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# Green Trade Organisation: Climate Policies and WTO Reform

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**Abstract**

As cooperation on climate mitigation is difficult, more and more countries act unilaterally, for instance by introducing carbon pricing. As such unilateral carbon pricing can lead to carbon leakage, where production is shifted abroad, countries or regions such as the EU and the US plan the implementation of Border Carbon Adjustments (BCAs). BCAs consist of carbon tariffs and potential export rebates. Therefore, they have effects on trade and fall under World Trade Organization (WTO) rules. The trade regime has no clear rules on climate policies affecting trade so far. In this thesis, I investigate current WTO rules and how they apply to Border Carbon Adjustments and other climate policies. As there is a lot of legal uncertainty around how WTO Dispute Settlement will judge these policies, I then discuss potential options for WTO reform. Most multilateral reform options such as amendments, authoritative interpretations or waivers could provide legal certainty but are very difficult to negotiate given the current political climate. Plurilateral options such as an Environmental Goods and Services Agreement are easier to achieve but will not enable countries to counteract carbon leakage through BCAs.

*JEL-Codes*: F13, F18, Q54, Q56.
*Keywords*: WTO Reform, Border Carbon Adjustments, Carbon Leakage

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# List of Abbreviations

| | |
|---|---|
| AB | Appellate Body |
| ACCTS | Agreement on Climate Change, Trade and Sustainability |
| APEC | Asian Pacific Economic Cooperation |
| BCA | Border Carbon Adjustment |
| BTA | Border Tax Adjustment |
| CBAM | Carbon Border Adjustment Mechanism |
| CGE | Computable General Equilibrium |
| CTE | Committee on Trade and Environment |
| DSM | Dispute Settlement Mechanism |
| EGA | Environmental Goods Agreement |
| ETS | Emission Trading Scheme |
| EU | European Union |
| EITE | Energy-Intensive and Trade-Exposed |
| GATT | General Agreement on Tariffs and Trade |
| GHG | Green-House Gases |
| IPCC | Intergovernmental Panel on Climate Change |
| JSI | Joint Statement Initiative |
| LDC | Least Developed Country |
| MFN | Most-Favored Nations |
| PPM | Process and Production Method |
| RTA | Regional Trade Agreement |
| SCM | Subsidies and Countervailing Measures |
| TESSD | Trade and Environmental Sustainability Structured Discussion |
| TRIPS | Trade-Related Aspects of Intellectual Property Right |
| US | United States |
| UN | United Nations |
| UNFCCC | United Nations Framework Convention on Climate Change |
| WTO | World Trade Organization |

# 1 Introduction

Climate change is one of the biggest current challenges of humankind. Therefore, many countries are trying to find cooperative solutions to mitigate Green-House Gas (GHG) emissions and thus limit global warming. The Paris Agreement was an important step towards such global cooperation (UNFCCC 2015). However, the current pledges committed by countries in their Nationally Determined Contributions (NDCs)[1] are not sufficient to limit climate change to 2°C (Stockwell et al. 2021), as was agreed in the Paris Agreement. Countries have different levels of reductions planned and ambitions vary greatly between states and regions. More ambitious countries are going ahead with mitigation policies such as carbon pricing. Trade flows around the world can nullify part of these mitigation efforts if emissions are shifted to countries that do not price carbon, a phenomenon referred to as carbon leakage (Felder et al. 1993). Carbon leakage counteracts emission reduction efforts as production is shifted abroad to avoid higher prices due to the carbon tax. This harms the competitiveness of domestic firms. Fear of carbon leakage can act as a deterrence from carbon pricing for some countries. To prevent carbon leakage, other countries are considering to accompany their carbon pricing with border adjustment measures such as carbon tariffs. These so-called border carbon adjustments (BCAs) are domestic policies affecting trade, as they put a price on carbon embedded in imports. Therefore, such policies fall under the rules of the World Trade Organization (WTO). As the trade regime has so far no clear rules on climate change mitigation policies, it is unclear how WTO dispute settlement will judge a climate mitigation policy affecting trade. What could help against these legal uncertainties and problems is multilateral cooperation and new rules to clarify the connection between trade liberalisation and climate protection.

[1] In the Paris Agreement, countries submit their planned emission reductions in form of a NDC. These are then updated every five years to increase ambitions over time (Roth et al. 2021).

The WTO would be well-suited for such cooperation due to its already existing dispute settlement mechanism. So far, the trade and climate policy regimes have not worked together to clarify how climate change mitigation and trade liberalisation can go hand in hand (Kulovesi 2014). Some even argue that the regimes are separate silos (Bacchus 2017).

In this thesis, I investigate whether the WTO currently helps or hinders the mitigation of climate change and how it could be reformed to help climate protection more effectively. For this, it is first important to understand how and why trade measures can act as effective climate policies. Then, it is important to analyse how the WTO is currently working and how its dispute settlement is going to judge potential climate policies that affect trade. With this knowledge, there can be several options for WTO reform. Their chance of success will depend on the political will of WTO members.

First, I give an overview of climate policies that can affect trade in section 2. I focus on carbon pricing, carbon leakage and BCAs, as several states are currently considering these measures and they have potential to create WTO conflict. According to economic models, BCAs can reduce carbon leakage (Branger et al. 2014). The size of the reduction depends on the scope of emissions and the scope of goods or sectors covered by the BCA. It is also important to consider welfare effects of BCAs, as many studies find that BCAs shift the welfare burden of carbon pricing towards developing countries (Branger et al. 2014). Even though there are no national BCAs in place so far, the European Commission has recently proposed a regulation for a BCA and other countries might follow soon. I shortly discuss other relevant climate policies affecting trade, such as climate clubs, subsidies, technology transfers and tariffs on environmental goods and services. These policies also fall under WTO rules.

In section 3, I outline current WTO rules relevant for mitigation policies af-

fecting trade and how they can affect them. Currently, there is legal uncertainty surrounding the introduction of BCAs or other policies. According to legal scholars, a rule-conform design of BCAs is possible but limits the design options for a BCA substantially (Mehling et al. 2019; Cosbey et al. 2019). Careful design will be necessary to ensure rule conformity. Whether a BCA is legal under WTO rules will most likely be decided by the Dispute Settlement Mechanism (DSM) only after other countries feel discriminated and file a complaint.

Finally, I discuss potential options for WTO reform which could boost the WTO's role in climate change mitigation in section 4. Many of these options are unlikely, given the current global political climate. Therefore, I first give an overview about the current state of negotiations and dispute settlement in the WTO and sketch several proposals for general reforms. In particular, a reform of the blocked dispute settlement is necessary to make any other reform of the WTO enforceable. Then, I discuss different options for WTO reforms regarding climate policies. Any reform will need to balance the need for climate protection with the purpose of the WTO to prevent green protectionism: If reforms are too broad, states will be able to use climate policies to protect domestic industries. I give an overview of different multi- respectively plurilateral reform options in section 4.2. Multilateral reform options include amendments of current WTO rules or authoritative interpretations. These will be most difficult to achieve as they require consensus and are permanent changes of WTO rules. There are also temporary solutions such as a waiver or a peace clause which can give the trade and climate regime time to negotiate more substantial reforms. Plurilateral agreements can be an opportunity as they require less countries to find a compromise. However, as they are only plurilateral, they are not binding for non-participants and therefore they cannot prevent WTO dispute over climate policies. A plurilateral environmental goods and services agreement has the largest chance of success in the medium term,

as there is already a group of WTO members conducting structured discussions around it (WTO 2020a).

# 2 Climate Policies Affecting Trade

The Paris Agreement does not prescribe how individual countries should achieve their emission reductions set out in their NDCs (UNFCCC 2015). To limit climate change to 2°C, many different mitigation measures need to be implemented simultaneously (IPCC 2021). Many countries are choosing to price emissions. It is economically efficient because it allows market actors to choose the most cost-effective carbon abatement options (World Bank 2021). Carbon pricing can be done via two main ways: a tax on carbon or an emission trading system (ETS) (World Bank 2021). For a carbon tax, the government determines a certain price for carbon emissions and levels it as a tax. For a cap-and-trade ETS, governments determine a 'cap' on emissions allowed in a certain period and distribute emission allowances accordingly. These allowances are either allocated for free or auctioned (World Bank 2021). To be efficient policy tools, carbon taxes or ETS need to be designed well and reach a carbon price high enough to reduce emissions substantially (World Bank 2021). For a more detailed discussion of different carbon pricing options and current carbon pricing schemes around the globe, see World Bank (2021).

To date, there are already many different carbon pricing schemes implemented around the globe. Figure 1 shows the carbon taxes (red) and ETS (green) that are already implemented or scheduled for implementation as of 2021 as well as carbon taxes or ETS currently considered by governments (yellow) (World Bank 2021). In 2021, 21.5% of global GHG emissions are covered by carbon pricing. This increase is mainly due to the introduction of China's ETS on electricity which initially covers around 30% of Chinese emissions. However, less than 4% of the globally

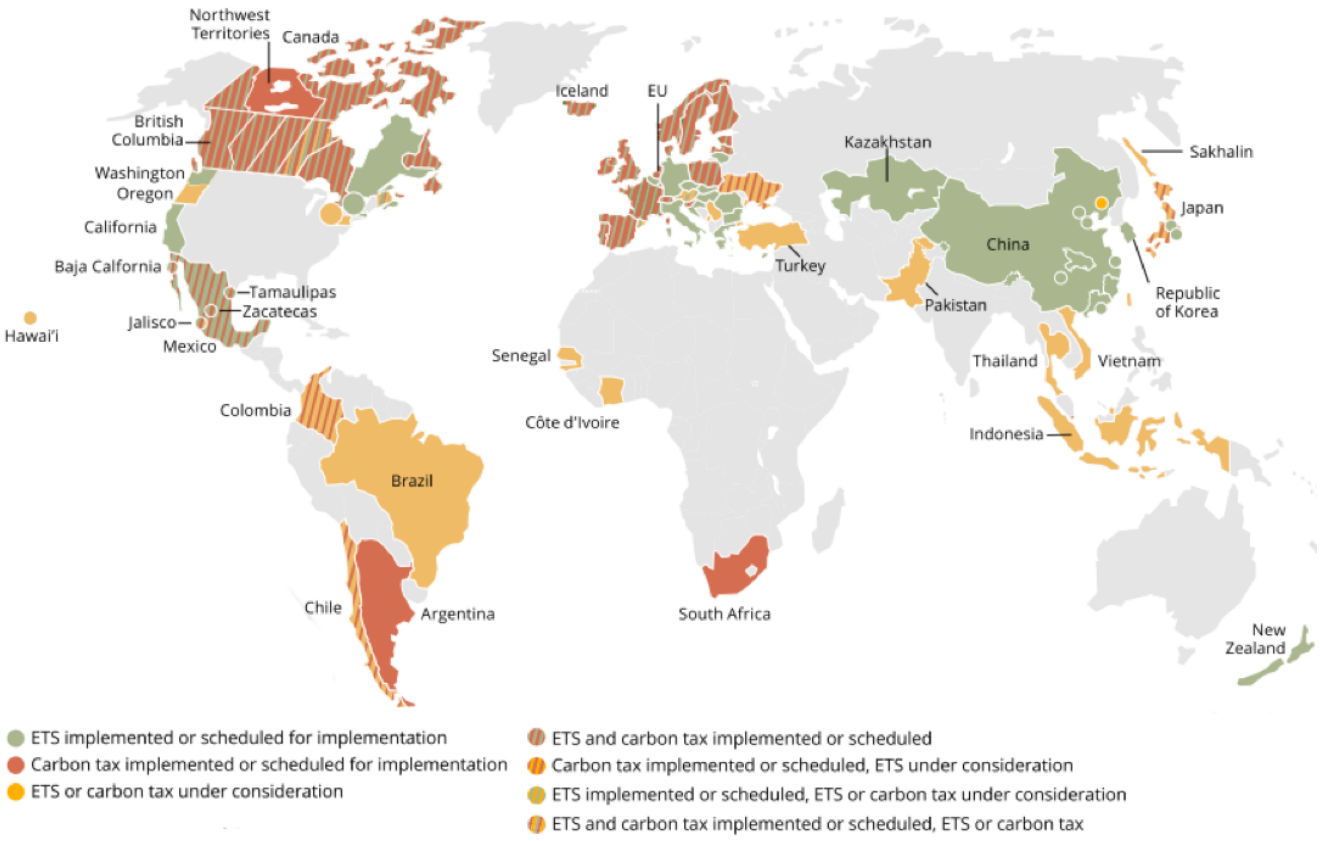


Figure 1: Current worldwide carbon pricing initiatives. Figure adopted from World Bank (2021).

covered emissions are priced above the lowest price recommended to reach the 2°C target (40 USD per $tCO_2e$) (World Bank 2021). This shows that carbon prices need to increase in amount as well as scope to reach the Paris Agreement. Furthermore, they need to be accompanied by other policies such as research and development support to become more effective.

Carbon pricing changes the relative prices of goods, as carbon-intensive goods become more expensive than low-carbon products. Therefore, it changes the competitiveness of domestic firms and has an impact on the terms of trade. One potential problem resulting from this is carbon leakage, if carbon pricing becomes

less effective because production moves abroad.

In the following subsections, I first explain the concept of carbon leakage in more detail and summarise current evidence. Second, I describe border carbon adjustments (BCA) and their theoretical and empirical justifications. This section also gives an overview of design and scope recommendations for BCAs. Then, I summarise past and current BCA proposals from the US and the EU before I discuss the political dimensions of BCAs, in particular whether they can serve as motivation for other countries to join a carbon pricing scheme. Finally, I will discuss other climate policies affecting trade, such as climate clubs, subsidies and technology transfer.

## 2.1 Carbon Leakage

When countries implement unilateral carbon abatement measures[2], production can move abroad which increases emissions in other countries. Such **carbon leakage** reduces the net effect of these policies (Branger et al. 2014).

There are two main types of carbon leakage, direct and indirect. **Direct leakage** can happen if carbon pricing increases the domestic production costs especially for energy-intensive trade-exposed (EITE) industries. This can cause a competitive disadvantage for these industries in international competition (Branger et al. 2014). As production increases abroad and imports into the carbon mitigating country rise, the domestic industry is damaged and the mitigation policy is less effective than intended (Condon et al. 2013). This mechanism is called the competition channel of leakage (Verde 2020). In the long term, this might lead to leakage through the investment channel when plants or whole industries relocate to a different country with lower carbon pricing (Verde 2020). There is also **indi-**

[2]Although I refer to carbon mitigation policies and carbon pricing throughout this paper, this allows to include other green-house gases (GHG) into the policies by converting them into carbon equivalents.

**rect leakage**, or leakage through the energy-price channel via the global energy price market. If a country or region implementing a carbon pricing policy is large enough to influence world market prices, its reduction of fossil fuel consumption will also reduce global energy prices (Burniaux et al. 2013). This is an incentive for other countries to increase their fossil fuel consumption, reducing the net effect of the carbon tax.

For direct leakage, economic theory alone is not sufficient to determine whether it will occur (Jakob et al. 2013). For example, if carbon intensive production is outsourced from fossil-fuel reliant countries to countries with predominantly renewable energy sources, global production will be more efficient and global emissions will be reduced (Baumert et al. 2019). Furthermore, carbon pricing could stimulate new innovations and technologies improving the production processes and the competitiveness of domestic firms (Porter et al. 1995). This could even lead to negative leakage, as new technologies spread towards non-participating countries (Burniaux et al. 2013). It is important to investigate empirically how much and which form of leakage occurs after the introduction of unilateral carbon pricing policies. There are only few studies available so far, results are presented in the following.

Nielsen et al. (2020) investigate carbon leakage by analysing 43 countries and their respective commitments to the Kyoto Protocol in the period 2000-2014.[3] The authors compare whether countries which ratified the Kyoto Protocol experienced more carbon leakage than others: Countries participating in the Kyoto Protocol reduced their emissions on average by 10% but 2.5 percentage points of these 10% where cancelled out by carbon leakage. The largest driver of carbon leakage was the US importing carbon-intensive products from China even though neither China

[3]In the Kyoto Protocol, only developed nations pledged to reduce emissions. Annex I outlines the countries and their pledges of emission reductions compared to national 1990 emission levels (UNFCCC 1997).

nor the US ratified the Kyoto Protocol. This study shows that carbon leakage can happen as a consequence of carbon reduction policies but also due to the structure of global trade between developed and developing countries. Bolscher et al. (2013) investigate carbon leakage for nine energy intensive sectors after the introduction of the EU ETS and find no evidence for direct carbon leakage between 2005 and 2012. Verde (2020) confirm these findings in a literature review on econometric evidence of competition loss and carbon leakage due to the EU ETS. However, Bolscher et al. (2013) as well as the studies examined by Verde (2020) use only the first and second EU ETS periods between 2005 and 2012. These periods were marked by a high share of free emission allowances to EITE industries (Verde 2020). The broad availability of free allowances in these first two periods of the EU ETS lowered the prices. As free allowances were distributed to reduce the potential problem of direct leakage, the lack of evidence for leakage is not surprising (Bolscher et al. 2013). Therefore, further evidence including the third period of the EU ETS (2013–2020) is necessary, as in the last period the free allowances were reduced.

The extent of carbon leakage will likely increase if countries or coalitions such as the EU increase their unilateral efforts and carbon prices rise (Lamy et al. 2020). Therefore, countries want to reduce the risk of carbon leakage when introducing carbon pricing mechanisms. Apart from free emission allowances, which only combat the competitive effect of carbon pricing, there are several options to decrease direct carbon leakage. One option is to switch from production-based to consumption-based carbon pricing (Jakob et al. 2013). With consumption-based carbon pricing, emissions embodied in trade are automatically incorporated in the consumption, as the consumption levy or pricing occurs at the point of consumption and not at production (Ghosh, Luo, Siddiqui, T. Rutherford, et al. 2020). However, this is not practical, as global standards of emission accounting are all production-based and adoption would therefore lead to increased complexity in

calculation and data collection (Nielsen et al. 2020). An option that might be easier to implement are BCAs. These are discussed in more detail in the following section.

## 2.2 Border Carbon Adjustments

To combat carbon leakage and the negative effects of unilateral carbon pricing on the competitiveness of domestic firms, many economic scholars have suggested border carbon adjustments (BCAs) (cf. Markusen 1975; Keen et al. 2014; Böhringer, Balistreri, et al. 2012; Branger et al. 2014; Condon et al. 2013; Boeters et al. 2012; Mason et al. 2015; Böhringer, Schneider, et al. 2021; Weitzel et al. 2012; Larch et al. 2017; Lanzi et al. 2012; Mörsdorf 2021). Therefore, many countries with higher climate ambitions are currently discussing their introduction. As BCAs have also trade effects, it is important to consider their possible impacts on competitiveness and welfare. Design and scope of BCAs matter for their effectiveness to reduce carbon leakage. First, I outline theoretical justifications for BCAs and then I summarise the main evidence from applied models on how a BCA should be designed.

### 2.2.1 Economic Theory on Border Carbon Adjustments

In his seminal paper, Markusen (1975) theoretically analysed the effects of negative externalities such as carbon emissions on trade. He found that a unilateral carbon tax (or auctioned emission quotas), with tariffs on carbon-intensive imports and subsidies on carbon-intensive exports, constitutes only a second-best policy response compared to a cooperative solution. Such border carbon adjustments or border tax adjustments (BTAs) minimise the competitive disadvantage for domestic industries that results from the carbon pricing mechanism (Burniaux et al. 2013). The goal is to treat domestic and foreign products equally by including imports in carbon pricing (Mehling et al. 2019). A full BTA consists of the two parts

as theorised by Markusen (1975): the carbon tariff based on the embodied carbon content of imports, as well as a rebate on the emission taxes paid by domestic producers on their exports (Ghosh, Luo, Siddiqui, and Zhu 2012). Exempting exports is beneficial for the domestic competitiveness on international markets, but not for carbon emissions (Böhringer, Carbone, et al. 2012). Furthermore, export rebates can create difficulties in application as they might not be WTO conform, as outlined in section 3. Therefore, BCAs discussed in policy contexts often levy a tariff on imports without any export rebates. There are two main ways a BTA could be implemented given production-based carbon accounting. If a country or a coalition levels a carbon tax, it can charge the difference between the domestic and the foreign carbon taxes as a tariff. If on the other hand, a coalition has an ETS in place like the EU, it could oblige importing companies to buy emission certificates for their imports. For a full BTA, the country can distribute free emission allowances to certain export-oriented industries, as done by the EU in the beginning of the EU ETS (Burniaux et al. 2013).

Keen et al. (2014) analysed whether carbon BTAs are justified when countries can cooperate and want to maximise global welfare. Using a general equilibrium model of trade with added carbon emissions, they find that under specific conditions a BTA can be beneficial for global welfare and efficiency. Lower-income countries can set their carbon taxes lower or can receive lump-sum transfers from high-income countries to account for the higher abatement costs. Their contribution is important as it shows that not only self-interest but also global cooperation could justify a BTA to prevent carbon leakage and increase global efficiency.

### 2.2.2 Empirical Evidence for Border Carbon Adjustments

Apart from these theoretical justifications for BCAs, there are also applied models that calculate the effects of BCAs on carbon leakage, competitiveness and wel-

fare. Most studies use multi-region, multi-sector computable general equilibrium (CGE) models of trade that are extended to include $CO_2$ or other GHGs (cf. Böhringer, Balistreri, et al. 2012; Böhringer, Carbone, et al. 2012; Burniaux et al. 2013; Bednar-Friedl et al. 2012; Ghosh, Luo, Siddiqui, and Zhu 2012; Böhringer, Bye, et al. 2017; Böhringer, Schneider, et al. 2021; Mörsdorf 2021). CGE models work with counterfactuals and compare a baseline scenario with unilateral carbon pricing to scenarios with different BCAs (Böhringer, Carbone, et al. 2012). This allows to test different approaches for BCAs, for instance comparing the effects of a full BCA versus only carbon tariffs on imports. Next to a "business as usual" scenario, studies calculate a baseline scenario in which countries are implementing carbon pricing to achieve emission reduction goals such as 20% reduction of domestic emissions. Most baseline scenarios are based on the introduction of emission pricing by either the Annex I countries of the Kyoto Protocol, Annex I countries together with the US, Russia or China or by the EU alone. Depending on the model, the studies find different rates of carbon or emission leakage. According to a review by Branger et al. (2014), leakage rates range between 5 and 25% for most studies. Böhringer, Balistreri, et al. (2012) find a mean leakage rate of 12% across 12 models and explain these differences with different assumed heterogeneity in traded goods (Armington elasticities). A further difference comes from including non-carbon GHGs in the emission pricing. This reduces the leakage rate because the base for emission pricing is larger which lowers the price necessary to achieve mitigation goals (Ghosh, Luo, Siddiqui, and Zhu 2012). Larch et al. (2017) use a structural gravity model to investigate the introduction of carbon tariffs. As structural gravity models are commonly used to analyse international trade flows, they extend it to include carbon emissions and carbon tariffs. They also model a carbon tax introduction by Annex I countries and find a carbon leakage rate of 13.4%, confirming the results of the CGE models.

Introduction of a BCA reduces leakage across all studies. A full BCA is effective in reducing leakage (Böhringer, Balistreri, et al. 2012; Böhringer, Carbone, et al. 2012; Branger et al. 2014), so are carbon tariffs alone (Böhringer, Bye, et al. 2017; Larch et al. 2017). Böhringer, Schneider, et al. (2021) find a leakage reduction of 69% due to the introduction of carbon tariffs by countries of the Organisation for Economic Co-operation and Development. Böhringer, Balistreri, et al. (2012) argue that the efficiency of carbon tariffs is almost equal to a full BCA because the mitigating coalitions are large net importers of emissions and therefore the export rebates have little effect. Mörsdorf (2021) finds a larger difference where a full BCA by the EU reduces leakage from 22% to 7% and carbon tariffs only to 14%. This could also be explained partly by the fact that his model only includes direct emissions. Including also indirect emissions such as emissions from electricity production used in the manufacturing of the imported good widens the basis for the BCA and can therefore be more effective in reducing leakage (Burniaux et al. 2013; Böhringer, Carbone, et al. 2012).

Next to direct versus indirect emission inclusion, it matters on which emission basis the BCA or the carbon tariffs are applied. Even though a BCA can be calculated based on actual emissions of the firm (firm-based tariffs), this will lead to the most complex accounting and compliance processes (Böhringer, Bye, et al. 2017). Therefore, many proposals suggest basing the BCA on emission averages to reduce transaction costs. These averages can be either based on domestic or foreign emission averages. As domestic emission intensities in the mitigation coalitions are already low, this leads to a lower BCA which is less effective in reducing carbon leakage than a BCA based on foreign emission averages (Burniaux et al. 2013). Böhringer, Bye, et al. (2017) show that firm-targeted tariffs are most efficient in reducing carbon leakage as it gives exporting firms an incentive to reduce emissions. For region-based tariffs, exporting firms face the same tariff regardless of their

individual emission level and have no such incentive. They find that region-based tariffs reduce the leakage rate to 17% and firm-targeted tariffs based on direct and indirect emissions to 11% (compared to 20% in their baseline scenario).

The size of the abating coalition also influences leakage and therefore the effectiveness of a BCA, the larger a coalition the more effective a BCA becomes (Böhringer, Carbone, et al. 2012). This shows why unilateral action is inferior to cooperation in reducing emissions. A further factor increasing the effectiveness of a BCA is including non-carbon GHGs (Ghosh, Luo, Siddiqui, and Zhu 2012). Both these factors, coalition size and the inclusion of more GHGs have also been identified as the most influential factors in the meta-regression of Branger et al. (2014). Sectoral coverage also influences the effectiveness of a BCA. Studies show that a BCA on imports from EITE sectors can be effective at reducing leakage (Böhringer, Balistreri, et al. 2012; Burniaux et al. 2013; Mörsdorf 2021). However, coverage of all sectors can reduce leakage even further (Böhringer, Carbone, et al. 2012; Branger et al. 2014). According to Ghosh, Luo, Siddiqui, and Zhu (2012), already the inclusion of the agricultural sector can help to reduce leakage significantly if non-GHG are included simultaneously. Empirical studies can also shed light on whether the competitiveness concerns for EITE industries are justified and whether BCAs are good instruments for EITE industries after a carbon price introduction. The introduction of carbon pricing leads to output losses for EITE industries, as expected (Böhringer, Balistreri, et al. 2012). These output losses can be reduced by the introduction of carbon tariffs or a full BCA (Branger et al. 2014; Böhringer, Carbone, et al. 2012). However, they can never be offset completely. Burniaux et al. (2013) argue that the underlying cause of the remaining output loss is not the competitive loss in trade but the impact of the carbon tax on production cost.

One important consideration in planning and designing a BCA are welfare ef-

fects. As almost all studies do not incorporate avoided environmental damages, carbon pricing reduces welfare for the mitigating coalition (Branger et al. 2014). BCAs can increase the cost-effectiveness of carbon pricing for the mitigating coalition moderately (Böhringer, Balistreri, et al. 2012; Branger et al. 2014). Including non-carbon GHGs in the emission pricing and the BCA can reduce welfare costs for coalition and non-coalition countries by 50% (Ghosh, Luo, Siddiqui, and Zhu 2012). The main driver behind this is the increased flexibility in abatement options. Nonetheless, carbon pricing is still costly for the coalition, as prices of EITE sectors' products have increased (Branger et al. 2014). Some studies report positive welfare effects for non-coalition countries in the baseline scenarios as these profit from reduced fossil fuel prices and the competitive advantage in production of carbon-intensive goods (Larch et al. 2017). The main welfare effect of BCAs is distributional: A BCA shifts the welfare costs of carbon pricing from the coalition to the rest of the world (Böhringer, Carbone, et al. 2012). This has been confirmed across studies (Böhringer, Carbone, et al. 2012; Böhringer, Balistreri, et al. 2012; Böhringer, Schneider, et al. 2021; Ghosh, Luo, Siddiqui, and Zhu 2012; Burniaux et al. 2013; Branger et al. 2014; Larch et al. 2017; Mörsdorf 2021). This makes BCAs economically attractive for coalitions (Babiker et al. 2005). However, this also means that the costs of the additional emission reductions are mostly borne by developing countries (Böhringer, Balistreri, et al. 2012). Therefore, special considerations for developing and least-developed countries (LDC) could help to alleviate negative welfare effects for developing and least developed countries. This could for example mean to exclude LDC from BCA coverage.

## 2.3 Past and Current BCA proposals

Although there is no international BCA in existence to date, there have been several proposals to introduce a BCA in the US and the EU over the last 15 years.

Other countries have not as seriously discussed the introduction of a BCA yet, even though Mexico threatened the introduction of a BCA in response to the US leaving the Paris Agreement and has this option in its NDC (Davenport 2016). Canada is currently also exploring the options of a BCA (Government of Canada 2020). However, these plans are not yet advanced or introduced to the legislative process (Baril 2020). I therefore outline only the proposals of the US and the EU in the following.

### 2.3.1 Past BCA Proposals in the United States

In the US, there have been several BCA proposals, even though none have come far in the legislative process on a federal level until now (Mehling et al. 2019). The US did not ratify the Kyoto Protocol in 2001 and in 2017, the US left the Paris Agreement under President Trump. Both times, feared competitive losses for the US industry were the main justification (Mehling et al. 2019). Therefore, any discussion of carbon pricing on a federal level has been accompanied by potential BCAs to offset the potential competitive damage. The first proposal for a BCA came from an American company supported by a large labour union in 2007. This led to several bills including a BCA proposal in Congress between 2007 and 2009 (Mehling et al. 2019). The most famous one which also came closest to being implemented was the American Clean Energy and Security Act of 2009, also known as the Waxman-Markey Climate Bill (H.R.2454 2009). Although it was passed by the House of Representatives, it failed to reach a vote in the Senate (Mehling et al. 2019). It contained a concept regarding countries and sectors covered as well as different calculation options for a BCA that would have become effective from 2020 onward. The American Opportunity Carbon Fee Act of 2014 also suggested a full BCA. This bill was introduced in Congress but failed to be enacted on time, as the legislature period ended two months later (Lamy et al. 2020). The Energy

Innovation and Carbon Dividend Act of 2019 outlined a carbon tax with a border adjustment measure on imports to discourage firms to relocate because of the tax (Lamy et al. 2020). However, it was never voted upon in Congress, and the bill died with the end of the legislative period (H.R.763 2019). Recently, it got reintroduced in Congress as the Energy Innovation and Carbon Dividend Act of 2021 (H.R.2307 2021). This is reflected in the trade policy agenda of the new administration that also contains the possibility of a BCA (United States Trade Representative 2021). In the US, a BCA could therefore become reality in the next years.

At state level, California introduced an ETS including a de facto BCA on electricity imports in 2013. For other sectors, California chose to distribute free allowances in order to avoid carbon leakage to other US states. However, for electricity, California made companies liable for the emissions resulting from electricity generation, even if the electricity is imported from other states (Mehling et al. 2019). This resulted in major resource reshuffling, where electricity companies reorganised their electricity flows in a way which allowed them to import low-carbon electricity into California while selling high-carbon electricity in other states (Mehling et al. 2019). California tried to counter this challenge by explicitly prohibiting reshuffling (Mehling et al. 2019). A seen above, the possibilities and dangers from reshuffling are not well researched in academic literature so far.

### 2.3.2 Past BCA Proposals in the European Union

In Europe, four proposals have been introduced over the last 15 years, the fourth is currently in the legislative process and will soon be implemented. In 2007, the European Commission included a BCA in an internal draft for the revision of the ETS. However, in the final proposal, there was only a tentative legal basis for a BCA included and the ETS was still based on free allowances to avoid carbon

leakage (Mehling et al. 2019). In 2009, France published a non-paper[4] outlining a carbon inclusion mechanism on imports for sectors at risk of carbon leakage (Lamy et al. 2020). The non-paper specified the potential scope and the calculation of the BCA and included an exception for LDCs. Furthermore, it stressed the need of the BCA to be WTO-compatible (Mehling et al. 2019). But other European countries hoped to achieve a global climate deal and feared that protectionist measures would hinder these negotiations so the idea was abandoned (Mehling et al. 2019). In 2016, France reintroduced the idea of a BCA on imports in another non-paper (Mehling et al. 2019). It provided a very specific guideline for implementation, using the cement sector as a test. However, this proposal was rejected by the EU Parliament in 2017 (Lamy et al. 2020). The EU Commission was also against this proposal due to the recent success of the Paris Agreement and fear of WTO compliance issues (Simon 2017).

### 2.3.3 Current BCA Proposal of the European Union

In 2019, the current proposal was introduced as part of the European Green Deal by the European Commission itself (European Commission 2019). The Carbon Border Adjustment Mechanism (CBAM) aims to reduce carbon leakage by "putting a carbon price on imports from certain goods" while ensuring WTO compatibility (European Commission 2020a). A justification for this change in mind compared to previous attempts is the changed global landscape with differing ambition levels of climate protection (European Commission 2019). In an impact assessment, several design options were discussed (European Commission 2021a). None of them included export rebates (Bierbrauer et al. 2021). This is mostly due to the fear of non-compliance with WTO rules. In March 2021, the European Parliament discussed the potential directive and formulated requirements such as compatibil-

[4] an informal policy proposal

ity with the WTO rules in a resolution to the European Commission (European Parliament 2021).

In July 2021, the European Commission published its proposal for a regulation establishing a CBAM (European Commission 2021a). Based on the impact assessment, the Commission decided to implement a CBAM on selected products in form of CBAM certificates based on actual emissions. Importers will need to surrender CBAM certificates based on the embedded emissions of the imports (European Commission 2021a). If importers cannot provide emission data, a set of default values will be used. The EU ETS targets certain process and production methods. Correspondingly, the CBAM is targeted at the importation of goods resulting from these production methods. The starting sectors outlined in the proposal are iron, steel, cement, aluminium and electricity. These sectors have been selected based on cumulative GHG emissions and risk of carbon leakage. The CBAM will initially apply only to direct emissions of these products (European Commission 2021a). The proposal gives a legal basis to expand the scope of the CBAM over time. To facilitate implementation, the CBAM will have a phase-in period between January 2023 and December 2025 in which importers have to report emissions but do not pay for certificates yet (European Commission 2021a). After that, certificates will be introduced progressively while the EU phases out free allowances at the same time. This transition period will span ten years.

As can be seen, the CBAM will not contain any export rebates. However, as it is based on actual firm emissions, it will be more effective at reducing carbon leakage (cf. Böhringer, Bye, et al. 2017). Furthermore, it will incentivise importers to move towards cleaner production processes (European Commission 2021a). A potential side-effect of a firm-based BCA could be reshuffling of emission intensities so that low-emission products are exported to the EU and high-emission products exported to other countries or used for domestic consumption, as seen in California. There

is no exception planned for LDCs or other developing countries. The proposal only refers to offering technical assistance for less developed countries to"facilitate their adaptation to the new obligations established by this regulation" (European Commission 2021a). As argued in section 2.2, this will substantially increase the welfare burden for developing countries.

## 2.4 The political dimensions of BCAs

Apart from practical, economic and welfare considerations, carbon tariffs and any form of BCAs also have a political dimension. Countries or coalitions implementing a BCA could motivate other countries to join the emission reduction, especially when an incentive is created or costly tariffs can be avoided (Kaufmann et al. 2011). However, BCAs could also be perceived as a protectionist tool, in particular when they aim primarily at preserving the competitiveness of the domestic industries. This could induce retaliation, for example in the form of countervailing tariffs (Mehling et al. 2019). Whether countries retaliate or join the carbon mitigation efforts will depend on the specific design and implementation of the border carbon policy. From a climate perspective, it is beneficial to design unilateral climate policies in a way which fosters cooperation, since any carbon tax or ETS will become more efficient as more countries participate (Bierbrauer et al. 2021). Even if a BCA prevented carbon leakage completely, this would increase global emission reductions only by 1 or 2%, as shown by Larch et al. (2017). Motivating other countries to introduce their own carbon pricing mechanisms or including them into the domestic mechanism could increase the global carbon abatement. Then, not only the leaked carbon will be mitigated but also some of the carbon emissions from the countries that participate. For example, the implementation of the Chinese ETS in the beginning of 2021 increases global carbon pricing from 16% to almost 22%, even though the ETS covers only electricity (World Bank 2020).

Game theoretical approaches can give insights into how countries respond to the introduction of BCAs and the corresponding welfare effects. They usually assume that players behave rationally. I focus on studies allowing for retaliation. Böhringer, Carbone, et al. (2016) investigate whether the threat of carbon tariffs can be an incentive for emission reductions in a simultaneous-move game based on a CGE model. They model a coalition consisting of Annex-I countries of the Kyoto Protocol and the US. The coalition reduces its domestic emissions and chooses whether to implement carbon tariffs against countries which are not part of the coalition. Non-coalition countries can either adopt emission regulation to avoid the carbon tariffs, retaliate or do nothing. They find that in the Nash Equilibrium of their simultaneous move game, China and Russia adopt emission regulations while all other non-coalition countries retaliate. However, the assumption is that the coalition has a global reduction goal and not national targets. So, when other countries join, they reduce their abatement target (20%) of the initial coalition which creates an incentive for China and Russia to join as the coalition's export market becomes more attractive. This is a very unlikely scenario, as most emission targets are formulated independently of other emission abatement and refer to base years instead (UNFCCC 1997; UNFCCC 2015). Once this is incorporated into the authors' model, China and Russia will only participate if they have to abate only up to 10% of domestic emissions. Böhringer, Carbone, et al. (2016) also run a model variation where only the EU is implementing carbon abatement (20%). In this case, China and Russia will join the EU while the US and other non-coalition countries will retaliate (apart from India, which chooses no action). They assume limited abilities of countries to retaliate and aggregate countries into regions, which exaggerates their market power. Their model shows that under certain circumstances, the threat of carbon tariffs can be sufficient to induce participation of other countries such as China. Participation depends on the trade

openness of countries and therefore on the dependence of countries on their export markets.

Böhringer and T. F. Rutherford (2017) analyse the use of carbon tariffs as a trade sanction against the US after they left the Paris Agreement. They investigate whether carbon tariffs are a credible threat for the US to re-join the Paris Agreement, given multiple retaliation options. They focus on the US, the EU and China, as they together create more than 50% of global GHG emissions. The authors develop different scenarios with a CGE model and compare welfare impacts for the three countries. When the US leaves the Paris Agreement, carbon leakage and the welfare costs for China and the EU increase in the model. Therefore, they enact carbon tariffs that harm the US welfare but are beneficial for them. In their simulations, the US retaliates by setting its optimal tariffs for the EU and China. This in turn triggers retaliation by China and the EU, constituting a tariff war. As China is very open to trade, the tariff war is very costly for China. Therefore, the threat of carbon tariffs is not credible for the US, which will leave the Paris Agreement (Böhringer and T. F. Rutherford 2017). The credibility of carbon tariffs will depend on the retaliatory measures the US is able to enact. Given that the US is still a member of the WTO, retaliating with optimal tariffs against the EU and China alone would be a violation of WTO rules. However, there are many other trade retaliation measures available which could harm the EU and China. Even though this scenario is now obsolete as the US has re-entered the Paris Agreement Milman (2021), it can still give insights into how countries could react to carbon tariffs. If countries perceive a BCA as a threat, they could retaliate instead of increasing their carbon abatement. This can then further increase welfare costs for countries or coalitions participating in the abatement.

## 2.5 Climate Clubs

If more and more countries raise unilateral carbon prices, they will be able to collaborate together and form a **climate club**. As proposed by Nordhaus (2015), a climate club could be a self-enforcing cooperative solution to the problem of free-riding which hinders cooperation on climate change mitigation. Starting as cooperation between small groups of countries, clubs can be designed to encourage other countries to join (Victor 2015). In economics, a club is a voluntary group sharing the costs of producing a mutually benefitting public good. To be successful, the club must be beneficial to members, and it must be possible to exclude non-members or penalise them at a low cost. The club should also be stable in the sense that no member wants to leave (Nordhaus 2015). Nordhaus (2015) proposes a climate club where countries commit to an international target carbon price. Members can decide on how to meet it, be it through an ETS, a carbon tax or other means. Since non-members cannot be excluded from the public good of reduced carbon emissions, sanctions can incentivise participation and exclude non-members. Non-participants are penalised by a uniform percentage tariff on all goods. In this sense, the climate club is different from a BCA, as the height of the tariff on imports will depend on club membership and not on the emissions embodied in trade. Nordhaus develops a model of coalition formation to test his proposals and finds that climate clubs with uniform tariffs as sanctions are stable and self-enforcing. Participation in the club depends on the international carbon price and the tariff rates. A higher carbon price reduces participation while higher tariff rates increase the number of countries participating.

However, club benefits can also be shared differently. Hovi et al. (2019) suggest a club committing itself to conditional unilateral emission reductions by a fixed percentage share of a country's GDP. Climate action is conditional, as any participating country will only act if other countries also act. Instead of explicit

trade sanctions, they suggest providing specific climate goods as benefits for membership. These could entail joint research and development programs, cooperation around emission reductions and preferential terms of trade. Especially providing market access via preferential terms of trade could incentivise others to join the club. They describe two necessary conditions to start a climate club: Countries starting the climate club must control a sufficiently large share of global emissions and GDP, and the club must provide sufficiently large benefits for other countries to join. Therefore, they test under which conditions countries could act as enthusiastic starters with an agent-based model. Enthusiastic actors are defined as countries willing to spend at least 1% of their GDP on climate mitigation without other countries joining. They find that club goods and conditional commitments are effective in combination. However, Hovi et al. (2019) assume that there is no carbon leakage, that all conditional commitments are fully credible and that there are no problems concerning compliance.

Paroussos et al. (2019) analyse the macro-economic benefits and emission reductions of different club benefits. They find that clubs based on trade benefits or sanctions such as tariff exemptions actually have the smallest effect on welfare and emission reduction. Instead, technology transfers and low-cost climate finance have larger impacts, as they are more relevant for developing countries.

## 2.6 Other Trade-Related Climate Policies

Apart from BCAs and climate clubs, there are also other climate policies which can affect trade and therefore need to conform to WTO rules. I shortly discuss subsidies, technology transfers and tariffs on environmental goods and services in this section.

Instead of taxes or regulations, states can use **subsidies** to incentivise firms or consumers to change GHG emission rates (Howse 2010). In the climate context,

two types of subsidies are most relevant, namely fossil fuel subsidies and subsidies to promote clean production, such as renewable energy subsidies. Fossil fuel subsidies undermine sustainable development and hinder climate mitigation, as they stipulate the consumption of fossil fuels. They also make fossil fuel investments more competitive compared to cleaner investments like renewable energy (Kuehl et al. 2021). This is not only bad for climate change, but also costly for countries. Therefore, many countries have acknowledged the need for reforming such subsidies (Casier et al. 2013). Already in 2009, the G20 committed to phase out inefficient fossil fuel subsidies encouraging wasteful consumption (Barbier 2010). A commitment to phase out fossil fuel subsidies is also part of the Sustainable Development Goals (Kuehl et al. 2021). Despite these commitments, countries still spent 320 billion USD to subsidise fossil fuel consumption in 2019 (Kuehl et al. 2021). Furthermore, in the newly updated NDCs, only 15 countries explicitly mention fossil fuel subsidy reform (Roth et al. 2021). Using a partial-equilibrium model, Kuehl et al. (2021) analysed the potential impacts of fossil fuel reform for 32 countries. They found that a complete removal of fossil fuel consumption subsidies reduces national GHG emissions on average by 6% until 2030, for some countries even by up to 30%. If the budget reduction from the subsidy reform is allocated to energy efficiency and renewable energy, GHG emissions would even decrease by 9% on average. This shows that phasing out fossil fuel subsidies should be part of countries climate strategies to reach the 2°C goal set out in the Paris Agreement. Another important policy instrument are climate friendly subsidies. Often, they are divided into those which support renewable energy and those which increase energy efficiency (Howse 2010). Examples include support for research and development, investment tax credits or price supports. Such subsidies can follow an economic rationale, as they correct market failures or reflect a positive externality (from reduced emissions) which would otherwise not be part of a market actor's

choice. Since energy markets are in most cases already distorted by fossil fuel subsidies, renewable energy subsidies are often a good remedy (Howse 2010). Subsidies will then only impact trade if they influence the relative cost of production. As such, subsidies can improve the competitive position of a firm in the international market, i.e., they can also be used with protectionist intent (Epps et al. 2010). It is legally unclear whether fossil fuel subsidies are permitted under the SCM Agreement and whether renewable energy and energy efficiency subsidies are allowed. I discuss this further in section 3.5.

Apart from subsidies, **technology transfers** can also play a big role in climate change mitigation and can also fall under trade rules of the WTO. The need for technology transfers, especially between developed and developing countries, has been recognised in Article 10 of the Paris Agreement. The Article stresses the importance of implementation support including finance, technology, and capacity building (UNFCCC 2015). Clean technologies and know-how can for example increase energy efficiency and use of renewable energies or help with climate adaptation (Dröge et al. 2017). Technology transfers impact trade particularly regarding intellectual property rights, as patents can hinder developing countries from utilising clean technologies. For a detailed discussion of this topic and its potential benefits for climate change mitigation and adaptation, see for example Sampath et al. (2012).

Finally, there are also trade measures which impact climate change mitigation. In particular **tariffs on environmental goods or services**, e.g. on wind turbines to produce renewable energy, can make it harder for countries to adopt green and environmentally-friendly infrastructures. Reducing or eliminating such tariffs on climate-friendly goods, technologies or services can reduce costs for mitigation and adaptation (International Bar Association 2014).

# 3 WTO Rules

As outlined above, BCAs will most likely be implemented soon in the US and the EU. Therefore, it is important to consider whether such measures will be legal under the current WTO regime. This question has been debated intensively by scholars over the last years (cf. Howse and Eliason 2009; Holzer 2012; Marceau 2016; Mehling et al. 2019; Pauwelyn et al. 2020). Whether a climate policy affecting trade will be consistent with current WTO rules depends on the design, the implementation and the policy intent of the specific measure and cannot be established a priori. WTO agreements, e.g. the General Agreement on Tariffs and Trade (GATT), have been drafted without explicitly considering climate change mitigation and adaptation in mind, as these were less of urgent topics in these times (Marceau 2016). This can make it challenging to draft WTO-conform climate policies for international trade, such as BCAs. A careful analysis of which articles of the GATT and the other WTO Agreements are relevant for BCAs and other trade-related climate policies can help to avoid WTO disputes. Such considerations can then also be used to design a WTO conform BCA, as suggested by Mehling et al. (2019).

One former important strength of the WTO was its dispute settlement mechanism. When countries think another country's policy is violating a WTO agreement, they can file a complaint. Then the WTO creates an ad hoc panel consisting of experts who will review the factual and legal aspects of the respective case (World Trade Organization 2017). A panel's decision is not final, as the accused country can file for appeal which is then decided upon by the Appellate Body (AB). However, due to the WTO crisis, the AB is currently not functioning, as the US is blocking the nomination of new judges (Pauwelyn et al. 2020). This allows countries to appeal 'into the void', as nobody can judge the appeal and a decision is deferred until the AB is functioning again. This current crisis could

benefit countries introducing a BCA but potential retaliation measures could not be sanctioned by the WTO either (Pauwelyn et al. 2020).

A commitment for sustainable development can already be found in the Preambles of the GATT and the Marrakesh Agreement Establishing the WTO (1994b) (hereinafter WTO Agreement). These Preambles leave open what sustainable development exactly means and are also not legally binding (Eliason 2019). In the GATT, there is a clear set of exceptions to its rules in Article XX for reasons such as health, the environment and the conservation of natural resources (Jaspers et al. 2013). As I outline below, these exceptions can be used to justify climate change mitigation policies.

Climate clubs based on uniform tariffs sanctions will be very difficult to implement under WTO rules, as WTO members have committed themselves to bind their tariffs in the WTO Agreement. Therefore, I only discuss climate clubs based on preferential market access below. In the following, I give an overview of relevant WTO legal rules and jurisprudence. First, I discuss the relevant articles of the GATT, such as Articles II, III, I and XX and how they apply to border carbon adjustments and climate clubs. Any BCA or other climate policy would need to satisfy Articles I, II and III of the GATT simultaneously or qualify as an exception under Article XX of the GATT. Furthermore, as WTO obligations are cumulative, the BCA also needs to adhere to the obligations of the other WTO Agreements. Therefore, I then discuss how the Agreement on Subsidies and Countervailing Measures (SCM) and the Technical Barriers to Trade (TBT) Agreement apply to unilateral climate policies. The final decision on whether a BCA is compliant with WTO rules will depend on the ruling of Dispute Settlement and on its interpretation of the WTO obligations in the context of climate policies.

## 3.1 GATT Article II and III – Border Tax Adjustments

As the main goal of the GATT and the WTO Agreements is to reduce trade barriers, it prohibits to increase tariffs or to level charges on imports. However, certain taxes and charges are allowed to ensure trade neutrality of domestic policies. Article II:1(b) of the GATT[5] prohibits charges on imports. Article II:2(a), however, explicitly allows the border adjustment of internal taxes to ensure trade neutrality of domestic taxation if the charge is equivalent to an internal tax on a "like domestic product" (Porterfield 2019). A tax is allowed under Article II:2(a) of the GATT if the additional requirement of Article III:2 of the GATT is also met and the tax is not imposed "in excess of those applied, directly or indirectly, to like domestic products". A BCA could be seen as a specific BTA falling under Article II and III of the GATT if the BCA would be considered a tax on imports triggered by an internal factor, for example the sale of the product (Porterfield 2019).

Furthermore, there has been some debate about whether indirect taxes also include taxes on inputs which are not included in the final product such as energy consumed in the production process (Mehling et al. 2019). This is important as carbon emissions are emitted during the production process but not incorporated in the final product. The answer on this will therefore also influence whether Article II:2(a) applies to a BCA and any ruling will depend on how the dispute settlement body interprets the respective articles of the GATT (Mehling et al. 2019).

In the case *U.S. – Superfund*, the dispute revolved around taxes on imports of certain chemicals and the end-products containing such imports levied by the US. The panel found that taxes on chemicals used in the production of the final product could still be border adjusted (GATT Panel Report 1987). However, it

[5]Referring to the GATT, I will always refer to the GATT (1994) as included in the Annex 1A of the WTO Agreement. This Agreement needs to be read together with the provisions of the GATT 1947 as detailed in the GATT (1994).

was not resolved in this dispute whether such chemicals or substances have to be physically present in the final product or not (Mehling et al. 2019). Some authors take the *U.S. – Superfund* case as evidence that inputs do not have to be present in the final products (Porterfield 2019). Others argue that even though the *U.S. – Superfund* case provides support for the treatment of a tax on energy as border adjustable, $CO_2$ emissions are not an input but an output of production and that therefore the panel could conclude that carbon taxes are not border adjustable (Marceau 2016).

Even though it is still open whether a BCA can be justified as a BTA under Article II:2(a) and III:2 of the GATT, a BCA fulfilling the requirements of Article II:2(a) also needs to fulfil the national treatment obligation of Article III:2 of the GATT and the most-favoured-nations (MFN) obligation of Article I which I discuss in the next sections.

## 3.2 GATT Article III – National Treatment

The national treatment principle of Article III of the GATT requires that there is no discrimination between imported products and "like domestic products". Article III:2 deals with discrimination based on taxes and Article III:4 with discrimination based on regulations. Therefore, it will be important whether a BCA is considered to be a tax or a regulation.

Article III:2 of the GATT requires that there is no discrimination between taxes on imported products and taxes on "like domestic products". This is fulfilled if taxes directly levied on imported products are applied not "in excess of" taxes levied on like domestic products. Here, an important question is what renders the domestic and the imported products to be "like". For this, the Appellate Body has set out four criteria which need to be considered together to establish likeness: First, the products' properties, nature and quality. Second, their end-uses in a given

market and whether the products will be in a competitive relationship. Third, the international tariff classification and finally also the consumers' tastes and habits (Mehling et al. 2019). Under the first three criteria, low-carbon and high-carbon products will most likely be considered as 'like products' and regarding the last criterion, the state which implemented the BCA would need to prove that consumers distinguish between such products, e.g. based on health concerns (Mehling et al. 2019). As can be seen, different process and production methods (PPM) leading to differing carbon intensities are not included in the consideration of likeness.

Article III:2 of the GATT does not prohibit a BCA as long as the imports are not taxed "in excess of" the like domestic product. Basing a BCA on the lowest domestic charges would be the safest option under this condition (Mehling et al. 2019). However, as seen in section 2.2, this would make the BCA also less effective in preventing carbon leakage. Instead of being "like domestic products", low and high carbon products could also be found to be "directly competitive or substitutable products" under the second condition of Article III:2 of the GATT. The Appellate Body hinted at the possibility that products with different amounts of embodied carbon could fall under this category (WTO Appellate Body Report 2013, para. 5.63). As this notion is broader than the notion of "like domestic products", it only requires that both products are taxed but not strictly requires how much they are taxed (Mehling et al. 2019). This would be easier to achieve for BCAs.

If BCAs count as internal regulation and not as a tax, they will fall under Article III:4 of the GATT. This is most relevant for BCAs forming part of emission trading systems. Then, the requirement of Article III:4 is easier to fulfil as imports shall not be treated "less favourable" than domestic like products (Mehling et al. 2019). If a BCA is linked to the carbon footprint of a product and clear in its environmental

intent, it will most likely not violate the national treatment condition of Article III:4 (Mehling et al. 2019).

## 3.3 GATT Article I – Most Favoured-Nation Principle

Another provision for non-discrimination a climate policy with trade impact has to fulfil is the most-favoured-nation obligation as set out in Article I of the GATT. The principle is one of the most fundamental obligations in the WTO. Pursuant to Article I:1 of the GATT, countries need to accord any tariff reduction, privilege or treatment granted to one country also to "like products" being imported or exported to all other countries. This becomes relevant for BCAs, as they treat imports of "like products" differently depending on their carbon content. If products from countries that already have carbon pricing or an ETS in place are treated differently (i.e. the discrimination is based on the country of origin), this could violate the MFN obligation (Mehling et al. 2019).

Another question is whether countries are allowed to discriminate in favor of developing countries or LDCs. As discussed above, this would be beneficial for them from an economic perspective. Indeed, with the Enabling Clause, the WTO rules contain an option to differentiate policies for LDCs, taking into account their special economic situation (Mehling et al. 2019). This exception of the MFN principle will be admissible as long as this does not create additional trade barriers to other countries and creates actual benefits for the LDCs. Mehling et al. (2019) suggest distributing parts of the revenues resulting from the BCA to LDCs and other developing countries to achieve this.

The MFN obligation is also the most relevant provision for climate clubs based on preferential market access. Any trade benefits or tariff reductions for the climate club will be designed to discriminate other WTO members and therefore violate the MFN obligation (Leycegui et al. 2015).

## 3.4 GATT Article XX – General Exceptions

If a climate policy is found to be violating Article I, II or III of the GATT, it can still be justified as an exception. Article XX of the GATT lists a conclusive list of possible exceptions to the GATT obligations. There are two exceptions which could be used in the context of climate policies, Article XX(b) and (g).

Article XX(b) of the GATT allows exceptions for measures which are "necessary to protect human, animal or plant life or health". As climate change mitigation is needed to protect human health in the future, this can be used to make a case for a BCA aiming at climate protection. A panel already ruled in *Brazil – Taxation* that $CO_2$ emission reductions fall under Article XX(b) as they protect human health or life (WTO Panel Report 2017). This means that the BCA must have the objective to avoid carbon leakage or reduce carbon emissions. Economic reasons such as competitiveness or levelling the playing field on the other hand constitute no legitimate objective to justify an exception (Marceau 2016). Furthermore, the BCA has to be a *necessary* measure to reduce GHG emissions or reduce carbon leakage. For this, three factors need to be considered. First, there must be a "genuine relationship of ends and means" (WTO Appellate Body Report 2007). This means that it must be clear that the measure contributes to its purpose even though a measure must not be indispensable to be necessary. A BCA for example should lead to emission reductions via the prevention of carbon leakage (Mehling et al. 2019). A second requirement is proportionality of the measure to the values it protects. Given the global common understanding of climate change as a threat to humanity (IPCC 2013), any climate policy should pass this test easily (Mehling et al. 2019). The final requirement is the absence of a less trade-restrictive measure for the same end (Mehling et al. 2019). In a dispute, the burden of prove for this is shifted to the complainant who must prove the existence of an alternative measure achieving the same policy goal (Mehling et al. 2019).

Article XX of the GATT offers a second option to justify a BCA or another climate policy. Article XX(g) of the GATT allows members to adopt measures "relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption". Here, countries first need to show that the climate system is an exhaustible natural resource which is threatened by GHG emissions (Mehling et al. 2019). There is already one ruling on air pollution that recognised clean air as an exhaustible and natural resource which falls under this provision (*U.S. – Gasoline*). Given the trans-boundary character of and the international fight against climate change, it is likely that a BCA would pass this test (Mehling et al. 2019). The next step is to show that the measure in question "relates to" the conservation of the resource. This is not a difficult requirement, as long as the measure is not too wide in its scope or has protectionist elements (Mehling et al. 2019). However, this again does not allow competitiveness concerns as the main rationale for a BCA but instead the environmental reason of carbon leakage prevention should be in the centre of the policy. The third qualification is, as stated in Article XX(g) of the GATT that the measures "are made effective in conjunction with restrictions on domestic production or consumption". This does not require that domestic and imported products are treated identical (Mehling et al. 2019). Since BCAs want to adjust the carbon tax or ETS at the border and do not introduce a new measure only on imports this should pose no problem to any BCA. As Article XX(g) only requires a policy to "relate to" the conservation of an exhaustible resource, it is less strict than the necessity test of Article XX(b). Therefore, a BCA is more likely to be justifiable under XX(g).

An additional requirement for both exceptions, Article XX(b) and XX(g) is given in the *chapeau* of Article XX. The *chapeau* has two criteria which have to be met simultaneously and apply not to the content of the policy but to how it is

implemented in practice. Article XX of the GATT requires first that the measures are "not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail" and second that the measures are not a "disguised restriction on international trade". The first requirement can be met through ensuring fairness and due process in the introduction of the BCA (Mehling et al. 2019). This means for example to allow firms to prove that they have lower emissions than the average applied. It can also mean to implement a phase-in period in which other countries can increase their domestic climate policies before they have to comply with the BCA requirements (Mehling et al. 2019). Before implementing a unilateral policy such as a BCA, the adopting country furthermore has to try to find a multilateral solution. This can be done by conducting serious negotiations for multilateral or bilateral agreements to fight climate change. In order to avoid discrimination, these negotiations need to include all affected countries (Mehling et al. 2019). The negotiations under the UNFCCC leading to the Paris Agreement can count as such negotiations, however, the negotiations were not about BCAs specifically so that further negotiations might be required (Mehling et al. 2019).

As stated above, the measure should not discriminate against "countries where the same conditions prevail". This means that a BCA needs to take into account the climate policies of other countries and whether they are "comparable in effectiveness" (Mehling et al. 2019). This serves to ensure that countries cannot use a BCA to oblige other countries to adopt the same regulations or policy goals. However, this might pose difficulties as comparing different climate policies and carbon pricing strategies can become complicated (Mehling et al. 2019). Furthermore, to avoid discrimination under the *chapeau* of Article XX, countries should take into consideration the conditions of developing countries. This can be justified with the principle of common but differentiated responsibilities and respective capabilities

formulated in the Paris Agreement and the "special and differential treatment" recognised in the WTO. This would then allow differential treatment of LDCs which is also beneficial for economic reasons, as discussed above. However, there is likely to be a trade-off between satisfying the conditions set out in the *chapeau* of Article XX by treating LDCs and developing countries differently and satisfying the most-favoured-nation principle (Mehling et al. 2019). As found by the AB in *EC – Seals*, a connection between the arbitrary or unjustified discrimination and the policy goal can be relevant to justify the discrimination (WTO Appellate Body Report 2014). Hence, if the design of the BCA does not primarily lead to emission reductions, the DSM could find unjustified discrimination. This could become relevant if the BCA design includes export rebates which give no incentive for domestic firms to lower their emissions (Mehling et al. 2019). Pursuant to the second precondition set out in the *chapeau* of Article XX of the GATT, the measure should not constitute "a disguised restriction in international trade". If the measure has passed the other requirements set out in the *chapeau* of Article XX, this is passed if the measure is "publicly announced" (GATT Panel Report 1982). Furthermore, the design and the architecture should not indicate any protectionist intents. This means that you can choose whether you design a BCA to fulfil requirements of Article III and Article II:2(a) or you can choose to design it to qualify as an exception under XX (b) or (g) (Dröge et al. 2017).

## 3.5 Agreement on Subsidies and Countervailing Measures

Additionally to the rules specified in the GATT, the rules of the SCM Agreement are also relevant for the WTO conformity of BCAs and other climate policies. A BCA including an export rebate could constitute a prohibited export subsidy under the SCM Agreement. According to Article 1.1.(a) of the SCM Agreement, a subsidy is a "financial contribution by a government or any public body within the territory

of a Member" where "a benefit is thereby conferred." It classifies subsidies either as prohibited, actionable or non-actionable. **Prohibited** subsidies are in particular export subsidies. **Actionable** subsidies are subsidies which are specific to a certain firm or industry. WTO members can challenge them by demonstrating that the subsidy is harmful to them (Casier et al. 2013). However, the SCM explicitly allows the border adjustment of taxes on unincorporated inputs such as energy and fuels (Porterfield 2019). Therefore, export rebates on BCAs might not constitute a prohibited export subsidy but a permissible border adjustment. Here again, it is required that the rebate or exemption from the domestic tax is not "in excess of" the tax for products for domestic consumption (Porterfield 2019). This might be challenging for BCAs linked to an ETS, as fluctuating market prices might lead to overcompensation if the price changes between time of export and time of acquisition of the allowances (Mehling et al. 2019). Under the current SCM Agreement, it depends on WTO panels and the AB to decide in a dispute whether export rebates are considered to be an export subsidy or not. This will also depend on the exact design and implementation of the BCA. As seen in section 3.4, export rebates might anyhow be problematic for a justification of the BCA under Article XX of the GATT.

The SCM Agreement is also relevant for other trade related climate policies, in particular renewable energy and fossil fuel subsidies. Originally, the SCM Agreement contained a list of exceptions for subsidies that are **non-actionable** for reasons such as research and development or environmental protection. However, this list expired after five years, and WTO members have not been able to decide on a continuation or new list (Howse 2010). This has led to various disputes regarding renewable energy subsidies under the WTO. A problem with the SCM agreement and jurisprudence under the WTO is that the definition of subsidy used is not economically relevant in all cases (Epps et al. 2010). For example, it might

be economically useful to target specific firms or industries to correct a market failure (Howse 2010). However, under the SCM Agreement, this would constitute an actionable subsidy. It would be more useful to test the actual impact of a subsidy on the relative costs of production, as only subsidies which have an impact on these costs have an effect on competitiveness (Epps et al. 2010). Another reason why the current test of specificity is potentially problematic for renewable energy subsidies is that the test is designed for administrative feasibility and hence does not require the establishment of causality between the subsidy and the harm to another WTO member (Epps et al. 2010).

Problematic for subsidies in the WTO is also the current lack of transparency. Under Article 25 of the SCM Agreement, members are required to notify specific subsidies. However, in practice, the majority of WTO members are not notifying all their subsidies to the WTO (Casier et al. 2013). This is partly due to the ambiguity of the definition of a subsidy and the unclear requirements for a subsidy to be specific. Even though WTO members can also counter-notify subsidies of other members under Article 25.10 of the SCM Agreement, this reduces transparency.

## 3.6 Technical Barriers to Trade Agreement

The Technical Barriers to Trade (TBT) Agreement can also be relevant for climate policies affecting trade. The TBT Agreement deals with non-tariff barriers to trade such as technical regulations or standards (WTO 1994a). As all WTO Agreements are cumulative, the TBT Agreement has to be fulfilled next to all GATT requirements (Marceau 2016). However, as BCAs will contain either taxes or regulations, they will not fall under the TBT. Other climate policies such as regulations and standards may fall under the TBT, for example prescribing a certain maximum carbon intensity of goods. As Gründler et al. (2021) found, non-technical barriers to trade and Sanitary and Phytosanitary Measures (SPM) are not only used to

protect the environment and climate but also for protectionist aims. This shows the trade-off between environmental protection and preventing protectionism. Currently the focus of the WTO is on preventing protectionism, even though the study by Gründler et al. (2021) showed that countries still manage to introduce protectionist policies. How the WTO should weight protection against climate change versus prevention of protectionism can be decided by member states.

## 3.7 Trade liberalisation vs Climate Protection

As can be seen, many potential issues and pitfalls can arise while designing a BCA or another climate policy. Whether a BCA conforms to WTO rules will depend on its design, implementation and on how favourable the WTO Panel or AB see climate protection in this context. A BCA that is carefully crafted can be legal under current WTO rules. But the political reality will likely differ, given that not only legal experts but also lobbying groups and politicians are participating in the drafting of such a policy (Bacchus 2017).

The current proposal of the CBAM by the European Commission has been explicitly designed to make it compatible with WTO rules (cf. section 2.3.3). This can be seen already in the regulation's justification which gives only environmental or climate-related reasons for the CBAM, i.e., that it should reduce carbon leakage and with this help to protect the climate. The absence of export rebates also shows the environmental rationale for the BCA. This could justify the CBAM in a dispute under the exceptions of Article XX(b) or XX(g) of the GATT. The proposal outlines how the CBAM will be linked to the EU ETS to prevent discrimination between domestic and foreign suppliers as both pay the same price (European Commission 2021a). This could make the CBAM comply to the National Treatment obligation of Article III of the GATT. Furthermore, the proposal attempts to avoid any discrimination between foreign suppliers, as there is no

exception for developing countries or LDCs. This makes adherence to the MFN rule more probable. But, as discussed above, the absence of an exception for LDCs could also create potential problems for a justification under the *chapeau* of Article XX of the GATT. The proposal has to be adopted by both the European Council and the European Parliament together. This will lead to intermittent changes and unforeseeable details of implementation, so that there is still legal uncertainty surrounding the CBAM and its compliance with WTO rules.

Even though current WTO rules limit the possibilities for climate policy design, they do not necessarily prohibit them. In the progression over the last 30 years, WTO jurisprudence developed to be more favourable to environmental protection measures (Kulovesi 2014). However, to make climate and environmental protection easier for states, it would help to include a clear commitment to climate protection into WTO rules. Like any WTO change, this would require the consensus of all WTO members. In the following, I give an overview of the current state of the WTO, why reforms are needed apart from climate change concerns, and what different reform options exist to make the WTO climate-friendly.

# 4 Potential WTO Reforms

As delineated above, current WTO rules lack legal certainty for the introduction of climate policies affecting trade. Therefore, many have suggested WTO reforms by amending existing rules or introducing new rules (cf. Dröge et al. 2017; Bacchus 2016; Das et al. 2019; International Bar Association 2014; Epps et al. 2010; Hufbauer et al. 2009; Leycegui et al. 2015). Such reforms could help to increase legal certainty and therefore give countries the opportunity to use domestic climate policies without fear of WTO disputes. However, the WTO is also facing other issues that create reform needs, for example regarding its Dispute Settlement Mechanism, (cf. section 3). If WTO members agree to those reforms, they could also

use the opportunity to make climate protection a priority. The new US administration constitutes a window of opportunity for reform. Nonetheless, negotiations have failed over the last 20 years, so the outlook for substantial reforms is still bleak, in particular due to the consensus practice for nearly all decision-making in the WTO (Wilkinson 2018). Before outlining specific reform suggestions to make climate protection possible under the WTO, I therefore give an overview of the current issues the WTO is facing and of some reforms that have been proposed to solve these. Without these reforms, any climate reform of the WTO will not be enforceable.

## 4.1 Current state of the WTO

Since the creation of the WTO in 1994, members were not able to agree on many reforms. First, I describe the development of trade negotiations over the last 20 years. Then, I outline current problems in the Dispute Settlement Mechanism and describe main reform proposals for the WTO. As there are already different initiatives connecting trade and environmental or climate protection, I give a short overview of the main initiatives of the last years at the end of this section.

### 4.1.1 Development of Negotiations in the WTO

After the success of the Uruguay Round and the creation of the WTO in 1994, WTO members planned another round of negotiations to advance global trade liberalisation. Therefore, countries started the Doha Development Agenda (Doha Round) at the 2001 WTO Ministerial Conference, which also aimed at better incorporating the needs of developing countries (Wilkinson 2018). However, negotiations in the Doha Round have failed so far, as WTO members could not agree on many of the topics that were negotiated. Difficulties were hard to solve due to the "single undertaking" negotiation approach. This approach requires that all

topics have to be decided upon at the same time (WTO 2017). This led to a first collapse of negotiations in 2008 (Wilkinson 2018). Main reasons for the collapse were the difficulty to reach consensus under a growing number of WTO members, the lack of good negotiation practice to deal with the heterogeneity of the members as well as a missing willingness of developed countries to grant exceptions to developing countries (Bronckers 2020). In particular, the tension between developed and developing countries has caused many problems during the negotiations (Hopewell 2016). In 2013, members were able to agree to a small package around trade facilitation, agriculture and special and differential treatment for LDCs at the Ministerial Conference in Bali. Furthermore, in 2015, the Nairobi Conference also agreed upon a further small package on agriculture and benefits for LDCs (Wilkinson 2018). However, at the same conference, WTO members also agreed to put the Doha Agenda aside in favor of more plurilateral[6] negotiation approaches (Wilkinson 2018).

Over the last 20 years, the continued negotiation failure has shifted attention of members to bilateral or regional trade agreements (RTAs) outside of the WTO (Hoekman and Mavroidis 2021). Until 15 June 2021, 349 RTAs have been notified to the WTO (WTO 2021b). There is also a tendency to create mega-regional agreements between two or more important economic regions such as the *Comprehensive Economic and Trade Agreement* between Canada and the EU (Dröge et al. 2017). These agreements provide deeper integration than WTO rules and have a larger impact on trade flows (Dür et al. 2014). These RTAs contain more and more environmental provisions (Dröge et al. 2017).

It could still be possible for the WTO to regain its negotiation powers and shift rule-making back to the WTO if it can reform and reactive its negotiation function.

[6]Plurilateral agreements in the WTO are agreements formed by a subset of members contrary to multilateral agreements where all WTO members participate.

However, whether in a more and more heterogeneous world the WTO will be able to conclude new multilateral agreements and reform the existing multilateral rule-based system or whether a solution could be to allow more plurilateral approaches is currently an open question (Hoekman and Mavroidis 2021). To stay relevant, the WTO also needs to solve several institutional problems or flaws which hinder decision-making and negotiation success, such as a lack of transparency or the member-driven ad-hoc decision making (Narlikar and Wilkinson 2004). Therefore, many have called for structural reform of the WTO.

### 4.1.2 The Dispute Settlement Crisis

Despite the failures in negotiation, the WTO has long been perceived as a powerful and successful international organisation. This is mostly because of its Dispute Settlement Mechanism which has been called the most powerful international juridical institution (Jackson 2008). However, over the last five years, the DSM has been severely blocked. Dissatisfaction around the DSM was initially expressed by the US but is now more and more shared by other WTO members, such as the EU (European Commission 2021b).

The US has multiple complaints about procedural and systemic issues of the DSM, mainly concerning the Appellate Body. One of the main complaints is alleged judicial overreach of the AB. In some rulings, the AB does not only interpret the WTO Agreements but is creating own rules where the rules of the WTO Agreements are ambiguous or unclear. According to the US and other countries, this is a judicial overreach of the AB and its competences as lined out in Article 3.2 of the Dispute Settlement Understanding (DSU) (Payosova et al. 2018). In practice, this happens also due to the difficulty to distinguish between interpreting existing rules by applying them to new facts and the creation of new rules. As the US is firmly set on the position that the AB should never create own rules, the

US is blocking the appointment of new members of the AB since summer 2017 (Payosova et al. 2018). A more procedural concern of the US used to justify the blocking of appointments is the continuation of AB members on a case despite their end of term (United States Trade Representative 2020). As the AB needs three members to decide on a case, it stopped being operational in December 2019, as only one member's term continued (Payosova et al. 2018). To solve the crisis of the DSM, reforms are needed. The next section therefore outlines different proposals for reform of the DSM and other areas of the WTO.

### 4.1.3 Reform Proposals for the WTO

Over the years, many reform proposals have come from WTO members directly or from academics, think tanks or non-governmental actors. It goes beyond the scope of this paper to discuss them extensively, so I give a brief overview of the aspects which are also relevant for greening the WTO. As should have become clear from the last two sections, main reform proposals revolve around revitalising the negotiation function of the WTO and reforming the DSM (Hoekman and Mavroidis 2021). Further discussions centre on increasing transparency and substantive reforms or new agreements.

Without the **reform of the DSM**, any other reform of the WTO towards supporting climate mitigation or adaptation will be essentially in vain, as it cannot be enforced. To date, there are many different reform suggestions for the DSM, as it is a priority for most WTO members. One suggestion is a reform so that the Appellate Body has to refrain from decisions where WTO rules are ambiguous. This would solve one of the main concerns of the US. The ambiguity of WTO rules could then be solved by WTO members adopting an authoritative interpretation of the WTO text or WTO members negotiating new agreements clarifying the texts. Even though formally, a three-fourth majority is needed for an authoritative

interpretation, in practice consensus has been tradition (Payosova et al. 2018). Therefore, it might be very difficult to reach an authoritative interpretation for controversial issues. Procedural issues could also be solved by the AB itself which is allowed to amend its procedural rules and could prohibit giving cases to members whose term will end soon and so avoid a member to work on a case beyond their term (Payosova et al. 2018). However, this is currently not possible as long as it is not operational due to the US blockade.

Some argue that reform is needed beyond reforming the AB with the goal of maintaining the depoliticised character of the current dispute settlement mechanism. A more basic reform could be to change the ad-hoc panel member appointment to a standing body of professional panellists (Hoekman 2020). This could improve the quality of the decisions of the panels and potentially reduce the need for appeal. A similar suggestion is to reform the selection of judges to the AB to better satisfy US concerns (Howse 2021). These suggestions have the appeal of not requiring amendments of existing WTO agreements which are more difficult to achieve. Regardless, the way forward are multilateral negotiations for DSM reform with the result of changing either some of the existing WTO treaties or reach other solutions. Many WTO members are willing to work on these reforms, as can be seen for example in the Trade Policy Review of the EU European Commission (2021b) (see in particular the Annex for the reform proposal of the EU).

Apart from a reform of the DSM, it is important to improve the prerequisites for **successful negotiations**. Hoekman and Mavroidis (2021) suggest several measures to increase the quality of information available to WTO member. They suggest to enable the WTO Secretariat to collect and distribute information and analyses, e.g. regarding global economic effects of trade policies or spill-over effects. Currently, the Secretariat does not have the authority to do this and enabling it could improve the quality of information available to WTO members and

thereby foster informed negotiations and decisions. Furthermore, WTO members could utilise the existing Committees and fora for deliberation, e.g. by requesting input and feedback from stakeholders or external experts. This option is available by conducting "thematic sessions", a tool which is not frequently used so far (Hoekman and Mavroidis 2021).

Another option is to improve the possibilities for **plurilateral agreements** (Hoekman and Sabel 2021). Plurilateral agreements can be formed under the WTO if they are included in Annex 4 of the WTO Agreement, as specified in Article II:3 of the WTO Agreement. The benefits of the plurilateral agreements in Annex 4 apply only to participating countries. For new agreements to be included in Annex 4, Article X:9 of the WTO Agreement requires consensus by all members. This makes it impossible to include discriminatory agreements, as other WTO members are unlikely to support an agreement that discriminates against them (Hoekman 2020). Changing this consensus rule could therefore help to allow a WTO of variable geometry, where different states have different levels of connections to each other (Narlikar 2021). However, this is very unlikely to be an achievable reform, as many countries want to maintain their right to oppose to agreements where they could experience negative spill-over effects. A different way of concluding plurilateral agreements under the WTO are critical mass agreements, such as the Government Procurement Agreement. In these open plurilateral agreements, benefits apply to all WTO members on a non-discriminatory basis as required by the MFN principle (Hoekman and Sabel 2021). This can be a good option if the benefits of the agreements are easily internalised by members. However, as soon as there are free-riding concerns connected to the topic of the agreement, a critical mass of countries is needed for the agreement (Hoekman and Sabel 2021). This means that enough countries and in particular most major economies need to participate. The critical mass approach was for example chosen in the negotiations for the *Environ-*

*mental Goods Agreement* (EGA). There, most bigger economies including China, the US and the EU participated from the start (Mavroidis et al. 2019). Depending on the political will of the international community, there will be more plurilateral initiatives in the future, in particular if it stays difficult to conclude multilateral negotiations (Narlikar 2021). This can also be seen by the Joint Statement Initiatives (JSIs) launched in 2017. The JSIs are negotiations open to all WTO members on topics such as e-commerce or investment facilitation. There are currently four JSIs ongoing where up to 80 WTO members are involved (Hoekman and Sabel 2021). Of course, plurilateral agreements could also be negotiated outside of the WTO. However, depending on the topic and the scope, they might not be allowed under the WTO, which only allows RTAs liberalising trade in most areas (Melo et al. 2020). Furthermore, a plurilateral agreement as part of the WTO has the advantage of the dispute settlement system available to all parties which is not given under external agreements.

A further topic for WTO reform is **transparency**, in particular regarding notification and monitoring of trade measures (see also section 3.5). Improving the transparency of trade measures that are in place in different countries can help to foster understanding and trade liberalisation. This could happen for example by giving a mandate for reporting on trade measures to the WTO Secretariat or by encouraging counter-notification (Wolfe 2018).

Next to all these important structural and procedural changes, there are also many **substantive reform needs** which are currently discussed. Some of the most important topics are subsidy reform (e.g. regarding agriculture but also fossil fuels), the status of countries as developing countries (currently, countries self-declare this status), e-commerce and rules for state-owned enterprises. The discussion of state-owned enterprises is central to the conflict between the US and China and is mostly concerned with the subsidisation of firms (Hoekman and Mavroidis 2021).

As can be seen, there are many different areas where WTO reforms are discussed. Whether and how these can be implemented will depend on the political will of WTO members. Therefore, trade conflicts such as the conflict between the US and China will impact reform possibilities, as it will require them to work together (Hoekman 2020).

### 4.1.4 Initiatives at the Trade and Environment Nexus

Even though the WTO is currently facing many challenges, members have not forgotten about climate change. There are already several plurilateral initiatives inside and outside of the WTO advancing sustainable development, environmental protection and climate change mitigation in the trade context. The most known of these plurilateral initiatives is the negotiation of the EGA that started in 2014. 18 WTO members[7] (counting the EU as one) tried to negotiate tariff eliminations for different environmental goods (WTO 2020b). However, negotiations have been stalled since 2016, as countries could not agree on a list of environmental goods (Dröge et al. 2017). A similar endeavour has been successful outside of the WTO. The *Asian Pacific Economic Cooperation* (APEC) initiative reduced tariffs on certain environmental goods to 5% by the end of 2015 (Mavroidis et al. 2019). Even though this is not legally binding, as it has not been incorporated into the tariff schedules of the WTO so far, it is being applied by APEC members on a voluntary basis (Mavroidis et al. 2019). Furthermore, as the list consists of only 54 goods and excludes environmental services, this initiative is limited in its effects (Melo et al. 2020).

In November 2020, 26 WTO members launched the *Structured Discussion on Trade and Environmental Sustainability* (TESSD) at the WTO (WTO 2020a). The

[7]EGA participants were Australia, Canada, China, Costa Rica, the European Union, Hong Kong, China, Iceland, Israel, Japan, Korea, New Zealand, Norway, Singapore, Switzerland, Liechtenstein, Chinese Taipei, Turkey, and the United States.

TESDD was initiated to facilitate discussions around sustainable development and climate change mitigation. They have held meetings to prepare a potential joint statement for the WTO's 12th Ministerial Conference in December 2021 (WTO 2021a). The statement is intended to stress the role of trade policy in assisting the fight against climate change and other environmental challenges. The discussions of the group revolve around topics such as liberation of trade in environmental goods and services, transition to a circular economy, sustainable agriculture and the environmental impacts of subsidies. Furthermore, members debated the launch of a dedicated discussion on reaching long-term climate targets. This discussion would include climate policies affecting trade such as BCAs and how they can be in line with WTO rules and principles (WTO 2021a). However, these discussions have not yet started. This is worrying, because the EU has already proposed a regulation for its CBAM, as outlined in section 2.3.

There is currently also a plurilateral initiative focusing on trade and climate outside of the WTO. New Zealand, Fiji, Iceland, Norway, Costa Rica and Switzerland initiated negotiations for the *Agreement on Climate Change, Trade and Sustainability* (ACCTS) in 2019 (New Zealand Ministry of Foreign Affairs and Trade 2021). The negotiations centre around three pillars: Environmental goods and service liberalisation, reform of fossil fuel subsidies and voluntary eco-labelling programs. A further goal of the agreement is to create a pathway for multilateral cooperation on trade and sustainability by creating a positive example of cooperation (New Zealand Ministry of Foreign Affairs and Trade 2021). Therefore, other countries will be allowed to join the agreement after it is negotiated.

## 4.2 Reform options for a WTO Protecting the Climate

Even though the TESSD is a good start to discuss the environment and trade context in the WTO, members have yet to start discussing BCAs or other trade-related

climate policies in detail. If there is no progress until the plans of the EU and the US lead to BCAs, Dispute Settlement might rule against climate protection (cf. section 3).Strikingly, most prior reform proposals by WTO members were vague on the connection of climate and trade. WTO reform proposals by China and the US do not explicitly talk about the environment or climate change (Delegation of China to the WTO 2019). The European Commission has the explicit goal of a sustainable trade policy (European Commission 2021b). They have also published a non-paper on a possible trade and climate initiative in the WTO (European Commission 2020b): It focuses on liberalisation of trade in climate-mitigation goods and services, development, transparency, and improving the work of the Committee on Trade and Environment (CTE). BCAs are only mentioned in the context of transparency on trade policies. Possible motives for this focus are that these topics are the lower-hanging fruits and already hard enough to reach, as the stalled negotiations of the EGA show.

Nonetheless, it is important to think about options which can position the WTO at the forefront of climate protection. Academics and non-governmental actors have proposed several options on how the WTO could actively protect the climate and allow trade-restrictive climate policies (cf. Dröge et al. 2017; International Bar Association 2014). There are also reasons to restrict trade-affecting climate policies to prevent their widespread use with protectionist intents. However, as discussed above, countries will use such policies more and more to increase their climate ambition and reach their carbon reduction targets. The trade-off between climate mitigation and green protectionism will therefore be important in considering how to reform the WTO best to protect the climate and raise welfare through liberalised trade at the same time. As many of these reform options require consensus under current WTO rules, they will be very difficult to negotiate. Furthermore, as already explained in the last section, most of them require other

reforms, i.e of the DSM. A green WTO reform should aim at increasing legal certainty for trade-affecting climate policies or reduce tariff and non-tariff barriers for trade in environmental and climate goods and services. Even though it will be very difficult to achieve legal guidance on climate mitigation measures inside the WTO, this might be a preferable option over leaving disputes to the trade regime's Dispute Settlement (Dröge et al. 2017). A straightforward solution would be a new multilateral *Agreement on Trade and Climate*, as suggested for example by Epps et al. (2010). As such an agreement's chance of success is the lowest among all options, I do not discuss it further. Instead, I fist discuss multilateral solutions such as amendments, authoritative interpretations and waivers. Then, I discuss several plurilateral options, such as an environmental goods and services agreement or an exception for climate clubs.

### 4.2.1 Amendments of WTO Rules

The most substantive reform next to a new agreement would be to **amend existing WTO agreements**. WTO agreements could be amended to allow measures taken to pursue the Paris Agreement or more broadly to allow measures combating climate change (Das et al. 2019). This could increase legal certainty around climate policy measures and how they relate to the WTO regime (Dröge et al. 2017). A relative straightforward amendment would be to include climate policies in the general exceptions of Article XX of the GATT (1994). Any such amendment would reduce potential trade disputes in the trade-climate nexus and thereby also help to reduce the burden on the DSM (Das et al. 2019).

Amending the SCM Agreement could also help combat climate change, for example by clarifying the definition of a subsidy (International Bar Association 2014). Furthermore, an amendment could establish a new category of non-actionable subsidies allowing for subsidies with the policy goal of climate change mitigation (as

described in section 3.5, this category expired in 2000) (International Bar Association 2014). This category could entail subsidies related to commitments to the Kyoto Protocol or the Paris Agreement (Howse 2010).

The adoption process for amendments to any WTO agreement is set in Article X of the WTO Agreement. It is a politically difficult process, as it requires consensus of WTO members. Therefore, there is only one successful case of a WTO amendment so far which amended the *Trade-Related Aspects of Intellectual Property Right (TRIPS) Agreement*. Strikingly, this amendment took a long time from being adopted in 2005 to taking effect in 2017 (Das et al. 2019). According to Article X of the WTO Agreement, if consensus on the adoption of a proposed amendment is not reached in a certain period, a two-thirds majority is sufficient. This might still be very difficult for controversial climate measures such as BCAs. Anyhow, the amendment will then only become effective for the members that ratify it (WTO 1994b). This means that members that do not ratify the amendment can still win a dispute against climate change measures from other countries as long as they violate the original rules.

Given all these difficulties, it seems unlikely that WTO members will be able to adopt an amendment of WTO rules in the short to medium term. Some even argue that it is not worth to try to negotiate such amendments, given the time and resources required. For a detailed discussion on why the process of reaching an amendment of WTO agreements for climate mitigation can be considered to be "controversial, difficult, and time-consuming", see also Porges et al. (2013).

### 4.2.2 Authoritative Interpretation of WTO Agreements

Instead of amending WTO Agreements, a reform can also be in the form of an **authoritative interpretation**. Article IX:2 of the WTO Agreement states that "[t]he Ministerial Conference and the General Council shall have the exclusive

authority to adopt interpretations of this Agreement and of the Multilateral Trade Agreements [...] by three-fourth majority of its Members."[8] Such an authoritative interpretation could entail a specification that climate change measures fall under the exceptions of Article XX of GATT or that measures taken to implement the Paris Agreement are consistent with WTO provisions (Das et al. 2019). Members could also adopt an authoritative interpretation that a regulation based on PPMs does not violate Article III of the GATT (Buck et al. 2001).

The European Parliament urged for an authoritative interpretation regarding the "like product" principle already in 1998 (European Parliament 1998). However, an authoritative interpretation has never been implemented so far (Ehlermann et al. 2005; Das et al. 2019).[9] As this shows, it will be very difficult to achieve an authoritative interpretation on climate mitigation or adaptation (Das et al. 2019). A further potential problem of both an amendment and an authoritative interpretation is that if the scope of them is too broad, they could incentivise green protectionism (Dröge et al. 2017). Therefore, it is likely that countries will not be able to agree on their scope due to different political interests.

### 4.2.3 Climate Waiver

Another option is to decide upon a temporary **waiver** for trade-restrictive climate policies. According to Article IX:3 of the WTO Agreement, the Ministerial Conference is authorised to waive certain WTO obligations for a limited amount of time, given exceptional circumstances. This gives WTO members the power to lawfully limit the reach of WTO rules (Feichtner 2009). According to Article IX:3, a waiver decision needs a three-fourth majority. However, since 1995 all waivers have been

[8] As there are currently 164 members to the WTO, this would require 123 WTO members to vote in favor of the interpretation (WTO 2021c).

[9] Some authors interpret the *Doha Declaration on Public Health and the TRIPS Agreement* as an authoritative interpretation but this is a view not shared by all legal scholars (Feichtner 2009).

adopted by consensus (Feichtner 2009). Waivers can be granted to individual members or collectively to all WTO members. Individual waivers suspend obligations only for one WTO member whereas collective waivers suspend them for a group or all WTO members (Feichtner 2009). There is no formal definition of 'exceptional circumstances' and in practice this has not limited the use of waivers (Feichtner 2009). Instead, waivers are applied in many different cases where consensus can be reached, and members decide whether exceptional circumstances apply which justify a waiver (Bacchus 2017). Further requirements for waivers are outlined in Article IX:4 of the WTO Agreement: Waivers need to have a termination date, they need to be reviewed every year by the Ministerial Conference if the termination is longer than a year and there can be certain terms and conditions applicable. In the review, the Ministerial Conference should examine whether the exceptional circumstances still exist. In 2019, the WTO granted six waivers and reviewed the ten multi-year waivers currently in place (World Trade Organization 2020). This shows that waivers are indeed a common tool to grant temporary exceptions from certain obligations for some or all WTO members, in particular when comparing it to amendments or authoritative interpretations.

Therefore, a **climate waiver** could grant a temporary exception for trade-related climate measures. Bacchus (2017) has suggested a waiver from WTO obligations for measures that are based on the carbon embedded in production and that are taken in compliance with and in furtherance of the Paris Agreement or another agreement of the UNFCCC. This could for example mean to suspend Articles I and III of the GATT for products with differing carbon content (Das et al. 2019). Another option is to include a broader range of trade-related climate measures into the waiver (Das et al. 2019). In any case, any waiver would need to be carefully crafted to avoid green protectionism. The waiver option is politically interesting, as it might be easier to achieve compared to amendments or

authoritative interpretations due to its temporary nature (Bacchus 2017). Given the hope that more and more countries start carbon pricing, BCAs might be only a temporary measure, as discussed in section 2.4. Then, a temporary waiver would also be appropriate from a climate perspective. If, however, some countries are reluctant in joining the fight against climate change or do less than necessary to reach the goals of the Paris Agreement, BCAs will need to stay in place longer. Then, a temporary waiver could cause problems as soon as it expires or is not extended. Therefore, it would be advisable to connect the negotiations for a climate waiver with more extensive negotiations for permanent rule amendments. As seen in section 2.2, many CGE models predict that BCAs will shift the welfare burden of carbon pricing onto developing countries. Therefore, a further reason why it might be impossible to find a majority for a waiver is that it will burden developing countries more heavily than developed countries (Bacchus 2016). Developed countries could therefore accompany the waiver with actions ensuring developing countries' equal competitive opportunities, such as low-carbon technology transfers or financing for climate mitigation (Bacchus 2016).

### 4.2.4 Peace Clause

In a **peace clause** or a **moratorium**, WTO members can agree to abstain from filing complaints under the DSU on an agreed topic. This can be temporary and conditional and has been used before in the WTO. For example, in Article 64:2 of the TRIPS Agreement, there is a moratorium on disputes regarding "non-violation, nullification or impairments" of rights under the TRIPS Agreement. This moratorium lasted initially five years but has been regularly extended since, last in December 2019 (WTO 2020c). In the *Agreement on Agriculture*, WTO members also agreed on a peace clause in Article 13. This Article specified that members restrain from using their rights to countervail or challenge domestic and export

subsidies. The peace clause expired in 2004 (Das et al. 2019).

A peace clause on climate measures could be adopted by a Ministerial Conference. It could for instance require WTO members to wait a minimum of three years to challenge unilateral trade-restrictive climate measures in Dispute Settlement (Bacchus 2016). This could create time for negotiations on amendments or plurilateral agreements (Bacchus 2016). A peace clause has also been suggested for renewable energy policies, entailing certain conditions, under which clean energy measures are not challenged by other members (Meléndez-Ortiz 2016). In any case, due to its time-limited nature, a peace clause can only serve as a bridge to a more permanent solution, similar to a waiver. Furthermore, it is not given that a peace clause will prevent all disputes, as it is unclear what happens if a country decides to file a complaint even though it participated in the peace clause (Das et al. 2019). To increase legal certainty, a peace clause should clearly define the scope of measures not to be challenged (Hufbauer et al. 2009). If the definition is not clear enough, members might file a complaint arguing that a unilateral measure does not fall under the peace clause. If, on the other hand, the scope is too broad, it could serve as template for protectionist measures (Dröge et al. 2017). Any such protectionist measures will most likely hurt developing countries proportionally more, as they are producing with higher carbon intensities (Epps et al. 2010). Like for the waiver, it would also be very helpful to have a definition of a climate measure or climate action to make the peace clause effective (Dröge et al. 2017). However, such a definition does currently not exist in the climate or the trade regime. In light of these challenges, experts judge the likelihood of WTO members adopting a peace clause to be unlikely in the short term (Das et al. 2019). Plurilateral agreements could be easier to achieve.

### 4.2.5 A Trade and Climate Code

As described in section 4.1.3, WTO members can also negotiate plurilateral agreements under the WTO. One such plurilateral agreement could be a Trade and Climate Code or a WTO Climate Change Agreement. Hufbauer et al. (2009) suggest an open plurilateral agreement creating a "green space" for participating countries. The agreement could encourage participating members to adopt carbon taxes and certain climate change mitigation measures while at the same time commit members to not file complaints about such measures of other countries. The proposal of Hufbauer et al. (2009) contains detailed suggestions on the topics that could be regulated in this agreement. For example, BCAs should be allowed, but only without export rebates. The comparability assessment of foreign climate regulation (to assess the level of the carbon tariff applied) should be conducted by an international or independent agency. They also call for any BCA to be determined at the most specific level possible, e.g. at firm level. This in fact corresponds to the current plan by the European Commission. As seen in section 2.2, this would indeed increase the effectiveness of a BCA in reducing leakage. They also demand preferences for LDCs and regulation of climate-friendly and harmful subsidies. This includes for example the removal of fossil-fuel subsidies. Including this agreement under Annex 4 of the WTO Agreement would allow countries to enforce it via the DSM of the WTO. However, as described above, this would also require consensus by all WTO members (Dröge et al. 2017). This will be very difficult to achieve in practice since the Trade and Climate Code envisaged by Hufbauer et al. (2009) allows BCAs which might be harmful for non-participating countries. Even if such a consensus could be found, such a code would only be binding for participating countries. Therefore, other countries harmed by a BCA could still use the DSM to file a complaint.

### 4.2.6 An Environmental Goods and Services Agreement

A plurilateral agreement could also focus on environmental goods and services. Even though the negotiations for the EGA are stalled since 2016, many WTO members are motivated to restart negotiations. The TESSD group is currently not only talking about the liberalisation of environmental goods but also about environmental services (WTO 2021a). Negotiations of the EGA failed as members could not agree on a list of environmental goods. Draft lists contained around 300 environmental goods. Different goods were problematic for different members which made compromise or consensus very difficult (ICTSD 2016). Therefore, Chu et al. (2018) suggest focusing on a smaller set of environmental goods or services. The EU Commission wants to start with climate-mitigation technological goods, i.e. equipment for renewable energy (European Commission 2020b). It would be beneficial to include environmental services into negotiations, as environmental goods and services are often complements. For example, installation, maintenance and other engineering services of a wind turbine create 50% of value-added compared to 50% from production and raw materials (Chu et al. 2018).

The liberalisation of environmental goods and services is a more specific topic than a broad Climate Code. Therefore, it will also be easier to negotiate. However, for success, a critical mass of countries needs to participate, as described in section 4.1.3. US and China are currently not participating in the TESSD. To reach a critical mass, both WTO members' participation will be necessary. At least for the US, participation in an EGA should be attractive, as they already have lower tariffs on most environmental goods, so joining such an agreement would be beneficial for US exporters (Chu et al. 2018). It is possible that the new administration is more open to join the TESSD. A potential downside of an EGA or Environmental Goods and Services Agreement is its limitation is scope. It will not resolve potential issues around trade-restrictive climate measures such as BCAs.

### 4.2.7 A Climate Club under the WTO

Another concrete example of a plurilateral agreement could be a climate club inside or outside the WTO. As described in section 2.5, a climate club could incentivise other countries to join the mitigation efforts. However, this will create difficulties under the WTO, if penalties for non-participating members are based on tariffs or if club goods consist of preferential market access. Nordhaus (2015) simply assumes that "a climate treaty will amend trade rules so that a penalty tariff conforms with international trade law." However, as shown above, amending WTO rules or creating a new climate treaty is very difficult. Most WTO members will not form such a club as they know that other countries will file a complaint via the DSM. Leycegui et al. (2015) suggest a general permanent exception for climate clubs via a waiver or an authoritative interpretation to the MFN obligation. Such an exception could specify conditions for climate clubs and thereby distinguish allowed from prohibited club goods and penalties (Leycegui et al. 2015). For instance, punitive tariff as Nordhaus (2015) suggested could be prohibited whereas preferential market access for club members allowed. As discussed above, such a waiver or authoritative interpretation will be very difficult to negotiate.

Another option for climate clubs is as a plurilateral agreement. Then, it would require consensus of WTO members to include the plurilateral agreement in Annex 4 of the WTO Agreement. This will be difficult to achieve, even if there are no trade sanctions as part of the club design.

## 4.3 Outlook for WTO Reforms

This chapter showed the barriers to WTO reform. Stalled and complicated negotiations and conflict around dispute settlement make it very hard to "green" the WTO. Given the general need for reform, it will be important to include climate change mitigation and adaptation into these reforms already.

Different options for WTO reform are achievable in the current political climate. Especially the trade conflict between China and the US and the blocked dispute settlement system will make reforms harder. Nonetheless, the new US administration opens a window of opportunity for trade reforms. Main trade-offs of the different reforms are between their political feasibility and their legal clarity. WTO amendments or authoritative interpretations would be permanent solutions, and if drafted correctly they will increase legal clarity for climate measures. However, they are also most difficult to achieve as they require consensus and are substantive. A waiver could be a more feasible option if the consensus rule is dropped. This is unlikely at this point (Das et al. 2019). Even so, it would only be a temporary solution, as a waiver needs an end date. Therefore, the legal certainty is only temporary compared to an authoritative interpretation. Similarly, a peace clause could only help temporarily and would still be challenging to adopt.

Plurilateral solutions have the best prospects given the political climate in the WTO (Hoekman and Sabel 2021). However, as they will be only binding for participating countries, this will not increase legal certainty for potential BCAs. Concluding an Agreement on Environmental Goods and Services can nonetheless be a first step towards more cooperation on climate change mitigation in the WTO and is therefore very important. Given the advances of the TESSD, such an agreement is currently the most realistic one. Other plurilateral agreements are less likely to be achieved. Only if the US, the EU and China formed an alliance, a climate club could be formed. This could catalyse climate action across the globe (Tagliapietra et al. 2021).

Several scholars have suggested ways how WTO members can advance negotiations on "green" WTO reforms (Porges et al. 2013; Bacchus 2017). To start, WTO members would need to "make the case for the urgency of action to mitigate climate change, the necessity of the Member actions contemplated, and why

these actions cannot be taken in a clearly WTO-consistent manner" (Porges et al. 2013, p. 8). It could help to bring climate and trade negotiators together to draft a WTO reform (Bacchus 2017).

# 5 Conclusion

In this thesis, I explored how WTO rules could be changed in order to "green" the WTO and make it an international organisation at the forefront of climate change mitigation. Unilateral climate policies such as carbon pricing are less effective than multilateral efforts, given the phenomenon of carbon leakage. To counteract this, countries can implement border carbon adjustments. The design and implementation of BCAs however is constraint by WTO rules that regulate what kind of domestic trade policies members can apply.

First, I considered different trade-restrictive climate policies and showed how they can support climate action to increase mitigation efforts. This showed that design and scope matter for BCA effectiveness but that there is also a trade-off between effectiveness and practicability. As most models show that BCAs shift the welfare burden of carbon pricing to developing countries, it will be important to accompany a BCA with exemptions for LDCs, technology transfers or climate finance to prevent their disproportional harm. It is therefore problematic that the current proposal of the European Commission lacks such explicit exemptions or actions. I then examined WTO rules and how they can be applied to climate policies affecting trade. This showed that there is a lot of legal uncertainty given current rules. WTO rules of the GATT and the SCM Agreement are most relevant for trade-restrictive climate policies. As climate change is not explicitly included in the exceptions of Article XX of the GATT, legality of a climate policy will most likely hinge on its motivation, design and implementation. Any policy is likely to be challenged and then decided in dispute settlement. The CBAM of

the EU will hence be the first example to show whether a WTO rule conform BCA can be established. Given the current Dispute Settlement crisis, any dispute might be stalled. Therefore, WTO reforms are not only needed to increase legal clarity around climate measures but also to make the DSM and thus the WTO functioning again. Topics such as BCAs will be more difficult to discuss than environmental goods or services, as they actively harm other countries' firms. Already an agreement on environmental goods and services or subsidy reform could show the potential of the WTO to support climate mitigation and adaptation. Also, reforms will potentially be at most plurilateral and not multilateral. Given the state of the climate crisis, initiatives such as the TESSD give hope that WTO members will work together to create a climate-friendly and "green" trade regime.

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