and services that produce and implement these technologies is in the best interest of countries that are reducing emissions in accordance with the Paris Agreement's goal of keeping warming 2 °C, and 1.5 °C if possible, below pre-industrial levels (Yoo and Kim 2011, 581). Nearly twenty years after the launch of the WTO's Doha Round, which seeks to reduce trade barriers on a number of items, including environmental goods, no progress on reducing trade barriers to environmental goods and services has taken place at the WTO-level (de Melo and Solleder 2018b 2018, 2). A number of factors, most notably consensus on a list of environmental goods and services, have consistently hindered attempts to build a list at the WTO level. While one regional environmental goods agreement between Asia-Pacific Economic Cooperation (APEC) countries exists, it has limited ambition because it does require significant tariff

reduction, only includes 54 goods, does not include environmental services, and has no dispute settlement mechanism to coerce enforcement.

This chapter will consider (1) the liberalization of environmental goods by APEC countries; (2) how a group of countries tried but failed to replicate the APEC model at the WTO level; (3) how to address the issues contributing to this failure; (4) and the opportunity to catalyze liberalization of environmental goods and services through RTAs and PTAs. These considerations will make clear the potential to liberalize environmental goods and services through RTAs and PTAs in light of the non-existent WTO level agreement.

I. Liberalization of Environmental Goods by APEC Countries

In 2012, the Asia-Pacific Economic Cooperation (APEC) group, an economic forum composed of 21 members from the Asia-Pacific region, created a list of 54 environmental goods and affirmed their commitment to reduce tariff rates to five percent or less on these environmental goods by the end of 2015 (Matsumura 2016, 2). APEC economies did not attempt to define an environmental good, rather they agreed on a non-exhaustive list of products that mitigate pollution (Vossenaar 2013, iv). This list includes solar and wind energy components, machinery for processing and purifying water and wastewater, instruments for pollution monitoring and control, as well as diodes, transistors, and semiconductors (APEC 2012). Products that inflict less damage to the environment in their use and disposal were not considered (de Melo and Solleder 2018a, 2). The successful negotiation of this agreement illustrates the feasibility of a list-based approach and a decentralized rather than multilateral approach (Wu 2014, 109). While the APEC

list marks the most significant progress on environmental goods liberalization to date, it has a number of shortcomings that will be described in the following paragraphs.

First, the APEC agreement limits tariffs in a circumscribed manner, which creates more losers than winners. The APEC agreement only limits tariffs to a maximum of five percent and only does so for a list of 54 goods. High- and medium-income APEC countries managed to negotiate a list of goods for which applied tariff rates were already low (de Melo and Solleder 2018b, 13). As a result, the agreement has a mercantilist bent because it fails to encompass a number of domestically produced goods that may have been unable to withstand international competition if their tariffs were reduced to five percent. Next, the APEC agreement's list of industrial goods does not benefit most developing countries because they often lack strong markets for these goods in the first place (de Melo and Solleder 2018b, 3) (Tamini and Sorgho 2017, 66). Because tariffs were already low for most goods on the APEC list, developed countries purchasing these items are unlikely to derive much more benefit than they would have if purchasing them in a pre-APEC list scenario.

Second, the APEC agreement does not reduce trade barriers to environmental services. Without the liberalization of environmental services, foreign businesses that supply environmental services, such as wastewater treatment and waste management, cannot compete on a level trading field with domestic environmental service suppliers (Sauvage and Timiliotis 2017, 3, 11-12). Because the deployment of emissions reduction technology is generally reliant on the availability and quality of particular services, including those imported from other countries, significant complementarity exists between reducing barriers to environmental goods and services (Jacob and Møller 2017,

34). The availability of inexpensive and high-quality environmental services is also critical to building technical expertise for environmental good implementation in countries where such expertise does not exist. Thus, the failure to liberalize environmental services has likely reduced the efficiency and breadth with which APEC countries have implemented environmental goods.

Third, the APEC agreement does not include a dispute settlement mechanism (DSM), which would enable members to coerce enforcement if other members violated their commitment to reducing tariffs. A scenario in which an APEC member loses a competitive advantage for one of the 54 products on the APEC list could encourage this member to increase applied tariffs for this product to a number that is greater than five percent but is still below the tariff rates to which WTO members have agreed. If such a scenario were to occur, all countries benefiting from the reduced tariffs would be harmed. While violating the APEC agreement may carry reputation costs for violators, which reduce their credibility in future negotiations, the benefit of doing so may outweigh these costs. An APEC-based DSM would enable countries that are reducing tariffs in accordance with the APEC agreement to credibly threaten violators with costs likely sufficient for generating compliance. In the case that tariff rates are below the tariff rates to which WTO members have agreed but are above five percent, using an APEC-based DSM to adjudicate disputes about the APEC list would not violate Article 23 of WTO's Dispute Settlement Understanding because violating the APEC tariff rates does not violate WTO rules. Integrating an effective DSM in the APEC agreement would make APEC members that adhere to the tariff reduction agreement entitled to compensation for lost competitiveness and increased product costs from violators. The threat of these costs,

coupled with domestic, intra-APEC, and international reputation costs, would likely outweigh the benefits received from continuing to violate the tariff reduction agreement--thereby creating adherence once again.

II. Efforts to Create a WTO-Level Environmental Goods Agreement

APEC's successful efforts to reduce tariffs on environmental goods lent a renewed vigor to efforts to reduce tariffs on environmental goods at the WTO level. In 2014, 14 WTO members, representing 42 countries and including 12 of the 15 largest economies, started formally negotiating an agreement to eliminate tariffs on a number of environmental goods (WTO n.d. f) (Wu 2014, 97). Negotiators submitted over 400 goods to the Environmental Goods Agreement, with more than half falling under machinery and mechanical appliances, electrical machinery, and precision instruments for monitoring and analysis (Vossenaar 2013, 2). The 18 WTO members negotiating the Agreement by 2016 would have accounted for over 90 percent of global environmental goods trade--a number that has historically determined when a plurilateral agreement about globally traded goods goes into effect for all WTO members based on the Most Favored Nation principle (de Melo and Solleder 2018b, 3) (McKenna, de Melo, and Vigil 2014). By reaching this critical mass, the tariff reductions on environmental goods agreed to by members party to the Environmental Goods Agreement would be extended to all WTO members.

Negotiations stalled in 2016 for many of the same reasons that hindered progress in previous years. Negotiators, who represented developed countries with the exception of China and Costa Rica, could not arrive at a consensus about a list of environmental

goods because negotiators frequently submitted goods for which their country maintained a competitive advantage and low tariffs (de Melo and Solleder 2018a, 3). The overlap between the goods submitted by the negotiators was minimal, thereby reflecting a desire to put domestic interests above emissions reduction. The mercantilist motivations for the products on the WTO list are demonstrated by the fact that applied tariffs for these goods were approximately one percent for high-income countries, which were heavily represented in these negotiations, six percent for upper-middle-income countries, seven percent for lower-middle-income countries, and nearly nine percent for low-income countries (de Melo and Solleder 2018b, 9).

Negotiators struggled to create a list because products have various means of creation and multiple-end uses. For example, the components required to build a wind turbine may be produced or processed with varying levels of environmental harm and may be used to build a turbine for a coal-fired power plant (Yoo and Kim 2011, 593-594). Negotiators, particularly those from China and the United States, also failed to agree on the time frame of elimination of tariffs and delays and exceptions (de Melo and Solleder 2018a, 4). For example, China requested the privilege to maintain a five percent tariff on 11 goods and a three-year delay for removing tariffs, but the United States led a coalition of countries that objected to this request (de Melo and Solleder 2018a, 4).

III. Improving the Environmental Goods Agreement

While the Environmental Goods Agreement could help build trust between nations for creating more ambitious global climate action in the future, the average tariffs for the negotiating group are already so low (1.5 percent) that further tariff reductions on the

current list of goods would be unlikely to significantly increase trade in these goods (de Melo and Solleder 2018a, 5). To decrease the cost of producing and using environmental goods and stimulate environmental goods innovation and diffusion that yield significant emissions reduction, future attempts at environmental goods liberalization should consider non-tariff measures, environmental services, and participation from developing countries. The following paragraphs will explore these considerations.

Non-tariff measures affect trade in goods and services in a variety of ways, which makes determining the extent to which these measures meet legitimate policy goals without unduly restricting or distorting trade difficult (WTO 2012, 36). Assuming the intent of the policymakers who create these barriers is apparent, two types of non-tariff measures exist. The first type provide information about the characteristics of a good, which are precautionary and can correct for market failures. A non-tariff measure of this category will increase imports of a given product if consumers believe the cost-raising effect of imposing the non-tariff measure is less valuable than the information they receive (de Melo and Solleder 2018b, 14). A non-tariff measure of this category will decrease imports of a given product if consumers believe the cost-raising effect of imposing the non-tariff measure outweighs the value of the information they receive (de Melo and Solleder 2018b, 14). Information-providing non-tariff measures are exemplified by Minimum Energy Performance Standards and labeling about emissions content. These measures have generally adhered to WTO rules.

The second type of non-tariff measures, called non-tariff barriers, are often protectionist and do not correct for market failures (de Melo and Solleder 2018b, 14). Non-tariff barriers include local-content requirements, anti-dumping duties, and weak

intellectual property standards (de Melo and Solleder 2018a, 9). Because non-tariff barriers generally violate WTO rules, governments that harmed by other governments use of these measures have been able to threaten retaliation under the WTO's DSM if the law is not rescinded. By working to harmonize the first type of non-tariff measures across markets and eliminate the second type of non-tariff measures, future negotiators would likely contribute to more environmental goods innovation and diffusion.

Environmental services are crucial to the delivery and proper functioning of environmental goods, but countries throughout the world have non-tariff barriers that prevent foreign environmental service suppliers from competing on a level playing field with domestic environmental service suppliers. These non-tariff barriers include government procurement that favors local suppliers, subsidies or the tax structure that give local companies an advantage, or provisions that discriminate against foreign investors (Sauvage and Timiliotis 2017, 3, 11-12). While environmental services have historically referred to wastewater treatment and waste management, mounting evidence suggests that services like consulting, design, engineering, construction, and repair and maintenance can play critical roles in the installation and operation of environmental facilities, like renewable-energy plants or wastewater-treatment facilities (Sauvage and Timiliotis 2017, 3). By reducing non-tariff barriers to environmental services and broadening the definition of environmental services, government officials can increase the accessibility and adoption of environmental goods.

Before the 14 WTO members revived Environmental Goods Agreement negotiations in 2014, negotiations had been stalled due to the different commercial interests maintained by developed and developing countries. Developing countries that

were not partaking in the negotiations frequently voiced frustration that the WTO list inordinately focused on industrial goods, thereby inadequately considering environmentally preferable products, like fertilizers and textiles, in which developing countries generally have a competitive advantage (Yoo and Kim 2011, 585). To overcome this gridlock, developed countries accompanied by two developing countries--one being the largest trader in environmental goods and the other being one of the few countries on track to achieve emissions reduction goals laid out by the Paris Agreement--decided to proceed under the WTO framework in a plurilateral manner. As a result, the WTO list puts an overwhelming emphasis on goods that benefit the export interests of developed countries.

Three explanations may be contributing to the absence of developing countries from environmental goods negotiations. First, developing countries may refrain from liberalizing particular industries to protect domestic firms from international competition with the hope that the international competitiveness of these firms will increase over time (Melitz 2005, 178). Second, developing countries may oppose the plurilateral, piecemeal framework being used to negotiate the Environmental Goods Agreement because it strips them of the collective negotiating leverage they maintain at the multilateral level, and, thus harms their first-order goal of securing economic benefits (Wu 2014, 99, 119). The first two explanations suggest that if developing countries believed that the benefits of liberalizing trade of environmental goods would outweigh the costs, they would partake in these negotiations. This suggestion results in the third explanation: that with little to gain from participating in these negotiations, developing countries chose to free-ride on the efforts of developed countries rather than possibly arouse the frustrations of domestic

industry leaders and citizens (Wu 2014, 121, 126). Free riding is possible under the current negotiations because of the Most Favored Nation principle, which allows WTO members to exclude themselves from but be the beneficiaries of plurilateral tariff reductions.

The absence of developing countries from attempts to liberalize environmental goods should worry leaders of countries that are invested in reducing emissions in accordance with the goal laid out by the Paris Agreement. In a liberalized world, competition and innovation would drive down the cost of environmental goods faster than a partially-liberalized world. Countries seeking to reduce emissions in accordance with the Agreement stand to benefit from decreased prices of emissions-reducing goods, whether they be raw materials or intermediate or final goods, that would result from reduced tariffs and non-tariff barriers. In fact, all 179 countries that have ratified the Paris Agreement stand to benefit from the elimination of trade barriers to environmental goods, which would enable them to more efficiently reduce emissions in accordance with the Agreement. To catalyze buy-in from more developing countries, however, the domestic benefits of relinquishing these barriers would likely have to outweigh the costs. While taking a seat at the multilateral negotiating table may give these countries the agency to protect their economic interests and efficiently reduce emissions in accordance with the Agreement, the table has been far too crowded by developed countries to make this a worthwhile endeavor. To avoid reenacting the failed negotiations that have occurred at the WTO level, developed and developing countries could benefit from turning to decentralized negotiations--namely negotiations through RTAs and PTAs.

IV. Proliferating Decentralized Environmental Goods and Services Agreements

Recognizing that the implementation of the Environmental Goods Agreement appears unlikely in the near future, decentralized alternatives should be swiftly considered and implemented. Parties to RTAs and PTAs can negotiate and implement environmental goods and services agreements in their trade agreements. While the APEC agreement remains the only instantiation of a decentralized environmental goods agreement, the environmental chapters of a number of recently enacted RTAs and PTAs include non-binding provisions that call for the liberalization of trade in environmental goods and services (Sauvage and Timiliotis 2017, 13). The cooperative nature of RTAs and PTAs that results from low transaction costs due to a small number of participating countries and difficulty of free riding, and the success of the APEC list suggest that ambitious environmental goods and services agreements are more likely to succeed in a decentralized rather than a multilateral setting.

Negotiating and implementing environmental goods and services agreements at the PTA and RTA level has three primary rationales. First, members generally seek to adopt stronger policy standards and coordinate to address deficiencies in the WTO legal framework, including issues that lead to market failures and negative externalities. Second, fewer conflicting interests enable members to negotiate trade liberalization faster than that at the WTO level. Third, members may be able to expand initiatives into the WTO framework after proving their benefits (Bacchetta et al., 2011, 44-45).

If a government decides to grant Most Favored Nation status to one nation at the WTO level, it must extend this treatment to other nations at the WTO level. WTO members in RTAs and PTAs, however, are exempt from this requirement and can

negotiate their own tariff rates as long as these levels are below the tariff rates to which WTO members have agreed (Kaushik 2016). During negotiations, negotiators in PTAs and RTAs could choose to reduce tariffs and non-tariff barriers on environmental goods and services in an inclusive or exclusive manner. Inclusive agreements would create a level playing field and enhance cooperation among members and non-members, which would reduce trade costs and discrimination and create more trade. They would not contain member-exclusive tariff and non-tariff barrier liberalization provisions. Instead, the provisions would be constructed in ways that reduce trade costs for and discrimination against all countries, creating a positive spillover effect that may help catalyze adoption, innovation, and diffusion of environmental goods and services (Mattoo, Mulabdic, and Ruta 2017, 2). Inclusive preferential environmental goods and services agreements would increase the speed and efficiency with which environmental goods and services are distributed throughout the world, thus contributing to the overarching goal of mitigating climate change in line with the goal set forth by the Paris Agreement.

In agreements that are exclusionary vis-á-vis non-RTA or non-PTA members, members reciprocally or non-reciprocally reduce tariffs and non-tariff barriers but maintain tariffs and non-tariff barriers on non-member countries. Such an agreement could be used to stimulate the development of certain industries in member countries. Trade agreements generally increase trade between members countries, but an exclusionary agreement can also induce trade diversion that drives members to substitute imports previously sourced from non-members for member products (Mattoo, Mulabdic, and Ruta 2017, 2). Exclusive environmental goods and services agreements would

increase the speed and efficiency with which environmental goods and services are distributed between and implemented by members in the agreement, but they would be unlikely to maximize the potential positive externalities from environmental goods and services. Nevertheless, these agreements could prove helpful in achieving the goal laid out by the Paris Agreement in the instances when members want a greater level of liberalization but are not yet comfortable competing at the international level.

Because economically sustainable emissions reduction necessitates the use of environmental goods and services (rather than economic contraction), reducing tariffs and non-tariff barriers on environmental goods and services are integral to the efficient use of PTA-based climate side payments. If countries that receive climate side payments have tariffs and non-tariff barriers on environmental goods and services in place, the money donor countries allocate to emissions reductions will likely fall short of the potential emissions reductions that would have occurred without these restrictions. Inefficient use of these side payments neither benefits recipients nor donors. Inefficient use of climate side payments will not benefit recipients because recipients will fail to maximize their capacity to mitigate the cost of emissions reduction and emissions themselves. This will not minimize the negative economic impact of emissions reduction on the economy, backlash from domestic political stakeholders, and criticism from donors and other international stakeholders. Donors would not benefit from inefficient use of climate side payments because each dollar's contribution to creating a level trading field is not maximized, which harms their ability to compete in an increasingly globalized world and reduces domestic political will for further use or development of climate side payments in PTAs and other settings. Thus, to ensure side payments are used efficiently,

PTA members must work to reduce trade restrictions in addition to establishing adequately ambitious and transparent performance goals that have been laid out in the Nationally Determined Contribution that each country that ratified the Paris Agreement is required to submit.

The WTO lacks rules on environmental goods and services, meaning a DSM would be required to create to settle disputes over the reduction of tariffs and non-tariff barriers. Developed and developing countries would benefit from an RTA or a PTA -based DSM because they would be able to hold their trading partners accountable for reducing trade restrictions on goods and services that are integral to achieving the goal laid out by the Paris Agreement. If these barriers are not removed or are reinstalled, trading partners could threaten retaliation through the DSM to be compensated for lost competitiveness and increased product costs from violating members. Furthermore, by implementing ambitious, legally binding environmental goods and services provisions and robust DSMs in RTAs and PTAs, the benefits of following through on such provisions are far more likely to outweigh the costs. RTAs and PTAs with provisions that establish a DSM, transparency framework, financial and technical resource allocation system, and reduction of trade restrictions on environmental goods and services creates a reality in which trading partners can collaboratively reduce emissions. Thus, the pitfalls of the Paris Agreement, namely its failure to level the trading field and sufficiently reduce emissions, and the inadequacies of RTA- and PTA-based climate provisions, namely their weak legalization, replication, and emissions reduction, can be minimized by i) reiterating commitment to the Paris Agreement in RTAs and PTAs, ii) reducing

trade restrictions on environmental goods and services, and iii) creating an RTA- and a PTA-based DSM.

Chapter 7 Conclusion

Climate change is already killing people, ruining livelihoods, and destroying ecosystems. In the face of humanity's failure to overcome climate change through multilateral efforts, decentralized efforts that build collective action for emissions reduction must be swiftly considered and implemented. To stand a chance at achieving the 2 °C target that the Paris Agreement defines as the upper ceiling, annual global emissions, which currently stand at 53.5 billion tons of carbon dioxide equivalent, would have to be reduced to 50 billion tons of carbon dioxide equivalent by 2030. To stand a chance at achieving the Agreement's more ambitious 1.5 °C target, annual global emissions would have to be reduced to 24 billion tons of carbon dioxide equivalent by 2030 (UNEP 2018, XVII). Current emissions reduction-commitments produced by each country that has ratified the Agreement are inadequate to achieve the less ambitious 2030 goal. While preventing warming from rising 2 °C and 1.5 °C above preindustrial levels is possible, the 1.5 °C target will likely no longer be achievable if efforts to reduce emissions are not increased before 2030 (UNEP 2018, XV). Unfortunately, the largest emissions producers are not rising to the challenge, as is demonstrated by the fact that global emissions increased in 2017 after three years of stagnation (UNEP 2018, XV).

The previous chapters have sought to provide heads of state, policymakers, and members of civil society with a set of new ideas they can use to help overcome the

inadequate state of emissions reduction. By strengthening the climate-trade nexus, the decision to reduce emissions in accordance with the Paris Agreement can be motivated by short-term economic self-interest, rather than a commitment to ensuring current and future generations have access to a thriving natural world and economy. To initiate this shift, a small number of economically powerful governments must already be allocating a significant quantity of resources to reducing emissions in accordance with the Agreement. Without them, other governments would be far less likely to reduce emissions in accordance with the Agreement because the costs of doing would likely to continue to outweigh the benefits.

Luckily, the European Union fulfills this role. As the largest trading market, accounting for 16 percent of world imports and exports, it is reducing emissions in accordance with the Paris Agreement's 2 °C target and is working to bolster efforts to hit the 1.5 °C target (UNEP 2018, 13). Recognizing EU efforts to reduce emissions harm its competitiveness, EU leaders have successfully added climate provisions to their RTAs and PTAs to help level the trading field. In light of the European Union's climate and economic leadership, EU leaders, policymakers, and members of civil society are best positioned to implement the ideas presented in this thesis.

This thesis has demonstrated that the pitfalls of the Paris Agreement, namely its failure to level the trading field and sufficiently reduce emissions, and the inadequacies of RTA- and PTA-based climate provisions, namely their weak legalization, replication, and emissions reduction, can be minimized by i) reiterating commitment to the Paris Agreement in RTAs and PTAs, ii) constructing other emissions-reducing provisions, and iii) creating an RTA- and a PTA-based DSM. Recognizing that the WTO framework does

not address most domestically-focused climate policies, an RTA- and a PTA-based DSM will be required to guarantee that trading partners can credibly hold each other accountable to the climate provisions laid out in their respective RTAs and PTAs. By creating an RTA- or a PTA-based DSM provision, trading partners can credibly threaten and impose significant financial and reputational costs on other trading partners that violate harmonized or decentralized emissions reduction efforts. Preventing these threats from being carried out is in the self-interest of violators. Thus, DSMs create a reality in which self-interest drives members to comply with climate provisions that drive emissions reduction in accordance with the Paris Agreement.

Countries seeking to level the trading field should work diligently to negotiate and renegotiate RTAs and PTAs that include a DSM and a climate provision that reiterates each member's commitment to the Paris Agreement. When one country or bloc levels the trading field in its RTAs and PTAs through harmonized or decentralized emissions reduction efforts, that country or bloc will significantly mitigate lost competitiveness and jobs and emissions leakage. Their trading partners that are now reducing emissions in accordance with Agreement have a large incentive to level the trading field in all of their RTAs and PTAs. By reiterating commitment to the Paris Agreement in RTAs and PTAs, countries not only commit to emissions reduction, but they also commit to transparently monitoring, reporting, and verifying emissions, which is necessary for accumulating information necessary for adjudication through a DSM. The threat of DSM-derived costs may drive all 164 WTO members to integrate the Agreement and a DSM in their RTAs and PTAs, thereby driving massive emissions reduction.

A country or bloc that is reducing emissions in accordance with the Paris Agreement and has negotiated or renegotiated RTA- or PTAs-based climate and DSM provisions will catalyze emissions reduction. These countries can likely stimulate additional emissions reduction by negotiating and renegotiating their RTAs and PTAs to include provisions that provide climate side payments and liberalize environmental goods and services. By covering a sufficient portion of the incremental cost of reducing emissions in accordance with the Agreement, donor countries can incentivize their preferential trading partners to adhere to the Agreement, which helps level the trading field and drive emissions reduction. Liberalizing environmental goods and services reduces the cost of emissions reduction technologies and services, which provides all countries with less incentive to violate because the cost of compliance will fall as the price of cleaner, costlier substitutes falls and policy creation, implementation, and enforcement frameworks are streamlined.

Increasing the ambition of the climate-trade nexus helps countries overcome the anarchic nature of the international system by shifting the benefit-cost ratio of emissions reduction from a net cost to a net benefit. With this in mind, countries that are committed to keeping warming 2 °C, and 1.5 °C if possible, below pre-industrial levels can leverage this nexus to help them maintain their ability to compete in an increasingly globalized world, drive emissions reduction inside and outside of their trade agreements, and comply with the international trading rules.

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