

DESIGNING BORDER CARBON ADJUSTMENTS FOR ENHANCED CLIMATE ACTION

The Paris Agreement advances a heterogeneous approach to international climate cooperation. Such an approach may be undermined by leakage—the displacement of emissions from states with more to less stringent climate policy constraints. Border carbon adjustments (BCAs) offer a promising response to leakage, but they also raise concerns about their compatibility with international trade law. This Article provides a comprehensive analysis of border carbon adjustments and proposes a way to design them that balances legal, administrative, and environmental considerations.

I. INTRODUCTION

With the adoption of the Paris Agreement,¹ the international community has formally endorsed a transition towards a more fragmented, domestically driven architecture for international climate cooperation. Although the treaty has broadened participation in the collective effort to address climate change, Parties have made pledges to reduce greenhouse gases that differ vastly in timing, nature, and scope.² Given the modest provisions on compliance and enforcement in the Paris climate regime,³ moreover, these pledges may see uneven implementation and outcomes.

Meanwhile, the cost of climate action is expected to increase as abatement measures gradually extend beyond low-hanging fruit to ensure a broader de-carbonization of the economy over the second half of this century.⁴ While the earlier Kyoto Protocol formally legitimized an asymmetry of effort between developed and developing states, the new architecture now requires all Parties to contribute towards common objectives in accordance with vastly divergent national circumstances. Its progressive ambition and transparency frameworks may help reach policy convergence in the long term,⁵ but in the near future differences in the stringency of domestic climate policies are likely to persist or even increase. In addition, participation in the international climate regime cannot be taken for granted, as evidenced by the intended withdrawal of the United States—the largest economy and historical emitter of greenhouse gases.⁶

Uncertainty and asymmetry will therefore continue to define collective climate action. Concerns about impacts on domestic economies are also likely to increase over time as the

¹ Paris Agreement on Climate Change, art. 2(1), Dec. 12, 2015, T.I.A.S. No. 16-1104 [hereinafter Paris Agreement].

² See, e.g., Pieter Pauw et al., *Beyond Headline Mitigation Numbers: We Need More Transparent and Comparable NDCs to Achieve the Paris Agreement on Climate Change*, 147 CLIMATIC CHANGE 23, 24 (2018); Edward J. Balistreri et al., *Carbon Policy and the Structure of Global Trade*, 41 WORLD ECON. 194 (2018).

³ The Paris Agreement puts in place a committee to facilitate implementation and promote compliance “that shall be expert-based and *facilitative in nature* and function in a manner that is transparent, *non-adversarial* and *non-punitive*.” Paris Agreement, *supra* note 1, art. 15(2), emphasis added.

⁴ Paris Agreement, *supra* note 1, art. 4(1).

⁵ For a discussion of the Paris Agreement’s “ratchet mechanism,” see Daniel Bodansky, *The Paris Climate Change Agreement: A New Hope?*, 110 AM. J. INT’L L. 288, 306–307 (2016).

⁶ United Nations, *Paris Agreement, United States Communication* (Aug. 4, 2017) <https://treaties.un.org/doc/Publication/CN/2017/CN.464.2017-Eng.pdf>.

financial and political consequences of climate change policies become more significant.⁷ Policies that generate an explicit carbon price, in particular, may further concerns about the comparability of climate change mitigation efforts across jurisdictions and strengthen calls to safeguard a level playing field for vulnerable industries exposed to international competition.⁸

But uneven climate change mitigation efforts may also have environmental consequences. Above all, they can favor displacement of production, investment, and fuel consumption—and thus, inevitably, of emissions—from regions with more stringent carbon constraints to those with less climate ambition.⁹ Such effects—collectively referred to as “leakage”—have been discussed as part of climate policy initiatives, such as the European Union (EU) Emissions Trading System, proposed federal climate legislation in the United States, and the forthcoming national carbon market in China. Thus far, existing policy frameworks have mostly addressed the risk of leakage with purely domestic measures to alleviate the impacts of climate action.¹⁰

A growing body of evidence suggests, however, that these measures have not performed as intended.¹¹ As Parties to the Paris Agreement engage in progressively more ambitious climate mitigation efforts, the need for more effective approaches to counteract leakage will become more acute.

Border carbon adjustments (BCAs) are a promising way to do that. Repeatedly proposed but rarely implemented, BCAs seek to achieve symmetry in the treatment of domestic and foreign products by including imports in, or exempting exports from, the scope of a climate policy constraint.¹² Calls for the introduction of BCAs first originated in industrialized countries, primarily out of concern about the lack of comparable climate commitments in developing countries and U.S. withdrawal from the Kyoto Protocol.¹³ More recently, BCAs have been invoked by both developed and developing countries, again partly in reaction to the intended exit of the United States from the Paris Agreement.

Unlike earlier—and mostly unsuccessful—efforts to introduce BCAs, these latest appeals occur in a very different context of growing policy heterogeneity, an expectation of universal and increasingly stringent climate action, and greater willingness in some countries to adopt

⁷ See Balistreri et al., *Carbon Policy and the Structure of Global Trade*, *supra* note 2; Clara Brandi, *Trade Elements in Countries' Climate Contributions under the Paris Agreement*, INTERNATIONAL CENTRE FOR TRADE AND SUSTAINABLE DEVELOPMENT 6 (2017).

⁸ See, e.g., Carbon Pricing Leadership Coalition, *What is the Impact of Carbon Pricing on Competitiveness?* (2016), 1.

⁹ See generally John Ward et al., *Carbon Leakage: Theory, Evidence and Policy Design* (Partnership for Market Readiness Technical Note 11, 2015), <http://documents.worldbank.org/curated/en/138781468001151104/pdf/100369NWP-PUBLIC-ADD-SERIES-Partnership-for-Market-Readiness-technical-papers-Box393231B.pdf>.

¹⁰ *Id.* at 37–41. Such domestic measures include output-based rebates, free allocation of emission rights, and full exemption of affected emitters, see *infra* Part III.C.

¹¹ See, e.g., Sander de Bruyn et al., *Calculation of Additional Profits of Sectors and Firms from the EU ETS 2008-2015* (2016) (documenting additional windfall profits made by industries covered by the EU ETS); Karsten Neuhoff et al., *Inclusion of Consumption of Carbon Intensive Materials in Emissions Trading: An Option for Carbon Pricing Post-2020* 3 (2016) (arguing that free allocation mutes the carbon price, as well as the uptake of mitigation options in the sectors receiving allowances).

¹² Samuel Kortum & David Weisbach, *The Design of Border Adjustments for Carbon Prices*, 70 NAT'L TAX J. 421, 422 (2017).

¹³ In 2001, the U.S. announced its withdrawal from the Kyoto Protocol, endangering its entry into force and prompting international censure. See Joanna Depledge, *Against the Grain: The United States and the Global Climate Change Regime*, 17 GLOBAL CHANGE, PEACE & SECURITY 11, 27 (2005). This subsequently gave rise to a discussion of border adjustments against the U.S., see Frank Biermann & Rainer Brohm, *Implementing the Kyoto Protocol Without the USA: The Strategic Role of Energy Tax Adjustments at the Border*, 4 CLIMATE POL'Y 289 (2005).

protectionist trade measures.¹⁴ Taken together, these trends signal both the greater urgency of—and greater challenges for—ambitious climate action compared to the past. As recent breakthroughs in climate cooperation at the international level prove highly vulnerable to national pushback, and the window to achieve the temperature stabilization goals in the Paris Agreement rapidly closes, effective policy options will both have to better withstand domestic pressures and encourage climate action by all countries.

To date, however, BCAs have not been implemented on any meaningful scale. Although they have featured in a number of policy proposals and draft legislation, including major federal bills in the United States, only California has so far actually implemented a BCA on electricity imports from neighbouring states.¹⁵ Legal uncertainties, technical challenges of implementation, and fear of political backlash have thus far deterred the adoption of BCAs.

These barriers now face a rapidly evolving legal and policy landscape, creating a window of opportunity for renewed efforts to adopt BCAs. First, trade relations are fraying due to escalating tariff conflicts and gridlock in the World Trade Organization (WTO), potentially lowering earlier sensitivity against trade-related environmental protection measures. Second, an agreed climate regime is now firmly in place, easing concerns that BCAs might disrupt delicate climate negotiations. Third, technological conditions have changed. The availability and quality of emissions data, methodologies for measuring emissions, and administrative and technical capacity for implementation have greatly improved.¹⁶

What the evolving policy context has not yet resolved, however, are the international legal concerns associated with the adoption of BCAs. These include, in particular, fears of trade retaliation and challenges before the WTO dispute settlement system, as well questions about the compatibility of BCAs with the international climate change regime. Such concerns have stymied consideration of BCAs in the past, and they continue to be invoked by opponents of unilateral climate action.

This article provides a comprehensive analysis of BCAs that addresses these legal uncertainties and advances a proposal for a BCA design that balances legal, administrative, and environmental considerations. It does so in five parts: Part III traces relevant developments in climate and trade policy. Part IIII explores the conceptual underpinnings and economic rationales for BCAs, and Part IV reviews past BCA proposals. Part V offers a thorough analysis of legal considerations affecting BCAs under international trade and climate change law. Part VI, finally, draws on the insights of this analysis to formulate guidelines for the design and implementation of BCAs. It describes a number of substantive elements and procedural steps that states can use to help harness the climate benefits of BCAs while limiting their technical complexities and legal risks.

¹⁴ See *infra* Part II.

¹⁵ See *infra* Part IV.

¹⁶ Importantly, a growing number of multi-regional input-output databases contain detailed information on the greenhouse gas footprint of traded goods and effective carbon rates in different sectors, see, e.g., Martin van de Lindt et al., *Carbon Emission Mitigation by Consumption-Based Accounting and Policy: Final Project Report* 28 (2017); Kirsten S. Wiebe et al., *Policies and Consumption-Based Carbon Emissions from a Top-Down and a Bottom-Up Perspective*, 7 *LOW CARBON ECONOMY* 21, 23 (2016); and Kirsten S. Wiebe & Norihiko Yamano, *Estimating CO₂ Emissions Embodied in Final Demand and Trade Using the OECD ICIO 2015*, OECD SCIENCE, TECHNOLOGY AND INDUSTRY WORKING PAPERS 2016/05 (2016); ongoing activities such as the recent Carbon Loophole project likewise improve transparency of carbon embedded in traded goods, see Daniel Moran et al., *The Carbon Loophole in Climate Policy: Quantifying the Embodied Carbon in Traded Products* (2018), <https://buyclean.org/media/2016/12/The-Carbon-Loophole-in-Climate-Policy-Final.pdf>.

II. THE EVOLVING CONTEXT OF INTERNATIONAL CLIMATE AND TRADE COOPERATION

Recent developments in climate cooperation have not only altered the political context for measures affecting international trade, but have also added saliency to the debate on BCAs. In December 2015, in Paris, Parties to the United Nations Framework Convention on Climate Change (UNFCCC) adopted a new international agreement to govern global climate action after the Kyoto Protocol's second commitment period elapses in 2020. The Paris Agreement entered into force in November 2016, following a historically swift ratification by a critical mass of countries (55 countries representing at least 55 percent of global emissions).¹⁷ It signals an important breakthrough for international climate cooperation, following many years of impasse over ostensibly irreconcilable domestic interests.

The Agreement aims to strengthen the global response to climate change by, *inter alia*, limiting the global average temperature increase to “well below” 2°C above pre-industrial levels¹⁸ and calling for global greenhouse gas emissions to peak “as soon as possible.”¹⁹ Central to the achievement of this objective is a bottom-up system of national climate pledges, dubbed Nationally Determined Contributions (NDCs). The content, scope, and ambition levels of these NDCs are largely up to each country to individually determine. This flexibility represents a double-edged sword, however: it was an indispensable prerequisite for securing widespread participation in the post-2020 climate regime—for the first time, an international treaty incorporates mitigation contributions from developing countries—but offers little guarantee that the aggregate country pledges will stave off the most catastrophic climate change impacts.²⁰

Unlike the UNFCCC²¹ and the Kyoto Protocol,²² the Paris Agreement does not reference trade specifically. Nevertheless, achieving its goals is likely to affect the global trade system both directly and indirectly. Indirectly, taking the required degree of action will mean a major overhaul of domestic policy towards lower-emitting production and consumption processes. This could be brought about, for instance, through the adoption of new regulations and standards; the introduction of market signals and mechanisms such as carbon pricing; and by scaling up investments in climate technology research and development. Even where they are primarily intended as domestic measures, such interventions can have significant cross-border consequences as they affect products and services imported and exported by countries. Indeed, global trade in environmental goods is already estimated at almost \$1 trillion annually and growing.²³

In addition to domestic policies with indirect trade effects, promoting the goals of the Paris Agreement could involve the adoption of numerous measures with direct trade implications, such as removal or reduction of tariffs on environmental goods and services, a reform of fossil fuel

¹⁷ Paris Agreement, *supra* note 1, Art. 21(1).

¹⁸ Paris Agreement, *supra* note 1, Art. 2(1).

¹⁹ *Id.* art. 4(1).

²⁰ See Joeri Rogelj et al., *Paris Agreement Climate Proposals Need a Boost to Keep Warming Well Below 2°C*, 354 *NATURE* 631, 631 (2016) (suggesting that the intended NDCs submitted ahead of Paris “collectively lower greenhouse gas emissions compared to where current policies stand, but still imply a median warming of 2.6–3.1 degrees Celsius by 2100”).

²¹ United Nations Framework Convention on Climate Change, May 9, 1992, S. Treaty Doc. No. 102-38, 1771 U.N.T.S. 107, art. 3(5) [hereinafter UNFCCC].

²² Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 10, 1997, U.N. Doc FCCC/CP/1997/7/Add.1, 37 I.L.M. 22, art. 2(3).

²³ U.S. Trade Representative, *Environmental Goods Agreement*, <https://ustr.gov/trade-agreements/other-initiatives/environmental-goods-agreement>.

subsidies and subsidy schemes for renewable energy technologies, or participation in cooperative approaches under a provision of the Paris Agreement²⁴ that allows trading mitigation outcomes between countries.²⁵

The Paris Agreement's universal reach, long-term goals, and dynamic ambition mechanism suggest that these and other climate actions will increase over time, eventually leading to a convergence of different countries' climate policies. At the same time, with countries beginning from very different starting points and political realities, it is likely that efforts will remain heterogeneous and asymmetrical for the foreseeable future. The built-in flexibility and bottom-up nature of the new international climate regime are well-suited to allow certain actors to move ahead with climate action even where others can, or will, not do the same. Following the announcement of the United States' intended withdrawal from the Paris Agreement, for example, key parties such as China, the EU, and India were quick to reaffirm their commitment to move ahead with the deal's implementation.²⁶ Other countries, like Brazil or Australia, may however follow the example of the United States.

Such asymmetrical climate action may have its own trade implications. In particular, there have been growing signs that some countries see trade measures, such as BCAs, as one way to "level the playing field" between those that intend to uphold or increase their climate ambition and those opting for less stringent climate policy constraints. Following U.S. President Donald Trump's election, for instance, the Mexican Undersecretary for Environmental Policy and Planning noted that carbon tariffs "are an option,"²⁷ echoing mention of BCAs in Mexico's intended NDC as a possible condition for sustained domestic climate action.²⁸ To the north of the United States, Catherine McKenna, Canada's Minister of Environment and Climate Change, suggested that BCAs deserve attention and should be considered, ideally through the WTO.²⁹ In Europe, French President Emmanuel Macron has characterized a carbon tax at the EU's borders as "indispensable" for a fair ecological transition.³⁰

²⁴ Paris Agreement, *supra* note 1, art. 6.2 & 6.4.

²⁵ These examples are drawn from: Susanne Droege et al., *The Trade System and Climate Action: Ways Forward under the Paris Agreement*, 13 S.C. J. INT'L L. & BUS. 195, 219 (2017); Brandi, *supra* note 7; and Rana Elkahwagy et al., *UNFCCC Nationally Determined Contributions: Climate Change and Trade* (2017).

²⁶ Somini Sengupta et al., *As Trump Exits Paris Agreement, Other Nations Are Defiant*, N.Y. TIMES (Jun. 1, 2017). At the July 2017 meeting of the Group of 20 (G20) in Hamburg, the U.S. also found itself largely isolated. While the G20 Declaration took note of the Trump Administration's decision to withdraw from the Paris Agreement, the rest of the G20 confirmed that the Agreement is "irreversible" and reiterated their commitment both to the deal and to past pledges related to climate finance for developing countries. G20, G20 Leaders' Declaration, *Shaping an Interconnected World* (July 7–8, 2017), ¶¶ 24–25.

²⁷ See Coral Davenport, *Diplomats Confront New Threat to Paris Climate Pact: Donald Trump*, N.Y. TIMES (Nov. 18, 2016).

²⁸ In its NDC, Mexico included a conditional emissions reduction pledge of 40 percent, subject to *inter alia* the creation of a BCA. See Mexico, *Intended Nationally Determined Contribution 2* (Mar. 30, 2015), <http://www4.unfccc.int/submissions/INDC/Published%20Documents/Mexico/1/MEXICO%20INDC%2003.30.2015.pdf>.

²⁹ See Ben Garside, *Canada's Environment Minister Calls for Consideration of Carbon Border Measures*, CARBON PULSE (Oct. 11, 2017).

³⁰ Government of France, Initiative pour l'Europe: Discours d'Emmanuel Macron pour une Europe souveraine, unie, démocratique (Sept. 28, 2017), <http://www.elysee.fr/declarations/article/initiative-pour-l-europe-discours-d-emmanuel-macron-pour-une-europe-souveraine-unie-democratique> ("Il nous faut aussi, pour réussir cette stratégie, assurer pour nos industriels les plus exposés à la mondialisation d'être sur un pied d'égalité avec les entreprises, les industries concurrentes venant d'autres régions du monde qui n'ont pas les mêmes exigences environnementales. C'est pour cela qu'il nous faut une taxe aux frontières de l'Europe sur le carbone, c'est indispensable.")

With its conscious decision to decentralize climate cooperation through reliance on nationally determined climate pledges, the Paris Agreement could be seen to legitimize heterogeneous climate action, undermining the political case for BCAs by suggesting that they are unilateral measures that contravene the cooperative spirit of the international climate regime and infringe on other countries' flexibility to choose a level of climate ambition reflective of their domestic circumstances. At the same time, however, the need to scale up climate ambition is a recurrent theme throughout the Paris Agreement, starting with its temperature stabilization objectives and the ongoing, regular process to increase action by all countries through the global stocktake and the requirement of progressively more ambitious NDCs. As will be shown in the next section, BCAs can help sustain and increase domestic climate ambition while also incentivizing other countries to take comparable action, thereby furthering the goals of the Paris Agreement. Also, BCAs can be designed and introduced in an inclusive and transparent way, better aligning with the cooperative character of the Paris Agreement.³¹

Recent developments in international trade policy have also heightened the salience of BCAs. Like international climate policy, international trade, and trade policy, have recently been in flux. WTO negotiations have largely stalled, casting doubt on the future of the Doha Development Agenda (DDA).³² In parallel, recent years have seen a surge in regional trade agreements (RTAs),³³ including so-called "mega-regional" trade agreements, which involve nations responsible for a substantial share of world trade, and which have an expansive scope that goes beyond market access to cover issues such as regulatory coherence. Similar to the WTO, however, the future of several such agreements is uncertain.³⁴ Another important development with trade policy implications is the United Kingdom's decision to leave the EU, potentially necessitating the renegotiation of over 750 bilateral trade agreements.³⁵ These developments should be seen in the context of growing dissatisfaction with globalization and rising inequality, and a sense, particularly in the developed world, that "many are being left behind."³⁶

Against this backdrop of slowing progress and even partial setbacks in the liberalization of international trade, a surge in nationalist sentiment has given rise to protectionist agendas in a number of countries. Concerns about continued offshoring of production, coupled with persistent trade deficits, have translated into populist support for economic retrenchment. These sentiments are exacerbated by rising inequality and dissatisfaction with the *status quo* in a growing number of countries.³⁷ Overall, current public opinion seems to be more sensitive to the risks of

³¹ See *infra* Part VI.F.

³² World Trade Organization, Ministerial Declaration and Decisions of 19 December 2015, WTO Doc. WT/MIN(15)/45-WT/L/980 ¶ 30 (2015).

³³ WTO, *Regional Trade Agreements: Facts and Figures* (Jan. 25, 2018), https://www.wto.org/english/tratop_e/region_e/regfac_e.htm.

³⁴ Negotiations on two such agreements, the Trans-Pacific Partnership (TPP) and the Trans-Atlantic Trade and Investment Partnership (TTIP), were impacted by the outcome of the 2016 U.S. elections. Negotiations on the TPP continued without the U.S., resulting in signature of a Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) in March 2018, whereas the TTIP was abandoned for the time being, see Matthew P. Goodman, *From TPP to CPTPP*, CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES (Mar. 8, 2018); Richard Bravo & Julia Chatterley, *Trump is Willing to Reopen TTIP Amid EU-US Trade Dispute, Ross Says*, BLOOMBERG (Mar. 29, 2018).

³⁵ Paul McClean, *After Brexit: The UK Will Need to Renegotiate at Least 759 Treaties*, FINANCIAL TIMES (May 30, 2017).

³⁶ OECD, MAKING TRADE WORK FOR ALL, *supra*, n.13, at 4.

³⁷ ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD), MAKING TRADE WORK FOR ALL 4–7 (2017).

international trade than to its benefits.³⁸ Emboldened by these trends, some governments have embraced restrictions on trade in goods and services that would not have appeared viable only a decade ago.

Acting on one of his campaign promises to renegotiate multilateral trade agreements and end trade practices that he perceived to be unfair or detrimental to the United States,³⁹ President Trump ordered tariff increases on hundreds of billions' worth of imported goods from major trade partners such as China, Mexico, Canada, and the EU, including on washing machines, solar cells, soya beans, steel, and aluminum.⁴⁰ With these actions, the United States unleashed what commentators have described as a full-blown "trade war."⁴¹ Affected trade partners sharply censured the U.S. measures and announced retaliatory tariff increases against U.S. goods, prompting an escalation of the trade conflict⁴² as well as urgent efforts at reaching a negotiated solution.

While the final outcome of these trade hostilities has yet to be seen, it is nonetheless clear that trade relations between major economies and the United States are as frayed as they have not been in a long time. Ironically, this deterioration of trade relations could expand the political opportunity space for trade-related environmental policy measures such as BCAs: with countries already engaged in unilateral trade restrictions, BCAs may lose some of their former political sensitivity.⁴³ At the same time, the rejection of global integration and multilateralism may also strengthen the free-rider dynamic that has impeded climate cooperation in the past, further underscoring the value of BCAs as a tool to both address carbon leakage and incentivize other countries to engage in the collective climate effort. How BCAs achieve these ends is explained in the next section.

III. UNDERSTANDING BORDER CARBON ADJUSTMENTS

A. Rationale and Purpose

As mentioned earlier, BCAs are an effective policy option to alleviate carbon leakage, which can occur whenever only a subset of jurisdictions takes ambitious climate action. Carbon leakage

³⁸ See Bruce Stokes, *The Public's Mixed Views on Trade*, Presentation at the OECD Trade Communications Conference, Paris, France (Apr. 23, 2017), <http://www.oecd.org/tad/events/trade-comms-conf.htm>.

³⁹ Corey R. Lewandowski, *Trump's Pro-American Trade Policy Is Just What He Promised*, THE HILL (Mar. 7, 2018).

⁴⁰ See Office of the U.S. Trade Representative, *President Trump Approves Relief for U.S. Washing Machine and Solar Cell Manufacturers* (Jan. 22, 2018); The White House, *Presidential Proclamation on Adjusting Imports of Steel into the United States* (Mar. 8, 2018); Office of the U.S. Trade Representative, *Under Section 301 Action, USTR Releases Proposed Tariff List on Chinese Products* (April 3, 2018). In doing so, the Administration has exercised statutory authorities under the Trade Expansion Act, § 232, Pub. L. No. 87-794, 19 U.S.C. Ch. 7 (1962), and the U.S. Trade Act § 301, Pub. L. No. 93-618, 19 U.S.C. § 2411 (1974).

⁴¹ Ana Swanson, *U.S. and China Brace for Impact as Tariff Deadlines Expire*, N.Y. TIMES, July 5, 2018, at B1 (citing a statement by the Chinese Ministry of Commerce, according to which the U.S. "has launched the biggest trade war in economic history so far"); see also Steve Holland & David Lawder, *Trade Dispute Escalates as Trump Threatens \$100 Billion More in China Tariffs*, REUTERS (Apr. 5, 2018).

⁴² For instance, China swiftly responded to the tariff increases with commensurate, "dollar-for-dollar" tariffs on U.S. goods, whereupon the U.S. Administration has threatened to impose an additional tariffs on \$200 billion worth of Chinese goods, see Swanson, *U.S. and China Brace for Impact*, *supra* note 41.

⁴³ Michael A. Mehling et al., *Beat Protectionism and Emissions at a Stroke*, 559 NATURE 321 (2018).

matters, because it threatens to undermine aggregate emission reductions and the environmental effectiveness of collective climate action. It can occur through a number of channels, of which three are of particular importance: changes in production cost; changes in capital flows; and changes in fossil fuel consumption.⁴⁴ Attention has mostly focused on the first channel, where differences in production cost cause substitution of goods from jurisdictions that impose carbon constraints with goods produced elsewhere. Domestic emissions will fall in the jurisdiction with carbon constraints, but part of the reductions will only occur because production—and related emissions—shift to jurisdictions with less rigorous or no mitigation measures. When climate policies affect the return on capital, they can also redirect investment to more profitable opportunities elsewhere, and that, in turn, can result in new or replaced production capacities that emit more carbon than allowed domestically. Finally, leakage can occur through displacement of fossil fuels, as reduced demand due to climate policies exerts pressure on energy prices and thereby stimulates demand elsewhere.⁴⁵

To effectively address leakage, BCAs therefore have two central functions: to “level the playing field” among competing producers, and to create political leverage for more climate action across countries. Both help avoid the foregoing leakage effects, but—as discussed below—they cannot always be separated in practice.

Mitigation policies introduced in a country that is highly integrated in international goods and capital markets will have an impact on trade flows, especially if the country is a large producer, and on domestic firms’ competitiveness if trade partners in other countries face less stringent or no carbon constraints.⁴⁶ A regulatory burden on domestic products, be it in the form of an explicit carbon price from a tax or an emissions trading system, or through other forms of climate regulation, places competitive pressure on producers if they are unable to pass through the attendant costs. Imported goods sold in the domestic market can then gain market share if they are cheaper because of weaker or absent carbon constraints. Likewise, the international market share of domestic producers can decline if competitors in those markets do not face a similar mitigation burden. BCAs can counteract both impacts by levelling the playing field.

As noted above, the second main objective of BCAs is to exert political pressure on climate laggards, as they can be used as a lever to induce climate action of trade partners.⁴⁷ This rationale is frequently explained in terms of game theory: free riding on efforts of others is an established risk when managing the global commons.⁴⁸ In the theoretical literature, a trade sanction is recommended to induce cooperative behavior from countries that would otherwise not engage.⁴⁹ Also, sanctions have been discussed as a means to ensure compliance with an international agreement.⁵⁰ Under an arrangement such as the Paris Agreement, even countries that have pledged mitigation efforts will have an incentive to default on their commitments if others are taking action. Here, too, the benefits from mitigation will still accrue to all countries equally, whether they comply with their pledges or not. If a country fails to deliver on its abatement targets, a sanction

⁴⁴ Julia Reinaud, *Issues Behind Competitiveness and Carbon Leakage: Focus on Heavy Industry*, IEA INFORMATION PAPER 3–4 (2008).

⁴⁵ Ward et al., *Carbon Leakage*, *supra* note 9, at 14–15.

⁴⁶ See generally Joseph E. Aldy, *Frameworks for Evaluating Policy Approaches to Address the Competitiveness Concerns of Mitigating Greenhouse Gas Emissions*, HARVARD PROJECT ON CLIMATE AGREEMENTS (2016).

⁴⁷ This was proposed, for instance, by Nobel Prize Laureate Joseph Stiglitz; see Joseph E. Stiglitz, *A New Agenda for Global Warming*, 3 THE ECONOMISTS’ VOICE 3 (2006).

⁴⁸ Elinor Ostrom, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION 6 (1990).

⁴⁹ Nordhaus, *Climate Clubs*, *supra* note 70, at 1347.

⁵⁰ *Id.* at 1367.

could therefore help secure compliance. While BCAs are not sanctions in any formal sense, they can still exert political leverage on laggard countries. Because the imposition of a BCA will be conditioned on climate performance, it can shift the strategic calculation of such countries and compel them to adopt more robust climate action as a way to avoid the sanction.

To achieve this twin objective, a BCA needs to be carefully designed, considering the specific propensity of a given economic context for carbon leakage, but also in light of legal and political barriers.⁵¹ Still, even a well-designed BCA may face accusations of pursuing protectionist ends. As such, BCAs risks resuscitating the long-standing debate on green protectionism.⁵² That debate has revolved around allegations that industrialized countries resort to environmental standards and other environmental policy measures as a means of limiting imports from developing countries. Given their environmental rationale, BCAs – which are based on the processes and production methods applied in the producing country⁵³ – could therefore be perceived as a disguised protectionist tool. Even where an implementing country successfully navigates the complexities of calculating, operationalizing, and ensuring the legal robustness of a BCA, it will probably not succeed at convincing all trade partners of the usefulness and justification of the measure. Political rhetoric in countries whose exports are affected by the BCA will not linger on design technicalities, but quickly pivot to arguments of equity and retaliatory measures.

All that underscores the importance of process and communication in the context of BCAs. Particular attention has to be accorded to the environmental objectives of the BCA, which should be clearly identified and leave no doubt that they exclude protectionist motivations. Similarly, the process of adopting a BCA should be as transparent as possible to trade partners, and seek inclusiveness with respect to affected stakeholders. Incorporating the discussion of BCAs in multilateral negotiations—whether on climate change or international trade—may prove the safest way to ensure these considerations are observed. Along with the legal requirements established in Part V as well as the theoretical and practical features described in the next sections, such political considerations guide the design recommendations set out in Part VI.

B. Definition and Conceptual Boundaries

In order to prevent carbon leakage, BCAs seek to alleviate the negative impacts of uneven climate efforts by levelling the resulting carbon constraint at the border. In their most elementary form, they take the shape of a tariff or other fiscal measure applied to imported goods from countries that have not taken comparable climate action.⁵⁴ Much of the political debate on BCAs has focused on border adjustments applied to imports in conjunction with domestic carbon pricing instruments, such as a carbon tax or an emissions trading system. In the case of a carbon tax, a BCA on imports would charge a covered imported good the equivalent of its carbon tax liability had it been produced domestically. In the case of an emissions trading system, a BCA would require the

⁵¹ See generally Aaron Cosbey et al., *Developing Guidance for Implementing Border Carbon Adjustments: Lessons, Cautions, and Research Needs from the Literature*, 13 REV. ENVTL ECON. & POL'Y 3 (2019).

⁵² See Walden Bello, *The Threat of Green Protectionism*, 1 BRIDGES 2 (July 1, 1997); see also Peter Holmes et al., *Border Carbon Adjustments and the Potential for Protectionism*, 11 CLIMATE POL'Y 883 (2011).

⁵³ See also *infra* Part V.A.

⁵⁴ Gary Clyde Hufbauer et al., *GLOBAL WARMING AND THE WORLD TRADING SYSTEM* 6 (2009).

domestic importers or foreign exporters of a covered good to buy emission allowances side by side with the domestic producers of the same (or similar) good.⁵⁵

While these are the most commonly discussed mechanisms, BCAs can also be implemented through the extension of other compliance obligations to imports, such as performance standards. Because border adjustments limited to imports will only affect the relative price of domestic and foreign goods in the imposing country,⁵⁶ a BCA can alternatively or cumulatively apply to exports, rebating the domestic carbon constraint through tax or regulatory relief.⁵⁷

BCAs will generally share a number of common design features. A BCA has to determine its scope and coverage, that is, specify the products and trade flows affected by it, the sectors or geographies it applies to, and the types of carbon constraints it adjusts for. Because BCAs adjust for differences in embedded carbon and applicable carbon constraints, they also have to specify the scope of included emissions and a methodology to calculate those emissions. Once embedded emissions have been determined, the level of adjustment needs to be determined, factoring in any exemptions and rebates afforded to domestic producers. Finally, decisions also need to be taken with regard to the use of collected revenues, and the potential timeline of a BCA, including its entry into force and expiration. As important as the substantive design is the process through which the BCA is adopted and implemented, which should be transparent, inclusive, and aim for fair and equitable treatment of affected producers. Such design principles are revisited and detailed further in the final section of this article.⁵⁸

Slight variations to this basic design formula exist, such as BCAs implemented at sub-national rather than national borders, an approach that has seen application in California.⁵⁹ Caution should be applied, however, to distinguish BCAs from other climate policy measures that are conceptually similar and applied at or beyond national borders. An example is the extension of domestic climate policies to activities beyond the sovereign territory of the implementing state, as occurred with the inclusion of international air travel in the scope of the EU Emissions Trading System.⁶⁰ Although of interest for the judicial determination it elicited, pursuant to which coverage of emissions from foreign aircraft in international airspace and over foreign territory does “not infringe the principle of territoriality or the sovereignty” of third states,⁶¹ the application of the EU Emissions Trading System to international aviation is not a conventional BCA. Rather than adjusting for differences in climate ambition between two jurisdictions, it subjected all emissions from air travel—both within and outside the EU’s territory—to the European carbon constraint, and merely set out a process to “consider options available in order to provide for optimal interaction” with measures in the country of origin, which “may” result in a legislative amendment to exclude such flights.⁶²

⁵⁵ Aaron Cosbey, *Border Carbon Adjustment*, in TRADE AND CLIMATE CHANGE: ISSUES IN PERSPECTIVE 19, 20 (Aaron Cosbey ed., 2008).

⁵⁶ Carolyn Fischer & Alan K. Fox, *Comparing Policies to Combat Emissions Leakage: Border Carbon Adjustments versus Rebates*, 64 J. ENVTL. ECON. & MGMT 199, 214 (2012).

⁵⁷ Kortum & Weisbach, *The Design of Border Adjustments for Carbon Prices*, *supra* note 12, at 422.

⁵⁸ See *infra* Part VI.

⁵⁹ See *infra* Part IV.B.

⁶⁰ See e.g. Jacques Hartmann, *A Battle for the Skies: Applying the European Emissions Trading System to International Aviation*, 82 NORD. J. INT’L L. 187 (2013)

⁶¹ Case C-366/10, *Air Transport Ass'n of Am. & Others v. Sec'y of State for Energy and Climate Change* ¶ 125 (2011).

⁶² See Directive 2008/101, of the European Parliament and of the Council of 19 November 2008 Amending Directive 2003/87/EC so as to Include Aviation Activities in the Scheme for Greenhouse Gas Emission Allowance Trading within the Community, 2008 O.J. (L 8) 3, art. 25a.

Policies to measure and address emissions from consumption similarly share certain features with a BCA. In an attempt to overcome shortfalls of the territorial approach to emissions accounting and mitigation, such as emissions displacement from structural change and relocation of emitting activities, these policies target emissions along the entire value chain instead of merely at the point of production.⁶³ Policies targeting consumption can restore muted policy signals along the value chain, complementing policies that operate further upstream.⁶⁴ Legislation adopted in California in October 2017 to ensure that only primary goods meeting California’s strict emission standards are eligible for public procurement—the “Buy Clean California Act”⁶⁵—is an example of a policy targeting consumption. Like BCAs, such approaches require reliable emission data and robust methods to track emissions embodied in trade and consumption.⁶⁶ In contrast to a BCA, however, they can intervene at any level between producers, intermediaries, and final consumers, and are not limited to deployment at the border. Moreover, their purpose is to reduce emissions from domestic consumption, not to offset differences in climate policy ambition across jurisdictions. On the contrary, inclusion of consumption still leaves room for application of a BCA to adjust for policy differentials.⁶⁷

A third approach conceptually similar to BCAs is a uniform tariff or customs duty deployed by a group of countries committed to an agreed level of climate policy ambition against all products imported from trading partners outside the group, irrespective of the embedded carbon content of those products.⁶⁸ This approach is based on the economic theory of “clubs,”⁶⁹ meaning voluntary groups deriving mutual benefits from sharing the costs of activities that have public-good characteristics (such as climate change mitigation). Imposed against countries which fail to join the club and meet its climate policy requirements, this approach, its proponents contend, would penalize free-riding in an effort to protect the global climate, and promote the emergence of coalitions sharing climate ambition with a high level of participation and stability. Even moderate sanctions, they argue, are sufficient to create a strategic situation in which countries acting in their self-interest will choose to enter the club and undertake emissions reductions because of the structure of the incentives.⁷⁰ Although this approach therefore shares a strategic objective of BCAs, its focus lies on overcoming barriers to climate cooperation rather than adjusting for differences in climate ambition. Accordingly, it also departs in the methods of tariff determination and application, limiting the degree of overlap. Also, as mentioned in the previous sections, BCAs are not intended to serve as sanctions, nor do they deploy related terminology.

⁶³ See generally van de Lindt et al., *Carbon Emission Mitigation by Consumption-Based Accounting and Policy*, *supra* note 16.

⁶⁴ Neuhoff et al., *Inclusion of Consumption of Carbon Intensive Materials in Emissions Trading*, *supra* note 11, at 4.

⁶⁵ 2017 Cal. Stat. ch. 816.

⁶⁶ Elena Dawkins & Simon Croft, *Consumption-based Accounting Reveals Global Redistribution of Carbon Emissions*, STOCKHOLM ENVIRONMENT INSTITUTE DISCUSSION BRIEF 1 (2017) (explaining data requirements for consumption-based emissions accounting).

⁶⁷ Neuhoff et al., *Inclusion of Consumption of Carbon Intensive Materials in Emissions Trading*, *supra* note 11, at 11.

⁶⁸ See, e.g., Dominique Bureau et al., *Trade and Climate: Towards Reconciliation*, NOTES DU CONSEIL D’ANALYSE ÉCONOMIQUE, CONSEIL D’ANALYSE ÉCONOMIQUE 11 (2017).

⁶⁹ See generally James M. Buchanan, *An Economic Theory of Clubs*, 32 *ECONOMICA* 1 (1965).

⁷⁰ See generally William Nordhaus, *Climate Clubs: Overcoming Free-riding in International Climate Policy*, 105 *AM. ECON. REV.* 1339 (2015) (noting that without sanctions against non-participants, there are no stable coalitions other than those with minimal abatement. By contrast, a regime with small trade penalties on non-participants, a climate club, can induce a large stable coalition with high levels of abatement).

C. Theoretical Analysis and Comparison of Policy Options

As discussed earlier in this part, the main justification of BCAs is the causation of emissions leakage by uneven carbon constraints. Theoretical analyses suggest that leakage under unilateral climate action can be serious enough to outweigh the benefits of such action.⁷¹ *Ex ante* simulations using computable general equilibrium and partial equilibrium models suggest the possibility of statistically significant impacts, with leakage rates—defined as foreign emissions increases in relation to domestic emission reductions—estimated in the range of 5 to 30 percent.⁷² Sectors with high energy intensity that are exposed to international trade, such as cement, steel, and aluminum, could see considerably higher leakage rates,⁷³ with some studies estimating up to 90 percent.⁷⁴

Empirical *ex post* analyses have confirmed the existence of leakage, although typically at lower rates.⁷⁵ In part, the modest leakage observed to date is owed to the low ambition of current climate policies, and the fact that sectors considered vulnerable to leakage have generally been protected through various safeguards.⁷⁶ As countries heterogeneously increase the ambition of their domestic climate policies in line with the decarbonization objectives of the Paris Agreement, however, leakage may rapidly emerge as a more serious problem. In such a scenario, pressure to address emissions leakage, especially in sectors with high energy intensity and trade exposure, would continue and even grow as carbon constraints in some countries become more stringent, or become stringent more quickly, than in others.⁷⁷

Safeguards against emissions leakage have, to date, been largely taken behind the border in the form of full or partial exemptions, rebates, and other forms of preferential treatment under domestic climate policies. In the EU Emissions Trading System, for instance, the approach chosen to prevent leakage is free allocation of emissions allowances, which has been largely successful at avoiding serious leakage.⁷⁸ In theory, free allocation should only affect the distribution of effort and not the overall environmental outcome, measured in terms of overall emissions. In practice, however, it has revealed a number of unintended effects under the EU Emissions Trading System, such as muted policy signals along the value chain, windfall profits from cost pass-through,

⁷¹ Cary Coglianese & Jocelyn D'Ambrosio, *Policymaking Under Pressure: The Perils of Incremental Responses to Climate Change*, 45 CONN. L. REV. 1411 (2008).

⁷² Christoph Böhringer et al., *The Role of Border Carbon Adjustment in Unilateral Climate Policy: Overview of an Energy Modeling Forum Study (EMF 29)*, 34 ENERGY ECON. Supp. 2, S97 (2012).

⁷³ Philippe Quirion & Damien Demailly, *Changing the Allocation Rules in the EU ETS: Impact on Competitiveness and Economic Efficiency* (Fondazione Eni Enrico Mattei Working Paper 2008.89, 2008), <http://www.feem.it/userfiles/attach/Publication/NDL2008/NDL2008-089.pdf>; Jean-Pierre Ponsard & Neil Walker, *EU Emissions Trading and the Cement Sector: A Spatial Competition Analysis*, 8 CLIMATE POL'Y 467 (2008).

⁷⁴ Yihsu Chen, *Does a Regional Greenhouse Gas Policy Make Sense? A Case Study of Carbon Leakage and Emissions Spillover*, 31 ENERGY ECON. 667 (2009).

⁷⁵ Rahel Aichele & Gabriel Felbermayr, *Kyoto and Carbon Leakage: An Empirical Analysis of the Carbon Content of Bilateral Trade*, 97 REV. ECON. & STAT. 104 (2015); Grégoire Garsous & Tomasz Kozluk, *Foreign Direct Investment and the Pollution Haven Hypothesis: Evidence from Listed Firms*, OECD ECONOMICS DEPARTMENT WORKING PAPERS NO. 2017/1379 (2017); but see Arik Levinson & M. Scott Taylor, *Unmasking the Pollution Haven Effect*, 49 INT'L ECON. REV. 223 (2008).

⁷⁶ Intergovernmental Panel on Climate Change (IPCC), CLIMATE CHANGE 2014: MITIGATION OF CLIMATE CHANGE 1163 (Ottmar Edenhofer et al. eds., 2014).

⁷⁷ Balistreri et al., *Carbon Policy and the Structure of Global Trade*, *supra* note 2, at 194.

⁷⁸ Hans Bolscher et al., *Carbon Leakage Evidence Project: Factsheets for Selected Sectors* (2013), https://ec.europa.eu/clima/sites/clima/files/ets/allowances/leakage/docs/cl_evidence_factsheets_en.pdf.

perverse incentives to increase production, and downward pressure on allowance prices.⁷⁹ Another approach to protecting vulnerable sectors, full or partial exemptions from carbon constraints, by definition limits the mitigation outcome achieved with those constraints. Where auctioning, pricing, or other forms of payments are affected, exemptions and free allocation also weaken revenue streams, which can indirectly undermine investment in mitigation and adaptation efforts.

Despite their observed shortfalls, however, such safeguards have become deeply entrenched, a dynamic reflected, for instance, in the recent negotiations on the extension of the EU and the California emissions trading systems. Although often designed to be temporary, these measures have proven resilient to change, and—absent more effective alternatives—would likely remain in place given the current context of persistent policy heterogeneity and rising protectionist pressures.

As parties to the Paris Agreement engage in progressively more ambitious climate action, the undesirable effects of these approaches will become increasingly untenable, adding to the urgency of identifying alternative responses to leakage. BCAs offer such an alternative with their promise to reduce carbon leakage without muting market signals or generating windfall profits. Much analysis has gone into assessing the effects of BCAs, with relevant studies generally acknowledging the ability of BCAs to alleviate or prevent leakage, although the extent of such benefits is difficult to predict and depends on the assessment method.

A recent survey of economic literature,⁸⁰ for instance, found that BCAs could reduce the leakage ratio by an average of 6 percent relative to a policy scenario without border adjustments. *Ex ante* modelling studies provide a range of estimates, depending on the assumptions used for factors such as price elasticity of demand, elasticity of trade substitution, returns to scale, and the technological response of individual industries. Likewise, another study comparing different modelling approaches concluded that BCAs can be effective in reducing leakage, on average reducing production losses from energy intensive and trade exposed sectors from 2.8 to 1 percent.⁸¹ It bears mentioning, however, that other studies have also suggested more modest effects⁸² and aggregate welfare losses.⁸³ Assessing the merits of BCAs relative to other policies to counteract leakage, research has found that BCAs can be significantly more effective than tax exemptions and output-based rebates because they preserve price incentives for consumers,⁸⁴ although there, too, outcomes depend on relative emissions rates, elasticities of substitution, and consumption volumes.⁸⁵

⁷⁹ See de Bruyn et al., *Calculation of Additional Profits supra* note 11; Neuhoff et al., *Inclusion of Consumption of Carbon Intensive Materials in Emissions Trading, supra* note 11.

⁸⁰ Frédéric Branger & Philippe Quirion, *Would Border Carbon Adjustments Prevent Carbon Leakage and Heavy Industry Competitiveness Losses? Insights from a Meta-Analysis of Recent Economic Studies*, 99 *ECOLOGICAL ECON.* 29 (2014).

⁸¹ Böhringer et al., *The Role of Border Carbon Adjustment, supra* note 72.

⁸² Onno Kuik & Marjan Hofkes, *Border Adjustment for European Emissions Trading: Competitiveness and Carbon Leakage*, 38 *ENERGY POL'Y* 1741 (2010).

⁸³ Niven S. Winchester et al., *Will Border Carbon Adjustments Work?* 11 *B.E. J. ECON. ANALYSIS & POL'Y* Article 7 (2011).

⁸⁴ Christoph Böhringer et al., *Unilateral Climate Policy Design: Efficiency and Equity Implications of Alternative Instruments to Reduce Carbon Leakage*, 34 *ENERGY ECON.* 208 (2012); Christoph Böhringer et al., *Cost-effective Unilateral Climate Policy Design: Size Matters*, 67 *J. ENVTL. & ECON. MGMT.* 318 (2014); Stéphanie Monjon & Philippe Quirion, *Addressing Leakage in the EU ETS: Border Adjustment or Output-based Allocation?* 70 *ECOLOGICAL ECON.* 1957 (2011).

⁸⁵ Fischer & Fox, *Comparing Policies, supra* note 56.

Aside from confirming the general effectiveness and relative benefits of BCAs, economic research yields a number of important insights for BCA design. Past work has identified indirect leakage caused by reduced fossil fuel demand and ensuing pressure on fuel prices as the most significant leakage channel, accounting for between one half and two thirds of total effects.⁸⁶ In global energy markets, the pressure exercised on fossil fuel prices in those regions that have introduced carbon constraints will stimulate demand elsewhere for the same fuels, shifting emissions across regions and weakening the aggregate mitigation effect of domestic climate action. Such indirect leakage is particularly difficult to address by way of policies, and largely eludes measures taken behind the border. This favors use of BCAs, which can include energy inputs in their scope by incorporating indirect emissions.⁸⁷ While that may not prevent displacement of fuel consumption into unrelated sectors, such as transport and residential heating, it can prevent falling input costs—and thus a *de facto* subsidy—for foreign producers benefitting from weaker or no carbon constraints.

Indirect leakage through falling fuel prices also has other implications for the design of BCAs. For instance, it favors application of a BCA to sectors with comparable production methods across jurisdictions, where the share of emissions from production outweighs the share of emissions from energy inputs.⁸⁸ One study moreover suggests that BCAs will be most effective when applied in a setting where a limited number of countries has implemented ambitious carbon constraints. In such a situation, declines in world fossil fuel prices will remain secondary to leakage through production displacement. As the group of acting countries grows, the need for and effectiveness of BCAs will eventually decline as BCAs address a diminishing leakage rate.⁸⁹

Moreover, it bears recalling that BCAs pursue a dual purpose, with the political leveraging effect an important objective alongside that of levelling uneven climate policy efforts.⁹⁰ An expanding coalition of countries with BCAs will exert greater political pressure against laggard countries to adopt their own carbon constraints,⁹¹ which, in turn, can counteract both direct leakage through production and investment relocation, as well as indirect leakage through fossil fuel displacement.

In terms of scope and coverage, a majority of leakage reduction benefits can already be obtained when a BCA is applied to major energy intensive and trade exposed sectors.⁹² Inclusion of only four products, namely cement, aluminum, steel, and electricity, has been suggested as the most economically efficient option to reduce leakage in the EU Emissions Trading System,⁹³ as it

⁸⁶ Jean-Marc Burniaux, *Carbon Emission Leakages: A General Equilibrium View*, OECD ECONOMICS DEPARTMENT WORKING PAPERS NO. 242 (2000), http://www.oecd-ilibrary.org/economics/carbon-emission-leakages_410535403555.

⁸⁷ See *infra* Part VI.B.5.

⁸⁸ Among these sectors, the most prominent example is the cement industry, which was therefore classified as a source of carbon leakage in the EU (see also Part IV.A). Production cost differentials caused by uneven climate policies can be a major factor promoting international trade in clinker and cement.

⁸⁹ Jean-Marc Burniaux et al., *Is there a Case for Carbon-Based Border Tax Adjustment? An Applied General Equilibrium Analysis*, 45 APPLIED ECON. 2231 (2012); Böhringer et al., *Cost-effective Unilateral Climate Policy Design*, *supra* note 84.

⁹⁰ See *supra* Part III.A.

⁹¹ Christoph Böhringer et al., *The Strategic Value of Carbon Tariffs*, 8 AM. ECON. J.: ECON. POL'Y 28 (2016).

⁹² Böhringer et al., *Unilateral Climate Policy Design*, *supra* note 84. See, however, Madanmohan Ghosh et al., *Border Tax Adjustments in the Climate Policy Context: CO₂ versus Broad-based GHG Emission Targeting*, 34 ENERGY ECON. S2 154 (2012), who argue that including additional greenhouse gases, such as methane, nitrous oxides, and fluorinated gases, as well as additional sectors, such as agriculture or waste, can reduce potential welfare losses under a BCA.

⁹³ Monjon et al., *Addressing Leakage in the EU ETS*, *supra* note 84.

avoids the administrative cost and trans-shipment risk associated with inclusion of goods with more complex supply chains. Extensive sectoral and gas coverage may be beneficial in theory, but can also alter the terms of trade and shift more of the burden of climate action towards developing countries,⁹⁴ which contravenes core principles of the climate and trade regimes.⁹⁵

Excluding exports from a BCA can weaken its ability to counteract leakage,⁹⁶ although most of the benefits should even accrue under a system limited to imports.⁹⁷ And finally, use of the revenue levied through a BCA significantly influences the overall effects of the BCA,⁹⁸ with application towards reducing other distortions in the economy preferable from the perspective of the implementing country, but not necessarily the most equitable or politically viable option. The foregoing considerations variously inform the recommended BCA design proposed later in this article.⁹⁹

IV. PAST PROPOSALS AND AND LESSONS LEARNED

As mentioned earlier, BCAs have been repeatedly proposed in the past, although few of these efforts advanced far in the regulatory process, and only one progressed far enough to see actual implementation. Still, the rationale, design features, and broader political context of these proposals harbor useful lessons for any future attempt to introduce a BCA. Relevant initiatives have been launched over time both in the European Union and the United States, with an early wave in Europe prompted by U.S. withdrawal from the Kyoto Protocol, a subsequent wave in the U.S. accompanying proposed federal climate legislation, and, more recently, new initiatives on both sides of the Atlantic. While the political and legal context has continued to evolve, as outlined earlier in this article,¹⁰⁰ the most important proposals are summarized in this section to infer such lessons for BCA design and implementation.

A. Europe

In 2005, the EU launched its Emissions Trading System, based on Directive 2003/87/EC,¹⁰¹ in order to pursue its emission reductions commitment under the Kyoto Protocol. The EU Emissions Trading System sets an emissions cap for greenhouse gas emissions from energy producers, industrial sectors, and some aviation activity.¹⁰² All covered emitters receive emissions allowances through a predetermined allocation procedure, which can involve free distribution or

⁹⁴ Mustafa H. Babiker & Thomas F. Rutherford, *The Economic Effects of Border Measures in Subglobal Climate Agreements*, 26 ENERGY J. 99 (2005).

⁹⁵ Böhringer et al., *The Strategic Value of Carbon Tariffs*, *supra* note 91.

⁹⁶ Branger & Quirion, *Would Border Carbon Adjustments Prevent Carbon Leakage*, *supra* note 80.

⁹⁷ Böhringer et al., *The Role of Border Carbon Adjustment*, *supra* note 72; Fischer & Fox, *Comparing Policies*, *supra* note 56.

⁹⁸ Warwick J. McKibbin et al., *The Role of Border Adjustments in a U.S. Carbon Tax*, 9 CLIMATE CHANGE ECON. 1840011-1 (2018).

⁹⁹ *See infra* Part VI.

¹⁰⁰ *See supra* Part II.

¹⁰¹ Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 Establishing a Scheme for Greenhouse Gas Emissions Allowance Trading Within the Community and Amending Council Directive 96/61/EC, 2003 O.J. (L 275) 32.

¹⁰² *Id.*, art. 9.

auctioning.¹⁰³ While emission allowances were largely allocated for free during the first trading phase (2005–2007), auctioning of allowances became the default for the electricity sector, and was set to rise from 20 per cent in 2013 to 70 percent in 2020 for industry.¹⁰⁴ This marked a significant modification of the allocation process, and led to an intense debate about how to address potential carbon leakage, including the option of measures at the border.¹⁰⁵

Since 2007, three proposals have been put forward at EU level to address carbon leakage using border measures. None has been so far applied in practice. A first informal proposal drafted by the European Commission for the third trading period (2013–2020) included a new Article 29, which set out a “Future Allowance Import Requirement.”¹⁰⁶ It would have applied to products exposed to risks of carbon leakage or unfair international competition until trade partners would commit to “binding and verifiable action to reduce greenhouse gas emissions comparable to the action taken by the Community.”¹⁰⁷ According to Article 29(2), the calculation of the BCA for imports would have taken the equivalent of the goods’ average emissions in the EU, subtracted the free allocation for its production, and multiplied that with the weight of imported goods.¹⁰⁸ In its proposed Article 29(5), the Commission also suggested an export adjustment through allowances, for which a 2 percent set-aside would have been created from EU-wide allowances. Meeting the obligation would have been possible with allowances and eligible offset credits issued under the Kyoto Protocol.¹⁰⁹

In the end, however, the option was not included in the published proposal for the third phase,¹¹⁰ let alone in Directive 2009/29/EC itself.¹¹¹ Instead, Article 10b of the Directive mandates that the Commission assess carbon leakage risks “in the light of the outcome of the international negotiations and the extent to which these lead to global greenhouse gas emission reductions,” to be accompanied by “appropriate proposals.”¹¹² Options for policy action listed in Article 10b include (1) free allocation, (2) inclusion of importers in the EU ETS, and (3) specific measures for leakage from the electricity sector.¹¹³ With the second option, the revised directive thus establishes a tentative legal basis for a BCA. Paragraph 25 of its preamble further specifies:

Energy-intensive industries which are determined to be exposed to a significant risk of carbon leakage could receive a higher amount of free allocation or an effective carbon equalisation system could be introduced with a view to putting installations from the Community which are at significant risk of carbon leakage

¹⁰³ *Id.*, art. 10–10c.

¹⁰⁴ *Id.*, art. 10 and 10c(2).

¹⁰⁵ See Harro van Asselt & Thomas Brewer, *Addressing Competitiveness and Leakage Concerns in Climate Policy: An Analysis of Border Adjustment Measures in the US and the EU*, 38 ENERGY POL’Y 42, 47–49 (2010) (discussing the rise of concerns about carbon leakage in the EU, as well as the negotiations on Directive 2009/29/EC).

¹⁰⁶ *Draft Commission Proposal for a Directive of the European Parliament and of the Council amending Directive 2003/87/EC* (Dec. 10, 2007, version 14, on file with authors).

¹⁰⁷ *Id.*, art. 29(1).

¹⁰⁸ *Id.*, art. 29(2).

¹⁰⁹ *Id.*, art. 29(6).

¹¹⁰ *Commission Proposal for a Directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to Improve and Extend the Greenhouse Gas Emission Allowance Trading System of the Community*, COM(2008) 30 final (Jan. 23, 2008).

¹¹¹ The third trading phase was put in place through Directive 2009/29/EC of the European Parliament and of the Council Amending Directive 2003/87/EC so as to Improve and Extend the Greenhouse Gas Emission Allowance Trading Scheme of the Community, 2008 O.J. (L 140) 63.

¹¹² Directive 2003/87/EC, *supra* note 101, art. 10b.

¹¹³ *Id.*, art. 10b(1).

and those from third countries on a comparable footing. Such a system could apply requirements to importers that would be no less favourable than those applicable to installations within the Community, for example by requiring the surrender of allowances. Any action taken would need to be in conformity with the principles of the UNFCCC, in particular the principle of common but differentiated responsibilities and respective capabilities, taking into account the particular situation of least developed countries (LDCs). It would also need to be in conformity with the international obligations of the Community, including the obligations under the WTO agreement.¹¹⁴

In 2009, a French “non-paper” elaborated on how this mandate could be exercised to include importers in the EU Emissions Trading System pursuant to Article 10b(1)(b) of the 2009 Directive.¹¹⁵ The non-paper set out a BCA for imports, designating it a “Carbon Inclusion Mechanism.” Export adjustments were regarded as a subject requiring further analysis. Both adjustments were to apply only to sectors at carbon leakage risk using the methodology of Article 10a(15)-(17) of the Directive.¹¹⁶ The non-paper made several references to the need for WTO compatibility of the mechanism.¹¹⁷

Specifically, it recommended two options to trigger the obligation to purchase allowances for imports, one focused on countries, the other on sectors. The first option proposed to cover countries that failed to cooperate in a future international climate agreement deemed sufficiently ambitious by the EU. The second option would have instead targeted goods from countries without a comparable approach to pricing emissions from relevant sectors. Under both options, Least Developed Countries were explicitly excluded.¹¹⁸

For the calculation of the BCA, the mechanism would have included only direct emissions from production.¹¹⁹ It would have been based on the average carbon content of the same goods produced in the EU, minus the free allocation of allowances based on product benchmarks, and multiplied by the quantity of goods imported.¹²⁰ At the time, however, very divisive negotiations about the future climate regime contributed to the decision to abandon the proposal in the political process.¹²¹

A third attempt at designing a BCA based on Article 10b(1)(b) of the Directive was circulated in another French non-paper in February 2016.¹²² It set out a BCA for the EU Emissions Trading System that would apply to imported products meeting three criteria: (1) a high carbon intensity and a significant share of total greenhouse gas emissions in Europe; (2) an easy determination of the carbon content; and (3) a limited impact on the downstream sector.¹²³ The

¹¹⁴ Directive 2009/29/EC, *supra* note 111, preamble ¶ 25.

¹¹⁵ Government of France, *Non-Paper: Mechanism for the Inclusion of Importers in the EU Emissions Quota Trading Scheme* (unpublished manuscript on file with authors, 2008).

¹¹⁶ *Id.*

¹¹⁷ *Id.*

¹¹⁸ *Id.*

¹¹⁹ *Id.*

¹²⁰ *Id.*

¹²¹ *Carbon Tariffs Falling out of Favour as Trade War Looms*, EURACTIV (Jul. 28, 2009), <https://www.euractiv.com/section/development-policy/news/carbon-tariffs-falling-out-of-favour-as-trade-war-looms>.

¹²² Government of France, *Non-Paper: Carbon Inclusion Mechanism for the Cement Sector* (unpublished manuscript on file with authors, 2016).

¹²³ *Id.*

introduction would be gradual, for example in sectors with a low trade impact. It also suggested a simplified implementation process, which would require an amendment to the Directive 2009/29/EC.¹²⁴

A suggested test sector was the cement industry. The non-paper states that the cause of leakage in this sector, namely imports of cheaper clinker or cement into the EU, could be addressed more directly by a BCA.¹²⁵ Further, the proposal illustrates how implementation might work, from using the existing Single Administrative Document of EU customs services, to calculating the volume of allowances needed for imports and synchronizing the surrendering of allowances. This would end with the potential magnitude of import volumes (around 1 percent of EU trade) and a visualization of the process.¹²⁶

While the European Parliament was deliberating amendments to the EU Emissions Trading System for the fourth phase (2021–2030) in December 2016, the Committee on Environment, Public Health and Food Safety took up the proposal and included it in the overall reform package for the system.¹²⁷ The package was subject to a plenary vote in February 2017, however, at which point the European Parliament rejected the proposal.¹²⁸ Legal uncertainty and risk of discrimination in downstream and export markets had contributed to opposition against a BCA, with the final outcome retaining free allowance allocation to the cement sector instead.¹²⁹

B. United States

In the United States, calls for some form of BCA originated from profound concerns about the impacts of climate action on the domestic economy, notably manufacturing, if other parts of the world were not to adopt similar efforts. The Senate passed an unanimous resolution in 1997 declaring that the United States should not join any climate agreement that would “result in serious harm to the U.S. economy” or impose limits on greenhouse gas emissions unless it mandates similar limits for developing countries.¹³⁰ Citing similar concerns, the administration of President George W. Bush never submitted the Kyoto Protocol for ratification, and President Donald Trump likewise invoked potential harm to the U.S. economy, including job losses and declining industrial output, when he announced his intention to withdraw from the Paris Agreement.¹³¹

1. National Level: Proposals for Federal Legislation

In 2008–2009, at the end of the Bush administration, BCAs came to the forefront of the U.S. debate on climate policy following changes in the 2006 midterm elections. BCAs were first proposed in

¹²⁴ *Id.*

¹²⁵ *Id.*

¹²⁶ *Id.*

¹²⁷ European Parliament Committee on the Environment, Public Health and Food Safety, Report on the Proposal for a Directive of the European Parliament and of the Council Amending Directive 2003/87/EC to Enhance Cost-Effective Emission Reductions and Low-Carbon Investments (COM(2015)0337 – C8-0190/2015 – 2015/0148(COD)), Amendment 12.

¹²⁸ See *European Parliament Adopts Draft Reform of Carbon Market Post-2020*, REUTERS (Feb. 15, 2017).

¹²⁹ *Carbon Market Reform Vote Puts EU Cement Sector in the Spotlight*, EURACTIV (Feb. 10, 2017), <https://www.euractiv.com/section/climate-environment/news/carbon-market-reform-vote-puts-eu-cement-sector-in-the-spotlight>.

¹³⁰ Byrd-Hagel Resolution, S. Res. 98, 105th Cong. (1997).

¹³¹ See White House, Statement by President Trump on the Paris Climate Accord (June 1, 2017).

2007 by the company American Electric Power, supported by one of the largest labor unions, the International Brotherhood of Electric Workers. Both sought to craft a proposal that would be compatible with WTO rules and, ideally, would “never take effect,”¹³² as it would induce other countries to take stronger action in climate change mitigation. A variety of climate bills in the Congress subsequently included provisions that required importers to surrender allowances, in anticipation of the loss of competitiveness and American jobs—especially to China.¹³³ None of them made it through the legislative process, with the American Clean Energy and Security Act sponsored by Representatives Henry A. Waxman and Edward J. Markey coming closest.

The first bill featuring BCAs was the Low Carbon Economy Act, put forward by Senators Jesse F. Bingaman and Arlen Specter in 2007.¹³⁴ The next bill, the 2008 Climate Security Act, suggested the establishment of an International Reserve Allowance Program,¹³⁵ which would require U.S. importers of covered goods from covered countries to purchase international reserve allowances from a separate pool of allowances. The American Clean Energy and Security Act, passed by the House of Representatives in 2009, also included a provision on border adjustment measures.¹³⁶

A comparison of the proposals yields several insights. First, the proposed coverage of goods slowly expanded. Initially, various bills applied to energy-intensive primary goods (e.g., cement, iron and steel, aluminum), which are used in the manufacturing of other products. Then, under various bills submitted after the 2008 version of the Climate Security Act, it became possible to apply the requirement to consumer goods. The international reserve allowance program in the 2009 American Clean Energy and Security Act covered goods from “eligible industrial sectors.” In addition, the bill also applied to manufactured items for consumption.

In terms of country coverage, early bills suggested applying the BCA only to countries that had not taken “comparable action” or that were not exempted because of low development or low emissions. The final version of the 2008 Climate Security Act included a more stringent “comparable action” test, effectively requiring any foreign country to adopt the same kind of greenhouse gas emission caps as the United States. However, this stringency was moderated by a provision for those countries that did not reduce or limit their emissions to the same extent, but still had policies and/or legislation in place to limit greenhouse gases. The clause covered a broad range of activities, but did not indicate what level of climate effort would be considered sufficient. It was also unclear how policies with quantified emission reduction objectives would be compared to other policies of a more qualitative nature, such as voluntary agreements or subsidies for renewable energy. Similarly, it was unclear how the program would deal with policies aimed at long-term emission reductions.¹³⁷

Another difference in the bills concerned the *authority* to decide whether other countries were taking comparable action, which was initially delegated to the President. Some of the later bills authorized a new body—the International Climate Change Commission—to make this evaluation.

¹³² Andrew W. Shoyer, *Comment*, in CLIMATE CHANGE, TRADE, AND COMPETITIVENESS: IS A COLLISION INEVITABLE? 60 (Lael Brainard & Isaac Sorkin eds., 2008).

¹³³ See also van Asselt & Brewer, *Addressing Competitiveness and Leakage Concerns in Climate Policy*, *supra* note 105.

¹³⁴ S. 1766, 110th Cong. (2007).

¹³⁵ S. 2191, 110th Cong. (2007).

¹³⁶ H.R. 2452, 111th Cong. (2009).

¹³⁷ Trevor Houser et al., LEVELING THE CARBON PLAYING FIELD: INTERNATIONAL COMPETITION AND U.S. CLIMATE POLICY DESIGN 39 (2008).

The 2009 American Clean Energy and Security Act, as passed by the House, did not include a definition of “comparable action,” but followed the basic logic of other bills by exempting countries with low emissions, a low level of development, or that met certain standards specified in the bill’s definition of “comparable action.” These would have required third countries to: have economy-wide emission caps in place; enter into a sectoral bilateral or multilateral agreement with the United States; or have a lower sectoral energy or greenhouse gas intensity than the United States.

Concerning the calculation of the BCA, in most bills the basis for defining the number of reserve allowances required for imports consisted of a formula considering: (1) the national greenhouse gas intensity rate in a covered country for a category of covered goods; (2) an adjustment factor for the allowances that were allocated free of charge in the United States; and (3) an economic adjustment ratio for foreign countries.

Finally, the bills differed with regard to the date of entry into effect of the measure. While the Low Carbon Economy Act targeted 2020, the implementation date was gradually moved up in subsequent bills. The American Clean Energy and Security Act version passed by the House moved this date to 2020 again. The President had much less discretion over BCA applications, and could only decide against implementing the measure together with Congress. The gap between enactment and the start of the program would have allowed time for potentially affected countries to develop and implement domestic climate change mitigation policies, and also for international climate change negotiations to deliver results.¹³⁸

After the American Clean Energy and Security Act failed to reach a vote in the Senate, legislative activity on climate change lost much of its political momentum. While several further bills addressing specific aspects of climate change were proposed in the following years, few had the scope – and none the political support – of the bills introduced in the 110th and 111th Congress. Accordingly, the need to counteract leakage and safeguard competitiveness was seen as less urgent, and corresponding proposals are therefore fewer and less elaborate. Several such bills focused on a specific climate policy instrument: a carbon tax or fee. In July 2018, for instance, Representative Carlos Curbelo introduced a bill to introduce a federal carbon tax coupled with a BCA for imports and exports.¹³⁹

If adopted, it would have eliminated the federal excise tax on gasoline and diesel fuel in favor of a carbon tax levied on fossil fuels and certain industrial facilities and products, with revenue earmarked to fund infrastructure projects, such as modernization of the highway network. At the same time, it would have curtailed executive powers to regulate greenhouse gas emissions from stationary sources and would have authorized the Department of the Treasury to introduce a BCA. Importers of goods with high trade and carbon intensity would have been liable to a tax equivalent to the domestic carbon tax, while exporters of such goods would have received commensurate rebates.¹⁴⁰

While the BCA in this bill would have echoed several elements of the earlier proposals before the 110th and 111th Congress, such as the exemption of Least Developed Countries and the inclusion of a *de minimis* clause, it would not have accounted for the level of climate ambition in affected countries. Instead, it placed particular emphasis on process—including early notification—and its environmental objectives, described in the bill as promotion of “a strong

¹³⁸ *International Aspects of a Climate Change Cap and Trade Program: Hearing Before the Sen. Committee on Finance*, 110th Cong. 47 (2008) (statement of Jennifer A. Haverkamp, Senior Counsel, Env't. Defense Fund).

¹³⁹ H.R. 6463, 115th Cong. (2018).

¹⁴⁰ *Id.*, Sec. 9912(2).

global effort to significantly reduce greenhouse gas emissions” and prevention of carbon leakage.¹⁴¹ Although the bill generated some debate because of its Republican sponsor, it never was brought to a vote in Committee.

Given the continued challenge of advancing climate legislation in a divided Congress, proposals for a federal BCA have also been fielded by civil society. On February 8th, 2017, the Climate Leadership Council—a think tank dedicated to promoting a carbon tax—released a policy proposal that included a BCA. Titled *The Conservative Case for Carbon Dividends*, it called for the introduction of a gradually increasing carbon tax applied upstream to fossil fuels, dividing the tax proceeds equally, and returning them to the public as a “carbon dividend” in the form of direct payments. Under the proposal, this tax would be accompanied by the establishment of BCAs for the carbon content of both imports and exports. Existing climate regulations would also be eliminated, as they would be rendered unnecessary by the carbon tax.¹⁴²

For its authors, the plan offered a single solution to multiple problems: the border adjustment would address free riding and compel other countries to follow suit; and the progressive nature of its dividends would help reduce inequality and redirect populist energy with political victories across the aisle that could help bridge divisions.¹⁴³ Exports from “sectors with greater than 5% energy cost in final value should have any carbon taxes rebated,” and “non-emissive fossil fuel products” should be exempt, with a refund for any tax previously paid.¹⁴⁴ An analysis of carbon price levels required to achieve meaningful mitigation, however, did not assume significant impacts in terms of emissions from the BCA, based on an assumption “that the border adjustments broadly cancel each other out in terms of emissions.”¹⁴⁵

BCAs could see a resurgence in the wake of discussions on a “Green New Deal”, which couples environmental concerns with calls for social justice and more equal distribution of wealth. A resolution introduced early in the 116th Congress by Representative Alexandria Ocasio-Cortez, for instance, calls for “enacting and enforcing trade rules, procurement standards, and border adjustments with strong labor and environmental protections ... to stop the transfer of jobs and pollution overseas.”¹⁴⁶ While a corresponding resolution introduced by Senator Edward J. Markey failed to pass a vote in the Senate, the “Green New Deal” discussion illustrates how populist calls for economic retrenchment and the perceived need for stronger action on climate change combine to generate political support for BCAs, as argued earlier in this article.¹⁴⁷

2. Subnational Level: California

At the subnational level, California—the second largest greenhouse gas emitter among U.S. states¹⁴⁸—has also explored the use of a BCA as part of its climate policy framework. Based on a

¹⁴¹ *Id.*, Sec. 9911(a).

¹⁴² James A. Baker, III et al., *THE CONSERVATIVE CASE FOR CARBON DIVIDENDS 1* (2017), <https://www.clcouncil.org/media/TheConservativeCaseforCarbonDividends.pdf>.

¹⁴³ *Id.*

¹⁴⁴ *Id.*

¹⁴⁵ David Bailey & David Bookbinder, *A WINNING TRADE: HOW REPLACING THE OBAMA-ERA CLIMATE REGULATIONS WITH A CARBON DIVIDENDS PROGRAM STARTING AT \$40/TON WOULD YIELD FAR GREATER EMISSIONS REDUCTIONS 5* (2017), https://www.clcouncil.org/wp-content/uploads/2017/02/A_Winning_Trade.pdf.

¹⁴⁶ Recognizing the Duty of the Federal Government to Create a Green New Deal, H.R. Res. 109, 116th Cong. (2019), Sec. 4(k).

¹⁴⁷ *See supra* Part II.

¹⁴⁸ U.S. ENERGY INFORM. ADMIN., *ENERGY-RELATED CARBON DIOXIDE EMISSIONS AT THE STATE LEVEL, 2000-2014* (2017), <https://www.eia.gov/environment/emissions/state/analysis/pdf/stateanalysis.pdf>.

mandate set out in the Global Warming Solutions Act of 2006,¹⁴⁹ the California Air Resources Board (CARB) launched a comprehensive emissions trading system in 2013.¹⁵⁰ California was concerned about the economic and environmental implications of this measure, and therefore included a statutory mandate to minimize emissions leakage.¹⁵¹ In addition to free allocation for industrial facilities, CARB Resolution 10-42 directed its staff to review the technical and legal issues related to a BCA for the cement sector,¹⁵² which resulted in the identification of three specific options. Although these have not been adopted to date,¹⁵³ their discussion allowed weighing the benefits and drawbacks of each option, such as administrative complexity, flexibility, and consistency.

In the electricity sector, by contrast, California has to account for emissions associated with imported power. Accordingly, electricity importers—the “first deliverers” of imported electricity—are liable for the emissions associated with electricity generated in sources outside California, provided that state does not have an emissions trading system linked to California’s one.¹⁵⁴ Additionally, the rules declare all emissions reported for imported electricity from unspecified sources to be above the coverage threshold, and apply a default emissions factor multiplied by a transmission loss correction factor.¹⁵⁵ Because California forms part of a physically interconnected electricity system—the Western Interconnection—and imports around one third of its power from neighboring states, these provisions have significant relevance in practice.

A specific challenge California had to face is “resource shuffling,” occurring where entities lower their compliance obligation by substituting electricity with a lower carbon intensity for electricity with higher carbon intensity, swapping the related contract or ownership arrangement, and selling the electricity with higher carbon intensity in states without the emission constraints imposed in California.¹⁵⁶ Not only is this a particular form of leakage in the electricity sector that undercuts emissions reductions in California, but it also allows electricity importers to avoid compliance with BCA provisions. While difficult to regulate, this practice has been addressed by

¹⁴⁹ A.B. 32, 2006 Leg. (Cal. 2006) (codified at Cal. Health & Safety Code §§ 38500–38599 (West 2011)).

¹⁵⁰ CAL. CODE REGS. tit. 17, §§ 95800–96023 (2011).

¹⁵¹ A.B. 32, 2006 Leg. (Cal. 2006) (codified at CAL. HEALTH & SAFETY CODE §§ 38500–38599, §38505(j) (West 2011)).

¹⁵² CAL. AIR RES. BD., Res. 10–42 (Dec. 16, 2010).

¹⁵³ CAL. AIR RES. BD., CALIFORNIA CAP-AND-TRADE PROGRAM: POTENTIAL BORDER CARBON ADJUSTMENT FOR THE CEMENT SECTOR (Feb. 5, 2014), <https://www.arb.ca.gov/cc/capandtrade/meetings/020514/border-carbon-adjustment.pdf>.

¹⁵⁴ CAL. CODE REGS. tit. 17, §95852(b): “First Deliverers of Electricity. A first deliverer of electricity covered under sections 95811(b) and 95812(c)(2) has a compliance obligation for every metric ton of CO₂e emissions calculated pursuant to section 95852(b)(1) for which a positive or qualified positive emissions data verification statement is issued pursuant to MRR, or for which there are assigned emissions, when such emissions are from a source in California or in a jurisdiction where a GHG emissions trading system has not been approved for linkage by the Board pursuant to Subarticle 12.”

¹⁵⁵ CAL. CODE REGS. tit. 17, §95812(c)(2)(B), reads: ‘Electricity importers. The applicability threshold for an electricity importer is based on the annual emissions from each of the electricity importer’s sources of delivered electricity. All emissions reported for imported electricity from specified sources of electricity that emit 25,000 metric tons or more of CO₂e per year are considered to be above the threshold.’ §95812(d)(2) specifies that ‘The threshold for an electricity importer of specified source of electricity is zero metric tons of CO₂e per year and for unspecified sources is zero MWhs per year as of January 1st 2015.’

¹⁵⁶ CAL. CODE REGS. tit. 17, §95802(a)(338), defines resource shuffling as: “any plan, scheme, or artifice undertaken by a First Deliverer of Electricity to substitute electricity deliveries from sources with relatively lower emissions for electricity deliveries from sources with relatively higher emissions to reduce its emissions compliance obligation.”

updating the regulatory framework, which expressly proscribes resource shuffling, and sets out a detailed list of permitted (“safe harbor”) practices.¹⁵⁷

In 2017, the California legislature considered options to extend the emissions trading framework beyond its current end date of 2020. A proposal introduced in the State Senate¹⁵⁸ would have required importers of covered products to surrender allowances “equal to the lifecycle greenhouse gas emissions” associated with the product. In the end, however, the California legislature endorsed a different bill, Assembly Bill 398, which authorizes the continuation of the California emissions trading system from 2021 to 2030.¹⁵⁹ Adopted with a substantial majority, this legislation retains the system of free allocation currently in place, and merely requests CARB to submit, by December 31st, 2025, recommendations on necessary changes to reduce leakage, including on a potential BCA.¹⁶⁰

V. REQUIREMENTS FOR BCAs UNDER INTERNATIONAL LAW

A. *BCAs and International Trade Law*

International trade law is regularly invoked as a reason not to adopt BCAs,¹⁶¹ and much ink has been spilled on whether, and under which conditions, BCAs could be compatible with WTO law.¹⁶² In this section, we analyze the implications of international trade law for BCA design. We first examine whether and under which conditions BCAs can be compatible with the non-discrimination obligations of the General Agreement on Tariffs and Trade (GATT),¹⁶³ and then discuss their possible justification under the GATT’s environmental exceptions. Turning to export-oriented BCAs, we also briefly discuss the role of the WTO Agreement on Subsidies and Countervailing Measures.¹⁶⁴ Our analysis reveals an important and underappreciated point—that

¹⁵⁷ CAL. CODE REGS. tit. 17, §95852(b)(2), reads: “Resource shuffling is prohibited and is a violation of this article.”

¹⁵⁸ S.B. 775, 2017-2018 Leg. (Cal. 2017).

¹⁵⁹ S.B. 398, 2017-2018 Leg. (Cal. 2017), (codified at CAL. HEALTH & SAFETY CODE §§ 38500–38599 (West 2017)).

¹⁶⁰ *Id.*, §38562 (c)(2)(I).

¹⁶¹ See e.g. *India Threatens WTO Case against Proposed ‘Carbon Border Taxes’*, BRIDGES (Mar. 31, 2010).

¹⁶² See e.g. Ross Astoria, *Design of an International Trade Law Compliant Carbon Border Tax Adjustment*, ARIZ. J. ENVTL. L. & POL’Y 491 (2015); Javier de Cendra, *Can Emissions Trading Schemes be Coupled with Border Tax Adjustments? An Analysis vis-à-vis WTO Law*, 15 REV. EUR. COMM. & INT’L ENVTL. L. 131; Kasturi Das, *Can Border Carbon Adjustments Be WTO-Legal?*, 8 MANCHESTER J. INT’L ECON. L. 65 (2011). Gavin Goh, *The World Trade Organization, Kyoto and Energy Taxes at the Border*, 38 J. WORLD TRADE 395 (2004); Kateryna Holzer, *CARBON-RELATED BORDER ADJUSTMENT AND WTO LAW* (2014); Roland Ismer & Karsten Neuhoff, *Border Tax Adjustment: A Feasible Way to Support Stringent Emission Trading*, 24 EUR. J. L. & ECON. 137 (2007); Joost Pauwelyn, *US Federal Climate Policy and Competitiveness Concerns: The Limits and Options of International Trade Law* (2007); Joost Pauwelyn, *Carbon Leakage Measures and Border Tax Adjustments under WTO Law*, in RESEARCH HANDBOOK ON ENVIRONMENT, HEALTH AND THE WTO 448 (Denise Prevost & Geert Van Calster eds., 2013); Ludivine Tamiotti, *The Legal Interface between Carbon Border Measures and Trade Rules*, 11 CLIMATE POL’Y 1202 (2011); Joel Trachtman, *WTO Law Constraints on Carbon Credit Mechanisms and Export Border Tax Adjustments*, in RESEARCH HANDBOOK ON CLIMATE CHANGE AND TRADE LAW 109 (Panagiotis Delimatsis ed., 2017).

¹⁶³ General Agreement on Tariffs and Trade, Oct. 30, 1947, 61 Stat. A-11, 55 U.N.T.S. 194, as incorporated in General Agreement on Tariffs and Trade 1994, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1A, 1867 U.N.T.S. 187 [hereinafter GATT].

¹⁶⁴ Agreement on Subsidies and Countervailing Measures, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1A, 1867 U.N.T.S. 14 [hereinafter ASCM].

the legal validity of any BCA depends on its specific design features and the modalities of its application and implementation.

1. GATT Non-Discrimination Obligations

The GATT contains two central obligations related to non-discrimination: Article III (“national treatment”) and Article I (“most-favored nation treatment”). Before turning to these provisions, however, we first discuss whether BCAs can be captured by the broader concept of border tax adjustment (BTA) in GATT Article II:2(a).

a. Border Tax Adjustment

A BCA is, in essence, a climate-related variant of a BTA, which is based on the idea that a country may impose domestic taxes and charges on imports, and exempt or reimburse them on exports.¹⁶⁵ The underlying aim is to ensure trade neutrality of domestic taxation. Conceptually, BTAs originate in the destination principle of taxation, according to which a product is taxed where it is consumed, rather than where it is produced.¹⁶⁶ An important resource for understanding BTA provisions under the GATT is the *Report of the Working Party on Border Tax Adjustments*.¹⁶⁷ For the purpose of its analysis, the Working Party drew on a definition of BTAs by the Organisation for Economic Co-operation and Development (OECD).¹⁶⁸ The Working Party clarified that the main reference points in the GATT for BTAs on imports were Articles II and III.

GATT Article II provides that imports shall “be exempt from all other duties or charges of any kind.”¹⁶⁹ If a BCA qualifies as such an import charge, it violates Article II. According to GATT Article II:2(a), however, Parties may impose a charge on an imported product, provided it is equivalent to an internal tax the relevant Parties already impose on “like” domestic products or on an article from which the imported product has been produced in whole or in part.¹⁷⁰ To escape the scrutiny of Article II, a BCA thus has to be designed so that its imposition is not triggered by the importation act as such, but rather by an “internal factor” (e.g., the internal sale of the product).¹⁷¹

GATT Article III:2 further specifies that imports “shall not be subject, directly or indirectly, to internal taxes or other internal charges of any kind in excess of those applied, directly or indirectly, to like domestic products.”¹⁷² The Working Party dwelled upon the phrase “directly or indirectly” as enshrined in Article III:2, and concluded that taxes directly levied on products are

¹⁶⁵ See GATT, *Border Tax Adjustments: Report of the Working Party*, L/3464, B.I.S.D. 18S/97 (Dec. 2, 1970) [hereinafter Working Party Report].

¹⁶⁶ OECD, *International VAT/GST Guidelines: Guidelines on Neutrality* ¶¶ 1 & 5 (2011).

¹⁶⁷ Working Party Report, *supra* note 165. The Working Party was constituted to understand the scope and application of BTAs, and the report was adopted by the GATT Parties in 1970.

¹⁶⁸ The Working Party Report cites a 1968 OECD report definition of BTAs “as any fiscal measures which put into effect, in whole or in part, the destination principle (i.e. which enable exported products to be relieved of some or all of the tax charged in the exporting country in respect of similar domestic products sold to consumers on the home market and which enable imported products sold to consumers to be charged with some or all of the tax charged in the importing country in respect of similar domestic products).” See Working Party Report, *supra* note 165, ¶ 4.

¹⁶⁹ GATT, *supra* note 163, art. II:1(b).

¹⁷⁰ *Id.* art. II:2(a).

¹⁷¹ Appellate Body Report, *China—Measures Affecting Imports of Automobile Parts*, WT/DS339/AB/R, WT/DS340/AB/R, & WT/DS342/AB/R ¶ 161 (12 January 2009).

¹⁷² GATT, *supra* note 163, art. III:2.

eligible for a BTA, as are indirect taxes, provided they are levied on *products*.¹⁷³ The Working Party did not reach a conclusion, however, on whether BTAs are allowed for taxes imposed only on inputs physically incorporated in the final product or inputs that are exhausted in the production process, including taxes based on the energy consumed in the manufacturing process. The Working Party merely noted that “there was a divergence of views with regard to the eligibility for adjustment of certain categories of tax,”¹⁷⁴ such as “*taxes occultes*,” which encompass consumption taxes on capital equipment, auxiliary materials and services used in the transportation and production of other taxable goods, as well as taxes on advertising, energy, machinery, and transport.

Neither the GATT nor the WTO dispute settlement bodies have had an occasion to resolve this issue. The only relevant precedent is the GATT Panel decision in the *U.S.—Superfund* case.¹⁷⁵ This involved the United States’ Superfund Act, under which the United States levied taxes on imports of certain chemicals and the end-products using those chemicals as inputs. The Panel concluded that taxes on substances used in the composition of the final product could be adjusted at the border. In this particular case, however, it remained unclear whether those substances were still physically present in the final product, or whether they had been exhausted in the production process, and the Panel made no distinction to that effect.¹⁷⁶ Thus, the jury is still out on whether a BTA is permissible for taxes imposed on an input not physically incorporated in the final product, as would be the case with a BTA for energy inputs.¹⁷⁷ It would ultimately depend on how broadly any future WTO dispute settlement body interprets the terms of Article II:2(a) and Article III:2 of the GATT.¹⁷⁸

The situation is even less settled for BCAs linked to emissions trading systems, as these raise the additional question of whether the requirement to purchase emission allowances constitutes an adjustable tax or charge covered by Article III:2, or an internal regulation under Article III:4. Because it is compulsory and unrequited, the duty to purchase and surrender allowances can arguably be viewed as an adjustable internal tax.¹⁷⁹ This argument is most convincing if emission allowances are auctioned, but even if they are handed out for free they create an opportunity cost for those who receive them.¹⁸⁰ Nonetheless, it remains distinctly possible that a WTO dispute settlement body would find that the inclusion of importers in an emissions trading system falls under Article III:4.

¹⁷³ Working Party Report, *supra* note 165, ¶ 14.

¹⁷⁴ *Id.* ¶ 15.

¹⁷⁵ GATT Panel Report, *United States—Taxes on Petroleum and Certain Imported Substances*, B.I.S.D. 34S/136 (Jun. 17, 1987).

¹⁷⁶ Committee on Trade and Environment, *Taxes and Charges for Environmental Purposes—Border Tax Adjustment*, WT/CTE/W/47 ¶ 70 (May 2, 1997).

¹⁷⁷ Holzer notes the literature is divided on the issue, but nonetheless finds that “a carbon tax can be viewed as one that applies to the product, and is therefore adjustable at the border. Holzer, CARBON-RELATED BORDER ADJUSTMENT, *supra* note 162, at 103.

¹⁷⁸ However, the carbon tax could arguably be based on the carbon content of a product, as long as it is linked to the product itself. See Jennifer Hillman, *Changing Climate for Carbon Taxes: Who’s Afraid of the WTO?* 6 (2013) (“While the amount of the tax would reflect the amount of carbon dioxide emitted during production, because it would be assessed on the product itself, the tax should be considered an indirect tax fully eligible for border adjustment for imports.”).

¹⁷⁹ See e.g. De Cendra, *an Emissions Trading Schemes be Coupled with Border Tax Adjustments?*, *supra* note 162, at 135–136.

¹⁸⁰ See e.g. Jos Sijm et al., *CO₂ Cost Pass-through and Windfall Profits in the Power Sector*, 6 CLIMATE POL’Y 50 (2006).

In short, it remains unclear what the legal status of BCAs would be under the GATT and, accordingly, which requirements a measure would need to meet. BCAs could qualify as a “border tax adjustment” under Article II:2(a) if a WTO dispute settlement body rules that an adjustment is possible on the basis of energy consumed in the production process. But even if this were the case, questions remain for BCAs related to emissions trading systems, which could either be deemed a tax or charge under Article III:2 or an internal regulation under Article III:4.

b. National Treatment

Assuming the BCA is considered a BTA under GATT Article II:2(a), meaning it can be considered an adjustable tax, it would still need to abide by the national treatment requirements of Article III:2 of the GATT, which are aimed at ensuring that imported products are not discriminated *vis-à-vis* “like” domestic products. This essentially requires the following two conditions to be satisfied: (1) imports are not charged, either directly or indirectly, “in excess of” those applied on “like” domestic products; and (2) internal taxes or other internal charges are not applied to imported or domestic products in a manner that affords “protection to domestic production.”¹⁸¹

The first condition draws attention to the notion of “like products,” a central issue for the determination of WTO compatibility of BCAs.¹⁸² By way of example: can aluminum produced using electricity generated from coal be treated “like” aluminum produced using electricity from natural gas or renewable energy, even if the carbon footprint of the former is much higher than that of the latter? As per GATT/WTO jurisprudence, the following criteria may be taken into account when determining “like” products, on a case-by-case basis:¹⁸³

- the products’ properties, nature, and quality, i.e. the physical features of the products;¹⁸⁴
- the products’ end-uses in a given market, i.e. the extent to which they are capable of serving the same or similar end-uses;¹⁸⁵
- consumers’ tastes and habits, i.e. the extent to which consumers perceive and treat the products as alternative means of performing the same function(s) in order to satisfy a particular want or demand;¹⁸⁶ and
- the international classification of the products for tariff purposes¹⁸⁷ (e.g., the Harmonized System Codes commodity classification).

Any determination of “like” products should ideally take into account all the criteria, even if they provide “conflicting indications.”¹⁸⁸ Moreover, the list of criteria should not be considered exhaustive, as other elements could be taken into account by a WTO dispute settlement body when deciding on the likeness of products.¹⁸⁹ Furthermore, any WTO dispute settlement body is likely

¹⁸¹ GATT, *supra* note 163, art. III:2 & art. III:1.

¹⁸² Aside from the “like products” question in GATT Article III, the issue also arises in the context of Article I. See *infra* Part V.1.A.iii.

¹⁸³ Appellate Body Report, *European Communities—Measures Affecting Asbestos and Asbestos-Containing Products*, WT/DS135/AB/R ¶ 101 (Apr. 5, 2001) [hereinafter AB Report, *EC—Asbestos*].

¹⁸⁴ Working Party Report, *supra* note 165, ¶ 18. See also Appellate Body Report, *Canada—Certain Measures Concerning Periodicals*, WT/DS31/AB/R 21–22 (Jul. 30, 1997).

¹⁸⁵ Working Party Report, *supra* note 165, ¶ 18.

¹⁸⁶ *Id.*

¹⁸⁷ Appellate Body Report, *Japan—Taxes on Alcoholic Beverages*, WT/DS8/AB/R, WT/DS10/AB/R, & WT/DS11/AB/R 22 (Oct. 4, 1996) [hereinafter AB Report, *Japan—Alcoholic Beverages II*].

¹⁸⁸ AB Report, *EC—Asbestos*, *supra* note 183, ¶¶ 109 & 120.

¹⁸⁹ *Id.* ¶ 102.

to have some discretion in determining the likeness of products.¹⁹⁰ While some have argued that low-carbon and carbon-intensive products can be presumed to not be “like” products,¹⁹¹ ultimately, any decision will depend on the specific circumstances of each case,¹⁹² as well as on how the panel examining the case exercises its discretion in assessing the facts and the relevant law.

That said, a few points can be made regarding how a BCA would fare in light of these criteria. With regard to the first two criteria (a product’s physical features and its end-uses), it should be clear that there is no legally relevant difference, for instance, between imported steel produced with fossil fuels and domestic steel produced using renewable energy. Likewise, tariff classifications are unlikely to distinguish between different cement-based products based on the way they are produced.¹⁹³ With regard to consumers’ tastes and habits, the WTO Appellate Body seemed to widen the scope in the *EC—Asbestos* case by suggesting that these “are very likely to be shaped by the health risks associated with a product.”¹⁹⁴ Given the health risks posed by climate change, it may be argued that consumers will distinguish between low-carbon and carbon-intensive products. However, the health effects of carbon-intensive products are more indirect than the effects of carcinogenic asbestos and unrelated to the product as such. In short, unless it can be demonstrated that consumers treat products with high and low carbon intensities differently (or are likely to do so), or other criteria assume a greater role in future jurisprudence, low-carbon and carbon-intensive products will probably be considered “like products.”

A finding of likeness, however, need not lead to a violation of the national treatment obligation. The next question that arises here is whether a BCA can be designed so that it does not end up taxing imports “in excess of” domestic products. Any “excess,” however small, may already be considered a violation of GATT Article III.¹⁹⁵ To avoid such a determination, it may be safer to base the BCA on the lowest charges incurred by domestic producers.¹⁹⁶

Although low-carbon and carbon-intensive products can be found to be “like,” they can also be considered “directly competitive or substitutable products” under the second condition in GATT Article III:2¹⁹⁷—a broader notion than that of “like products.”¹⁹⁸ Factors that need to be taken into consideration in deciding whether two products are “directly competitive or substitutable” include: the nature of the products compared; the nature of competitive conditions in the relevant market; physical characteristics of the products compared; common end-use; and tariff classifications.¹⁹⁹ The Appellate Body opened the possibility that products with different carbon intensities could fall under this category, finding that “[w]hat constitutes a competitive

¹⁹⁰ AB Report, *Japan—Alcoholic Beverages II*, *supra* note 187, at 19–21.

¹⁹¹ Pauwelyn, *Carbon Leakage Measures*, *supra* note 162, at 489.

¹⁹² AB Report, *Japan—Alcoholic Beverages II*, *supra* note 187, at 19, 20, 25, & 26.

¹⁹³ *EC—Asbestos*, *supra* note 183, ¶ 146 (“for any given cement-based product, the tariff classification of the product is the same”).

¹⁹⁴ *Id.* ¶ 122. In the same ruling, the AB said that “evidence relating to health risks may be relevant in assessing the competitive relationship in the marketplace between allegedly ‘like’ products,” thus indicating that health risks may generally play a role in the “like products” analysis. *Id.* ¶ 115. Note that while these findings were made in the context of GATT Article III:4, which has a slightly broader scope than Article III:2.

¹⁹⁵ AB Report, *Japan—Alcoholic Beverages II*, *supra* note 187, at 23.

¹⁹⁶ Ismer & Neuhoff, *Border Tax Adjustment*, *supra* note 162, at 147.

¹⁹⁷ GATT, *supra* note 163, art. III:2, second sentence, and *ad art.* III:2.

¹⁹⁸ Panel Report, *Korea—Taxes on Alcoholic Beverages*, WT/DS75/R, WT/DS84/R ¶ 118 (Sept. 17, 1998).

¹⁹⁹ AB Report, *Japan—Alcoholic Beverages II*, *supra* note 187, at 25.

relationship between products may require consideration of inputs and processes of production used to produce the product.”²⁰⁰

GATT *Ad Article III*, paragraph 2 specifies that a tax can only be deemed inconsistent with the second sentence “in cases where competition was involved between, on the one hand, the taxed product and, on the other hand, a directly competitive or substitutable product which was *not similarly taxed*.”²⁰¹ To prove that two products are “not similarly taxed,” it needs to be shown that the tax burden on the imported product is heavier than on “directly competitive or substitutable” domestic products, and that the tax burden goes beyond a *de minimis* burden in any given case.²⁰² This is a more lenient requirement than the “not in excess of” requirement under the first condition.²⁰³ Furthermore, even if products are “directly competitive or substitutable” and “not similarly taxed,” it needs to be found that the measure was not “applied to imported or domestic products so as to afford protection to domestic production.”²⁰⁴ This can be shown by tax differentials,²⁰⁵ but the intent of a policy may also play a role.²⁰⁶ The requirements for a BCA under Article III:2, second sentence, are therefore more lenient than those under the first sentence.

Finally, as noted above, it may be that a BCA would be considered an internal regulation falling under Article III:4. This provision also raises the issue of “like products.”²⁰⁷ For Article III:4, the main question is whether “the products involved are—or could be—in a competitive relationship in the marketplace.”²⁰⁸ Following the discussion of “like products” above, domestic low-carbon aluminum and imported carbon-intensive aluminum would probably be considered “like.” As a consequence, imports “shall be accorded treatment no less favourable than that accorded to like products of national origin.”²⁰⁹ With regard to “no less favourable” treatment, the Panel in *U.S.—Clove Cigarettes* found that it must be shown that any “adverse effects are related to the foreign origin of the product at issue” and that a Panel should “consider whether the detrimental effect(s) can be explained by factors or circumstances unrelated to the foreign origin of the product.”²¹⁰ This suggests that, under Article III:4, as long as the BCA is linked to a product’s carbon footprint rather than its origin—i.e., the different treatment can be explained by environmental considerations, and the measure is origin-neutral—the measure would be permissible.

Avoiding a violation of the national treatment requirement would thus most likely succeed if a BCA were considered to be an internal regulation under GATT Article III:4, and if the BCA

²⁰⁰ Appellate Body Report, *Canada—Certain Measures Affecting the Renewable Energy Generation Sector*, WT/DS412/AB/R, WT/DS426/AB/R ¶ 5.63 (May 6, 2013).

²⁰¹ GATT, *supra* note 163, *ad art.* III:2.

²⁰² AB Report, *Japan—Alcoholic Beverages II*, *supra* note 187, at 27.

²⁰³ Holzer, CARBON-RELATED BORDER ADJUSTMENT, *supra* note 162, at 133.

²⁰⁴ GATT, *supra* note 163, *art.* III:1.

²⁰⁵ AB Report, *Japan—Alcoholic Beverages II*, *supra* note 187, at 30.

²⁰⁶ Appellate Body Report, *Chile—Taxes on Alcoholic Beverages*, WT/DS87/AB/R & WT/DS87/AB/R ¶ 71 (Dec. 13, 1999) (“we consider that a measure’s purposes, objectively manifested in the design, architecture and structure of the measure, *are* intensely pertinent to the task of evaluating whether or not that measure is applied so as to afford protection to domestic production”).

²⁰⁷ According to the AB in *EC—Asbestos*, “the ‘accordion’ of ‘likeness’ stretches in a different way in Article III:4” compared to Article III:2. *EC—Asbestos*, *supra* note 183, ¶ 96. However, the AB suggested that the criteria for “likeness” used for Article III:2 may also be applied to Article III:4. *Id.* ¶ 103.

²⁰⁸ *Id.* ¶ 103.

²⁰⁹ GATT, *supra* note 169, *art.* III:4.

²¹⁰ *United States—Measures Affecting the Production and Sale of Clove Cigarettes*, WT/DS406/R ¶ 7.268 (Sept. 2, 2011). *See also* Holzer, CARBON-RELATED BORDER ADJUSTMENT, *supra* note 162, at 135–136.

design clearly displays its environmental intent. However, there is also a possibility that a BCA would be deemed permissible under the regime of Article III:2, second sentence.

c. Most-Favored Nation Treatment

Another core non-discrimination obligation under the GATT is contained in Article I:1, which sets out the principle of most-favored nation treatment by demanding that “any advantage, favour, privilege or immunity granted by any contracting party to any product originating in or destined for any other country shall be accorded immediately and unconditionally to the like product originating in or destined for the territories of all other contracting parties.”²¹¹

If BCAs are applied to “like” products based on their country of origin, favoring products from countries with stringent climate policies and penalizing products from countries with weak or no climate policies, they are likely to violate this principle.²¹² Conversely, if the BCA applies uniformly to all imports, regardless of country of origin and country-specific features, it should meet the most-favoured nation requirement. However, in such a scenario, the BCA could be challenged by countries that have effective emission reduction measures in place, as their exports would end up being subject to a carbon constraint twice: once while complying with their domestic climate policies; and again upon entry into the country implementing the BCA.²¹³ Exporters from countries without strong emission reduction policies would thus have an advantage not accorded to exporters with strong climate policies.

Another question arises with regard to BCAs that are based on the carbon footprint of a product. In *Indonesia—Autos*, the panel determined that MFN treatment “cannot be made conditional on any criteria that are not related to the imported product itself.”²¹⁴ This suggests that distinguishing between countries based on non-product-related processes and production methods would be inadmissible. However, a subsequent panel in *Canada—Autos* arguably opened the door for genuinely origin-neutral measures that are based on such processes and production methods, including BCAs based on a product’s embedded carbon.²¹⁵

Finally, a separate question is whether derogation from the most-favored nation requirement is possible for developing countries, particularly Least Developed Countries. According to the 1979 Enabling Clause, “[n]otwithstanding the provisions of Article I of the General Agreement, contracting parties may accord differential and more favourable treatment to

²¹¹ GATT, *supra* note 169, art. I:1. The “like products” test under Article I is similar to the “like products” analysis outlined above. See Appellate Body Report, *United States—Measures Concerning the Importation, Marketing and Sale of Tuna and Tuna Products (Recourse to Article 21.5 of the DSU by Mexico)*, WT/DS381/AB/RW ¶ 7.281 (Nov. 20, 2015).

²¹² This would follow the precedent set in GATT Panel Report, *Belgian Family Allowances (Allocations Familiales)*, B.I.S.D. 1S/59 ¶ 3 (Nov. 7, 1952) (with the Panel finding that the “Belgian legislation would have to be amended insofar as it introduced a discrimination between countries having a given system of family allowances and those which had a different system or no system at all”).

²¹³ Pauwelyn, *Carbon Leakage Measures*, *supra* note 162, at 494.

²¹⁴ Panel Report, *Indonesia—Certain Measures Affecting the Automobile Industry*, WT/DS54/R, WT/DS55/R, WT/DS59/R, & WT/DS64/R ¶ 14.143 (Jul. 2, 1998).

²¹⁵ In *Canada—Autos*, the Panel referred to “conditions that entailed different treatment of imported products depending upon their origin,” suggesting that if conditions do not relate to the country of origin, they may be permissible. Panel Report, *Canada—Certain Measures Affecting the Automotive Industry*, WT/DS139/S ¶ 10.25 (Feb. 11, 2000). See Charles Benoit, *Picking Tariff Winners: Non-Product Related PPMs and DSB Interpretations of Unconditionally within Article I:1*, 42 GEO. J. INT’L L. 583, 598 (2011) (discussing the jurisprudence in the context of an analysis of whether life-cycle assessments of ethanol—a form of non-product-related PPM—are permissible under Article I). See also Pauwelyn, *Carbon Leakage Measures*, *supra* note 162, at 495.

developing countries, without according such treatment to other contracting parties.”²¹⁶ In another provision, the Enabling Clause further instructs countries to take particular account of Least Developed Countries “in view of their special economic situation and their development, financial and trade needs.”²¹⁷ The Enabling Clause thus offers an exception to the most-favored nation requirement of GATT Article I, and draws attention to the situation of Least Developed Countries.

Still, this exception may not result in a measure that “raise[s] barriers to or create[s] undue difficulties for the trade” of other countries.²¹⁸ This means, for instance, that exempting Least Developed Countries from a BCA cannot result in other countries facing increased barriers to trade. Furthermore, a measure must “respond positively to the development, financial and trade needs of developing countries.”²¹⁹ According to the AB in *EC—Tariff Preferences*, a sufficient nexus should exist between, on the one hand, the preferential treatment provided and, on the other hand, the likelihood of alleviating the relevant “development, financial [or] trade need.”²²⁰ In the context of BCAs, this means that the preferential treatment must have clear benefits for the countries receiving the treatment. One way of achieving this would be to earmark part of the revenues from BCAs to support developing countries, and in particular Least Developed Countries.

While the most-favored nation requirement thus generally instructs the BCA-implementing country to treat other countries alike, some exceptions may be possible for specific groups of countries. As discussed in Part V.B.1.c below, this may matter in the context of a possible justification under the *chapeau* of GATT Article XX.

2. GATT Environmental Exceptions

As outlined in the preceding sections, a BCA can be designed in such a way that it reduces the likelihood of violating free trade disciplines under GATT Articles I and III. Still, considerable legal uncertainty remains, owed in part to the lack of conclusive case law on border adjustments. For countries considering the introduction of a BCA, this brings up the potential role of the exceptions contained in GATT Article XX.

Article XX provides a closed list of defenses to uphold GATT-inconsistent measures that are taken for legitimate public policy reasons, such as public health, environmental protection, and public morals. Although climate policy is not directly mentioned in these exception clauses, a BCA that is found to violate one of the provisions of the GATT may still fall under one of the Agreement’s exceptions. For the purposes of a BCA, the measures outlined in GATT Articles

²¹⁶ GATT Secretariat, *Decision on Differential and More Favorable Treatment, Reciprocity and Fuller Participation of Developing Countries*, B.I.S.D. 26S/191 ¶ 1 (1980) [hereinafter Enabling Clause]. This applies, *inter alia*, to “[s]pecial treatment on the least developed among the developing countries in the context of any general or specific measures in favour of developing countries.” *Id.* ¶ 2(d). However, such treatment of Least Developed Countries presupposes that the treatment of *all* developing countries will be favorable, which in the context of a BCA is “a tough bar to clear.” Aaron Cosbey et al., *A Guide for the Concerned: Guidance on the Elaboration and Implementation of Border Carbon Adjustment* 12 (Entwined Policy Report No. 3, 2012), http://www.iisd.org/pdf/2012/bca_guidance.pdf.

²¹⁷ Enabling Clause, *supra* note 216, ¶ 8.

²¹⁸ *Id.* ¶ 3(a).

²¹⁹ *Id.* ¶ 3(c).

²²⁰ *European Communities—Conditions for the Granting of Tariff Preferences to Developing Countries*, WT/DS246/AB/R ¶ 164 (Apr. 20, 2004).

XX(b) and XX(g) are the most relevant.²²¹ Measures that are provisionally justified through these exceptions must, however, also satisfy the requirements of the *chapeau* of Article XX. Each of these elements is set out in greater detail below.

a. Article XX(b)

GATT Article XX(b) offers an exception for measures that are “necessary to protect human, animal or plant life or health.” Given that these important objectives can be put at risk by climate change—including through related droughts, floods, and extreme weather events²²²—a strong case can be made that a BCA aimed at preserving a more stable climate is relevant to this provision. In *Brazil—Taxation*, the Panel put it clearly: “the reduction of CO₂ emissions is one of the policies covered by subparagraph (b) of Article XX, given that it can fall within the range of policies that protect human life or health.”²²³ By contrast, an economic rationale—e.g., safeguarding the competitiveness of energy-intensive industries or levelling the playing field—would not be considered a legitimate objective under the exceptions of Article XX(b).²²⁴

Whether a BCA is a *necessary* measure may prove more difficult to establish. WTO jurisprudence points to at least three factors that require “weighing and balancing” to determine the necessity of a measure in accordance with Article XX(b).²²⁵

First, although necessity does not require a measure to be “indispensable or of absolute necessity or inevitable,”²²⁶ the measure in question should be “apt” to make a “material” contribution to the achievement of the provision’s purpose.²²⁷ This involves establishing “a *genuine relationship of ends and means*” between the two.²²⁸ This means that the BCA should contribute to emission reductions, *inter alia*, by reducing the risk of carbon leakage.²²⁹ If a

²²¹ Arguably, the public morals exception of Article XX(a) could also be invoked. In *EC—Seals*, the AB accepted that an EU regulation prohibiting imports of seal products due to animal welfare concerns was indeed “necessary to protect public morals.” Appellate Body Report, *European Communities—Measures Prohibiting the Importation and Marketing of Seal Products*, WT/DS400/AB/R & WT/DS401/AB/R ¶ 5.201 (May 22, 2014) [hereinafter AB Report, *EC—Seals*]. Likewise, it could be argued that BCAs can be justified with reference to public morals. This would “basically disconnect[] the measure from geographical links to the territory of the importing country except for the mere fact of importation of products to the country imposing a regulation.” Thomas Cottier and Tetyana Payosova, *Common Concern and the Legitimacy of the WTO in Dealing with Climate Change* in RESEARCH HANDBOOK ON CLIMATE CHANGE AND TRADE LAW 28 (Panagiotis Delimatsis ed., 2017).

²²² See e.g. Intergovernmental Panel on Climate Change (IPCC), IPCC SPECIAL REPORT ON THE IMPACTS OF GLOBAL WARMING OF 1.5 °C ABOVE PRE-INDUSTRIAL LEVELS AND RELATED GLOBAL GREENHOUSE GAS EMISSION PATHWAYS, IN THE CONTEXT OF STRENGTHENING THE GLOBAL RESPONSE TO THE THREAT OF CLIMATE CHANGE, SUSTAINABLE DEVELOPMENT, AND EFFORTS TO ERADICATE POVERTY (2018) [hereinafter IPCC, 1.5 °C SPECIAL REPORT].

²²³ Panel Report, *Brazil—Certain Measures Concerning Taxation and Charges*, WT/DS472/R & WT/DS497/R ¶ 7.880 (Aug. 30, 2017). The finding in this case was made mainly with reference to the impacts of transport emissions on air quality, not to the climate or atmosphere.

²²⁴ See Tracey Epps & Andrew Green, RECONCILING TRADE AND CLIMATE: HOW THE WTO CAN HELP ADDRESS CLIMATE CHANGE 144–147 (2010); Tamiotti, *The Legal Interface between Carbon Border Measures and Trade Rules*, *supra* note 162, at 1207–1208; Pauwelyn, *Carbon Leakage Measures*, *supra* note 162, at 450–452; Holzer, CARBON-RELATED BORDER ADJUSTMENT, *supra* note 162, at 156.

²²⁵ Appellate Body Report, *Korea—Measures Affecting Imports of Fresh, Chilled and Frozen Beef*, WT/DS161/AB/R & WT/DS169/AB/R ¶ 164 (Jan. 10, 2001) [hereinafter AB Report, *Korea—Beef*].

²²⁶ *Id.* ¶ 161.

²²⁷ Appellate Body Report, *Brazil—Measures Affecting Imports of Retreaded Tyres*, WT/DS332/AB/R ¶¶ 151 & 210 (Dec. 3, 2007) [hereinafter AB Report, *Brazil—Retreaded Tyres*].

²²⁸ *Id.* ¶ 145 (emphasis added).

²²⁹ Holzer, CARBON-RELATED BORDER ADJUSTMENT, *supra* note 162, at 152.

measure is intended to address carbon leakage, but estimates of leakage are low for the affected sectors, it may be challenging to demonstrate a material contribution. Focusing a BCA on the most carbon-intensive, leakage-exposed sectors would strengthen the link between the measure and its environmental objective. Importantly, a measure associated with addressing climate change may be treated with some latitude. In *Brazil—Retreaded Tyres*, the WTO Appellate Body recognized that an ends-means relationship may not come to the fore immediately, noting that “the results obtained from certain actions—for instance, measures adopted in order to attenuate global warming and climate change [...] can only be evaluated with the benefit of time.”²³⁰

Second, the measure in question will need to be *proportional* to the values it seeks to protect. As noted by the Appellate Body in *Korea—Beef*, “[t]he more vital or important [the] common interests or values pursued” by the measure, the easier it would be to pass the necessity test.²³¹ The enormous global importance attached to the problem of climate change, as recognized by the best available science,²³² and the adoption, widespread ratification, and entry into force of the Paris Agreement suggest that a BCA would pass this step quite easily.

Third, establishing necessity also requires “*an absence of an alternative measure that would achieve the same end and that is less restrictive of trade.*”²³³ This test shifts the burden of proof to the complainant, who must prove the reasonable availability of such a less trade-restrictive alternative.²³⁴ In the case of BCAs, the free allocation of emission allowances to domestic polluters may form one such alternative. However, as noted in Part III.C, the economic and environmental performance of free allocation is questionable. Moreover, the WTO-compatibility of such allocation is doubtful.²³⁵ More generally, assessment of this step is dependent on the greater policy context of the challenged measure, and how different components of a policy interact.²³⁶

b. Article XX(g)

Where the determination of necessity under Article XX(b) is associated with some uncertainty, a more lenient assessment is offered by Article XX(g). Under this provision, a measure that would otherwise violate the GATT may be upheld where it is one “*relating to the conservation of exhaustible natural resources,*”²³⁷ on the condition that the measure is “made effective in conjunction with restrictions on domestic production or consumption.”²³⁸

Satisfying this provision requires, first, demonstrating that a safe climate is an “exhaustible natural resource.”²³⁹ Notably, in its consideration of air pollution—an environmental concern with strong parallels to climate change—the Panel in *U.S.—Gasoline* recognized clean air as a resource

²³⁰ AB Report, *Brazil—Retreaded Tyres*, *supra* note 227, ¶ 151.

²³¹ AB Report, *EC—Asbestos*, *supra* note 183, ¶ 172 (referring to AB Report, *Korea—Beef*, *supra* note 225, ¶ 162).

²³² See, e.g., IPCC, 1.5 °C SPECIAL REPORT, *supra* note 222.

²³³ AB Report, *EC—Asbestos*, *supra* note 183, ¶ 172.

²³⁴ Appellate Body Report, *United States—Measures Affecting the Cross-Border Supply of Gambling and Betting Services*, WT/DS285/AB/R ¶ 309 (Apr. 20, 2005).

²³⁵ See Luca Rubini and Ingrid Jegou, *Who’ll Stop the Rain? Allocating Emissions Allowances for Free: Environmental Policy, Economics, and WTO Subsidy Law*, 1 TRANS. ENVTL. L. 325 (2012).

²³⁶ AB Report, *Brazil—Retreaded Tyres*, *supra* note 227, ¶ 172.

²³⁷ GATT, *supra* note 163, art. XX(g) (emphasis added).

²³⁸ *Id.*

²³⁹ This term “must be read by a treaty interpreter in the light of contemporary concerns of the community of nations about the protection and conservation of the environment.” Appellate Body Report, *United States—Import Prohibition of Certain Shrimp and Shrimp Products*, WT/DS58/AB/R ¶ 129 (Nov. 6, 1998) [hereinafter AB Report, *U.S.—Shrimp*].

that is both exhaustible and natural within the meaning of this provision.²⁴⁰ Indeed, taking an evolutionary approach to the concept, the Appellate Body in *U.S.—Shrimp* underscored that this term should be interpreted “in the light of contemporary concerns of the community of nations about the protection and conservation of the environment.”²⁴¹ An indication of the major concern attached to climate change by the international community can be provided by international treaties such as the Paris Agreement.²⁴² It can furthermore be persuasively argued that climate change itself is associated with the depletion of other natural resources such as biodiversity and reliable water supplies.²⁴³ As such, it is likely that a BCA would pass this first test.

The second element of this provision implies that any BCA would need to “relate to” the conservation of a safe climate. In this regard, a member should demonstrate that the chosen measure is “reasonably related” to the end outlined in Article XX(g).²⁴⁴ Consequently, the legislation may not be “disproportionately wide in its scope and reach in relation to the policy objective of protection and conservation,”²⁴⁵ or merely “incidentally or inadvertently aimed at” this goal.²⁴⁶ This requirement has been easily met in previous cases such as *U.S.—Gasoline* and *U.S.—Shrimp*, prompting one author to conclude that “[u]nless there are blatant inconsistencies or protectionist features in the domestic legislation, climate change legislation [such as BCAs] should normally pass this ‘related to’ test.”²⁴⁷

Turning to the provision’s final qualifier, any measure must be “made effective in conjunction with restrictions on domestic production and consumption.” The WTO jurisprudence suggests that this entails a “requirement of even-handedness,” but not “identical treatment of domestic and imported products.”²⁴⁸ In the case of BCAs, therefore, while this provision appears to require the application of carbon-restrictive measures to both domestic and imported products, these products do not need to be treated equally. Given that any BCA would likely be applied together with carbon constraints imposed on domestic producers, it should not be difficult for the measure to pass this test. In fact, even if the relevant legislation were to discriminate against

²⁴⁰ Panel Report, *United States—Standards for Reformulated and Conventional Gasoline*, WT/DS2/R ¶ 6.37 (May 20, 1996), as modified by the Appellate Body Report, WT/DS2/AB/R (May 20, 1996) [hereinafter AB Report, *U.S.—Gasoline*].

²⁴¹ AB Report, *U.S.—Shrimp*, *supra* note 239, ¶ 129. In the same ruling, the Appellate Body considered that there was “sufficient nexus” between the respondent country (the United States) and sea turtles that, though at times outside the US’ jurisdiction, were migratory and endangered. *Id.* ¶ 133. Given the transboundary and severe nature of climate change, a similarly persuasive nexus would appear to exist between carbon emitted abroad and the potential adverse climate change effects in a regulating country. See Pauwelyn, *Carbon Leakage Measures*, *supra* note 162, at 498; Holzer, CARBON-RELATED BORDER ADJUSTMENT, *supra* note 162, at 165. On extraterritoriality in the context of measures addressing the carbon footprint of products more generally, see Natalie Dobson, *The EU’s Conditioning of the ‘Extraterritorial’ Carbon Footprint: A Call for an Integrated Approach in Trade Law Discourse*, 27 REV. EUR. COMP. & INT’L ENVTL. L. 75 (2018).

²⁴² Analogously, AB Report, *U.S.—Shrimp*, *supra* note 239, ¶ 132, cites the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

²⁴³ Holzer, CARBON-RELATED BORDER ADJUSTMENT, *supra* note 162, at 155.

²⁴⁴ AB Report, *U.S.—Shrimp*, *supra* note 239, ¶ 141.

²⁴⁵ *Id.* ¶ 141.

²⁴⁶ AB Report, *U.S.—Gasoline*, *supra* note 240, at 18.

²⁴⁷ Pauwelyn, *Carbon Leakage Measures*, *supra* note 162, at 500.

²⁴⁸ AB Report, *U.S.—Gasoline*, *supra* note 240, at 21. Even though treatment need not be identical, the Appellate Body nonetheless suggests that “a measure that would impose a significantly more onerous burden on foreign consumers or producers” is unlikely to pass the Article XX(g) test; Appellate Body Report, *China—Measures Related to the Exportation of Rare Earths, Tungsten, and Molybdenum*, WT/DS431/AB/R, WT/DS432/AB/R, & WT/DS433/AB/R ¶ 5.134 (Aug. 7, 2014).

imports in some of its details, compared to domestic products the legislation or the measure as a whole could still be found to meet this test.²⁴⁹

c. Article XX *Chapeau*

The preceding analysis suggests that although both defenses are feasible, a BCA would likely stand a higher chance of meeting the requirements of Article XX(g) test compared to Article XX(b). In both cases, however, the measure will additionally need to pass the requirements of the *chapeau* of Article XX. This means that the measure may not be applied in a manner that would constitute: (1) arbitrary discrimination between countries where the same conditions prevail; (2) unjustifiable discrimination between countries where the same conditions prevail; or (3) a disguised restriction on international trade.²⁵⁰ The *chapeau* is not about the measure as such, but about the provisions related to its detailed operation and how it is applied in practice.²⁵¹

With regard to arbitrary or unjustifiable discrimination, the Appellate Body in *U.S.—Shrimp* has highlighted the importance of “basic fairness and due process” in the application of a measure.²⁵² This would require, *inter alia*, a process that is “transparent” and “predictable”, and offers formal opportunities for the exporting countries concerned “to be heard, or to respond to any arguments.”²⁵³ For instance, if the BCA includes a process to determine whether another country has taken comparable action to the country implementing the measure, it would be important to involve the affected country in any such determination, and allow opportunities to appeal decisions.²⁵⁴ Another way of strengthening the fairness of the BCA would be to allow foreign producers to prove that the carbon intensity of their products is lower than a benchmark set by the BCA-implementing country.²⁵⁵ Furthermore, allowing a phase-in period to reduce the compliance burden of affected countries and afford them time to increase domestic climate policy efforts may be appropriate.²⁵⁶

In addition, the country implementing the BCA must engage in “serious, across-the-board negotiations with the objective of concluding bilateral or multilateral agreements” to address climate change before imposing the BCA.²⁵⁷ This requires “serious good faith efforts to reach an agreement” on the part of the implementing country, but not necessarily the conclusion of an

²⁴⁹ This was indeed the case in *U.S.—Gasoline*; see AB Report, *U.S.—Gasoline*, *supra* note 240, at 21.

²⁵⁰ GATT, *supra* note 163, art. XX. Each of these three standards must be met. AB Report, *U.S.—Shrimp*, *supra* note 239, ¶ 150.

²⁵¹ See GATT Panel Report, *United States – Imports of Certain Automotive Spring Assemblies*, B.I.S.D. 30S/107 ¶ 56 (May 26, 1983).

²⁵² AB Report, *U.S.—Shrimp*, *supra* note 239, ¶ 181.

²⁵³ *Id.* ¶ 180.

²⁵⁴ Harro van Asselt, Michael Mehling, & Thomas Brewer, ADDRESSING LEAKAGE AND COMPETITIVENESS IN US CLIMATE POLICY: ISSUES CONCERNING BORDER ADJUSTMENT MEASURES (2009) 56 (discussing the 2008 American Climate Security Act). See also Hufbauer et al., GLOBAL WARMING AND THE WORLD TRADING SYSTEM, *supra* note 54, at 86.

²⁵⁵ Ismer & Neuhoff, *Border Tax Adjustment*, *supra* note 162, at 148.

²⁵⁶ AB Report, *U.S.—Shrimp*, *supra* note 239, ¶ 174. See also Holzer, CARBON-RELATED BORDER ADJUSTMENT, *supra* note 162, at 173.

²⁵⁷ AB Report, *U.S.—Shrimp*, *supra* note 239, ¶ 166.

agreement.²⁵⁸ Moreover, such negotiations should not lead to any discrimination,²⁵⁹ meaning that any negotiations should involve all affected countries. Ongoing climate talks in the context of the UNFCCC—or even the negotiations that led to the Paris Agreement—arguably meet this criterion. However, since these negotiations do not specifically concern the BCA, bilateral negotiations with affected countries are likely warranted, also in light of the requirement to ensure basic fairness and due process.

Another requirement, related to whether the measure discriminates against “countries where the same conditions prevail,” is that any measure must be applied with “sufficient flexibility to take into account the specific conditions prevailing in *any* exporting Member.”²⁶⁰ Specifically, the country implementing the BCA cannot “use an economic embargo to *require* other Members to adopt essentially the same comprehensive regulatory program, to achieve a certain policy goal” as that of the implementing country, “*without* taking into consideration different conditions which may occur” in other countries.²⁶¹ However, while a country thus cannot require another country to adopt the same regulatory program, it can require the adoption of a program “*comparable in effectiveness.*”²⁶²

To satisfy these conditions, a BCA should take into account, first, whether and how another country has implemented climate policies.²⁶³ In a world of heterogeneous emission reduction policies, taking into account the efforts of other countries raises the vexing question of how different policies can be compared in the first place.²⁶⁴ A BCA might, for instance, refer to progress made in other countries’ implementation of their respective NDCs, as reported under the Paris Agreement.²⁶⁵ Second, in line with the principle of common but differentiated responsibilities and respective capabilities applied in the international climate regime,²⁶⁶ as well as the need for “special and differential treatment” of developing countries recognized under the international trade regime,²⁶⁷ a BCA should take into account countries’ levels of economic development.²⁶⁸ This would open the door for differential treatment of poorer countries, such as

²⁵⁸ Panel Report, *United States—Import Prohibition of Certain Shrimp and Shrimp Products (Recourse to Article 21.5 by Malaysia)*, WT/DS58/RW ¶ 5.67 (15 June 2001) [hereinafter Panel Report, *U.S.—Shrimp (Article 21.5)*]. See also Appellate Body Report, *United States—Import Prohibition of Certain Shrimp and Shrimp Products (Recourse to Article 21.5 by Malaysia)*, WT/DS58/AB/RW ¶ 134 (Oct. 22, 2001) [hereinafter AB Report, *U.S.—Shrimp (Article 21.5)*]. Non-ratification of the Paris Agreement could be used as evidence that a country has not made “serious good faith efforts.” In *U.S.—Shrimp*, the AB referred to the fact that the United States had not signed several relevant multilateral environmental agreements. *U.S.—Shrimp*, *supra* note 239, ¶171, fn. 174.

²⁵⁹ AB Report, *U.S.—Shrimp*, *supra* note 239, ¶ 172.

²⁶⁰ AB Report, *U.S.—Shrimp (Article 21.5)*, *supra* note 258, ¶ 149. The AB continued to state that this “does not require a Member to anticipate and provide explicitly for the specific conditions prevailing and evolving in *every individual Member.*” *Id.*

²⁶¹ AB Report, *U.S.—Shrimp*, *supra* note 239, ¶ 164.

²⁶² AB Report, *U.S.—Shrimp (Article 21.5)*, *supra* note 258, ¶ 144 (emphasis added).

²⁶³ Pauwelyn, *Carbon Leakage Measures*, *supra* note 162, at 502–503.

²⁶⁴ In addition, it raises the question of *who* should determine whether another country has taken action “comparable in effectiveness.” If this determination is made by the country introducing the BCA, considerations of basic fairness and due process may require, *inter alia*, an opportunity to appeal the finding.

²⁶⁵ Paris Agreement, *supra* note 1, art. 13(7)(b).

²⁶⁶ See *infra* Part V.B.

²⁶⁷ Various WTO Agreements contain specific provisions providing for special and differential treatment. See e.g. GATT, *supra* note 163, art. XVIII, XXXVI, XXXVII, & XXXVIII. See also Marrakesh Agreement Establishing the World Trade Organization, Annex IA, 1867 U.N.T.S. 187, preamble (“seeking both to protect and preserve the environment and to enhance the means for doing so in a manner consistent with their respective needs and concerns at different levels of economic development”).

²⁶⁸ Pauwelyn, *Carbon Leakage Measures*, *supra* note 162, at 503–504.

Least Developed Countries. These considerations suggest that there is a trade-off between satisfying the requirements of the *chapeau* and avoiding a violation of the most-favored nation requirement: while favourable treatment of developing countries, and particularly Least Developed Countries, may ensure that the BCA avoids arbitrary or unjustified discrimination, it would increase the risk of running afoul of the most-favored nation treatment.

Lastly, in *EC—Seals*, the AB found that “one of the most important factors in the assessment of arbitrary or unjustifiable discrimination is the question of whether the discrimination can be reconciled with, or is rationally related to, the policy objective with respect to which the measure has been provisionally justified under one of the subparagraphs of Article XX.”²⁶⁹ This means that the BCA must be designed and applied in such a way that it leads to emission reductions. In this regard, including export rebates could undermine the justification of a BCA on imports under Article XX GATT, as they could create an incentive for carbon-intensive production destined for export.²⁷⁰

To determine whether a measure constitutes “a disguised restriction on international trade,” jurisprudence suggests, first, that a measure has been “publicly announced.”²⁷¹ Second, the determination of “disguised restriction” should also take into account whether the measure also amounts to arbitrary or unjustifiable discrimination.²⁷² Finally, “the design, architecture and revealing structure”²⁷³ of a measure should be taken into account. As a consequence, if a BCA passes the tests posed by the *chapeau*’s other two tiers (pertaining to arbitrary and unjustifiable discrimination), if the measure is publicly announced before its application, and if its “design, architecture and revealing structure” do not blatantly indicate protectionist intents, then it is likely to pass this hurdle.

3. Agreement on Subsidies and Countervailing Measures

Aside from the GATT, the WTO Agreement on Subsidies and Countervailing Measures contains rules that may constrain the design of a BCA. Specifically, applying a BCA to exports may qualify as a “subsidy”—and possibly a prohibited export subsidy—under the Agreement.²⁷⁴

²⁶⁹ AB Report, *EC—Seals*, *supra* note 221, ¶ 5.318. In *Brazil—Retreaded Tyres*, the Appellate Body had suggested that there is arbitrary or unjustified discrimination “when the reasons given for this discrimination bear no rational connection to the objective falling within the purview of a paragraph of Article XX, or would go against that objective. The assessment of whether discrimination is arbitrary or unjustifiable should be made in the light of the objective of the measure.” AB Report, *Brazil—Retreaded Tyres*, *supra* note 227, ¶ 227.

²⁷⁰ Hufbauer et al., GLOBAL WARMING AND THE WORLD TRADING SYSTEM, *supra* note 54, at 69 (“Although GATT Article XX is not directly relevant to whether a BTA for outward shipments is an export subsidy, the rebate on an energy tax for exports could undermine the Article XX environmental justification for applying the BTA to imports”).

²⁷¹ GATT Panel Report, *United States—Prohibition of Imports of Tuna and Tuna Products from Canada*, B.I.S.D. 29S/91 ¶ 4.8 (Feb. 22, 1982). However, the AB also found that “concealed or unannounced restriction or discrimination in international trade does not exhaust the meaning of ‘disguised restriction.’” AB Report, *U.S.—Gasoline*, *supra* note 240, at 25.

²⁷² AB Report, *U.S.—Gasoline*, *supra* note 240, at 25.

²⁷³ *U.S.—Shrimp (Article 21.5)*, *supra* note 258, ¶ 5.142 (referring to AB Report, *Japan—Alcoholic Beverages II*, *supra* note 187, at 29).

²⁷⁴ See generally De Cendra, *Can Emissions Trading Schemes be Coupled with Border Tax Adjustments?*, *supra* note 162, at 139–141; Holzer, CARBON-RELATED BORDER ADJUSTMENT, *supra* note 162, at 201–204; Trachtman, *WTO Law Constraints*, *supra* note 162, at 117–118; Hufbauer et al., GLOBAL WARMING AND THE WORLD TRADING SYSTEM, *supra* note 54, at 41–46.

According to Article 1, a subsidy is a financial contribution by a government that confers a benefit.²⁷⁵ While export-oriented BCAs could qualify as one form of financial contribution—i.e. government revenue foregone—footnote 1 of the Agreement adds that “the exemption of an exported product from duties or taxes borne by the like product when destined for domestic consumption, or the remission of such duties or taxes in amounts not in excess of those which have accrued, shall not be deemed to be a subsidy.”²⁷⁶ The reference to “borne by the like product” once again raises the question of whether products with different carbon intensities are “like.”²⁷⁷

If the BCA is indeed considered a “subsidy,” it may be deemed a prohibited subsidy “contingent [...] upon export performance.”²⁷⁸ However, item (g) of Annex I of the Agreement on Subsidies and Countervailing Measures, which contains an Illustrative List of Export Subsidies, indicates that exemption or remission of indirect taxes²⁷⁹ for exports “not in excess of those levied in respect of the production and distribution of like products when sold for domestic consumption” is allowed.²⁸⁰ While at first blush, the Agreement thus seems to pose no major hurdle for export-oriented BCAs, two issues nonetheless arise. First, ensuring that the remission is “not in excess” of taxes accrued may be challenging for BCAs linked to an emissions trading system, where fluctuating prices on the carbon market make overcompensation possible if market prices are lower than the price originally paid for allowances.²⁸¹ In such cases, and where the domestic carbon constraint takes the form of a regulatory measure rather than a carbon price, the only viable export BCA may be a complete exemption of products destined for export, which can be technically challenging where the eventual destination of the product is uncertain at the time of production. Second, and more importantly, export BCAs could discourage emission reductions in export-oriented sectors, and thereby undermine the environmental rationale of the measure.²⁸² As noted in our discussion of the *chapeau* of GATT Article XX above, this may have reverberations for the justification of the BCA as a whole.²⁸³ This means that the legal admissibility of export BCAs remains shrouded in considerable uncertainty.²⁸⁴

²⁷⁵ ASCM, *supra* note 164, art. 1.1.

²⁷⁶ *Id.*, fn. 1. See also GATT, *supra* note 163, *ad* art. XVI.

²⁷⁷ See *supra* Part V.A.1.ii.

²⁷⁸ ASCM, *supra* note 164, art. 3.1(a).

²⁷⁹ This would presume that the original carbon constraint can be considered an “indirect tax.” Footnote 58 in Annex I of the ASCM seems to support such an interpretation. It includes income and property taxes under “direct taxes”, and refers to all other taxes as “indirect taxes.”

²⁸⁰ ASCM, *supra* note 164, Annex I, item (g). Item (h) of the Illustrative List may also apply, but this item is limited to “prior-stage cumulative indirect taxes.” Although carbon pricing measures could in theory be designed as such (Hufbauer et al., GLOBAL WARMING AND THE WORLD TRADING SYSTEM, *supra* note 54, at 45), it is more likely that they would fall under the broader reference to “indirect taxes” under item (g). *Id.*, at 45; McLure, Jr., *A Primer on the Legality of Border Adjustments for Carbon Prices: Through a GATT Darkly*, 4 CARBON & CLIMATE L. REV. 456, 459 (2011).

²⁸¹ See Holzer, CARBON-RELATED BORDER ADJUSTMENT, *supra* note 162, at 204. Moreover, in case the emissions trading system employs free allocation of emissions allowances, any payments would likely be in excess of taxes accrued, as exporters would get a rebate for allowances they received for free in the first place. *Id.*

²⁸² *Id.*, at 204–205.

²⁸³ See also Hufbauer et al., GLOBAL WARMING AND THE WORLD TRADING SYSTEM, *supra* note 54, at 68.

²⁸⁴ *Cf. Id.*, at 46; Holzer, CARBON-RELATED BORDER ADJUSTMENT, *supra* note 162, at 205.

B. BCAs and International Climate Change Law

Aside from international trade law, it is important to ensure that a BCA complies with the rules and principles of the international climate change regime. Unlike WTO law, however, international climate change law offers only limited concrete guidance. Borrowing language from GATT Article XX's *chapeau*, the main relevant provision in the UNFCCC states that "[m]easures taken to combat climate change, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade."²⁸⁵ This provision as such, however, "neither condones nor forbids using trade measures,"²⁸⁶ and it cannot be assumed that the relevant analysis for Article XX GATT would equally apply to this provision.

In addition, the principle of "common but differentiated responsibilities and respective capabilities"²⁸⁷ offers broad guidance that ideally should be taken into account in the design and application of any measure.²⁸⁸ Although the precise contents of the principle remain contested, the principle suggests it is important to take into account the different historical contribution to climate change by developing countries, as well as the level of countries' economic development. For a long time, differential treatment in the climate regime was characterized by a bifurcation of developed and developing countries.²⁸⁹ While not abandoning this characterization altogether, the Paris Agreement introduces new and nuanced forms of differential treatment,²⁹⁰ including for Least Developed Countries and small island developing states.²⁹¹

Although it does not provide any concrete or enforceable requirements that BCAs should adhere to, international climate change law does point to the need for introducing some form of favorable treatment for developing countries, and particularly Least Developed Countries. This could be achieved in several ways. First, BCAs imposed by developed countries could eschew any requirement for developing countries to adopt the same regulatory programs, programs that have a comparable mitigation effect (i.e., emission reductions),²⁹² or ask for similar technology or regulatory standards.²⁹³ Second, groups of developing countries (e.g., Least Developed Countries or countries with *de minimis* greenhouse gas emissions) could be altogether exempted from the

²⁸⁵ UNFCCC, *supra* note 21, art. 3(5).

²⁸⁶ Daniel Bodansky, *The United Nations Framework Convention on Climate Change: A Commentary*, 18 YALE J. INT'L L. 451, 505 (1993),

²⁸⁷ UNFCCC, *supra* note 21, art. 3(1). *See also* Paris Agreement, *supra* note 1, art. 2(2) (which includes the qualifier "in the light of different national circumstances"). On the principle in international environmental law generally, *see* Lavanya Rajamani, DIFFERENTIAL TREATMENT IN INTERNATIONAL ENVIRONMENTAL LAW (2006)

²⁸⁸ A related question not addressed here is the extent to which the principle of common but differentiated responsibilities could be used as applicable law or as interpretive device by WTO dispute settlement bodies, particularly in the context of the Article XX exceptions. *See* Michael Hertel, *Climate-Change-Related Trade Measures and Article XX: Defining Discrimination in Light of the Principle of Common but Differentiated Responsibilities*, 45 J. WORLD TRADE 653 (2011); and Pananya Larbprasertporn, *The Interaction between WTO Law and the Principle of Common but Differentiated Responsibilities in the Case of Climate-Related Border Tax Adjustments*, 6 GOETTINGEN J. INT'L L. 145 (2014).

²⁸⁹ Especially through the Kyoto Protocol, *supra* note 22, under which only developed countries listed in Annex I of the UNFCCC were obliged to achieve emissions targets.

²⁹⁰ *See* Lavanya Rajamani, *Ambition and Differentiation in the 2015 Paris Agreement: Interpretative Possibilities and Underlying Politics*, 65 INT'L & COMP. L.Q. 493 (2016).

²⁹¹ *See, e.g.*, Paris Agreement, *supra* note 1, art. 4(6) & art. 13(3).

²⁹² Hertel, *Climate-Change-Related Trade Measures*, *supra* note 288, at 677.

²⁹³ Jacob Werksman & Trevor Houser, *Competitiveness, Leakage and Comparability: Disciplining The Use of Trade Measures Under a Post-2012 Climate Agreement* 4 (2008).

BCA. Third, differential benchmarks might be used to calculate the adjustment level.²⁹⁴ Finally, revenues from BCAs can be channeled back to developing countries, for instance to financially support climate change activities in these countries.²⁹⁵

There are a range of ways in which the design and application of a BCA can therefore ensure conformity with the principle of common but differentiated responsibility. Yet implementing some of these options can result in tensions with the non-discrimination obligations under the GATT, and notably risk a violation of the most-favored nation requirement. However, the need to ensure flexibility to take into account the conditions prevailing in other countries under the *chapeau* of GATT Article XX offers an opportunity to align the requirements of both regimes with respect to BCAs.

VI. PRINCIPLES AND RECOMMENDATIONS FOR BCA DESIGN AND IMPLEMENTATION

A. Overview

Sometime during the second half of the century, the Paris Agreement with its embedded logic of progressive climate ambition and stated objective of net zero emissions should result in global convergence of mitigation efforts. As discussed in Part II, however, domestic climate action will remain characterized by heterogeneity in the near term. In Part III, we showed that, among unilateral measures to level uneven carbon constraints, BCAs are the only ones to offer both effective protection against leakage and an incentive for other countries to strengthen their efforts. Still, they are politically controversial and administratively demanding,²⁹⁶ and their compatibility with international trade law is uncertain. Based on the foregoing analysis of legal literature and case law, as well as existing case studies and proposals, the following subsections outline a BCA design that strikes a balance between legal durability, ease of implementation, and environmental performance.

B. Scope and Coverage

Any BCA has to determine its scope and coverage, that is, specify the products and trade flows affected by it, the sectors or geographies it applies to, and the types of carbon constraints it adjusts for. A number of design considerations emerge from the literature and case law.

1. Imports v. Exports

Although economic research has suggested that applying a BCA to both imports and exports can increase its effectiveness in preventing leakage (see Part III.C), its scope should be limited to imports. Doing so hedges against classification as a prohibited export subsidy under the SCM Agreement,²⁹⁷ and avoids setting an incentive for domestic producers to increase the carbon

²⁹⁴ Cosby et al., *Guide for the Concerned*, *supra* note 216, at 17.

²⁹⁵ *Id.*, at 18. See also Michael Grubb, *International Climate Finance from Border Carbon Cost Levelling*, 11 CLIMATE POL'Y 1050 (2011).

²⁹⁶ Reinaud, *Issues Behind Competitiveness and Carbon Leakage*, *supra* note 44.

²⁹⁷ de Cendra, *Can Emissions Trading Schemes be Coupled with Border Tax Adjustments?* *supra* note 162.

intensity of exports, which could potentially result in an emission increase (see Part V.A.3). Even with this limitation, a BCA on imports will still secure a majority of its potential benefits.²⁹⁸

2. Sectoral Coverage

Including only products from sectors with high carbon cost and trade exposure as well as limited ability to pass through the cost to consumers greatly reduces the administrative and technical burden of any BCA²⁹⁹ while still delivering significant environmental benefits.³⁰⁰ Such sectors include cement, steel, and aluminum, where the value of embodied carbon products, as a percentage of value added, tends to be relatively high compared with manufactured products.³⁰¹ By ensuring that the BCA only covers sectors where inclusion affords clear environmental benefits, this narrow scope helps meet the conditions set out in Article XX of the GATT, and notably the need to meet the necessity test under Article XX(b) (see Part V.A.2.a). Such coverage should also be useful at a political level, as the affected sectors tend to be influential domestic constituencies, yet their inclusion does not cause a strong shift in the terms of trade to the detriment of developing countries.³⁰²

Determination of these sectors can build on established criteria and thresholds already in use in several jurisdictions, and should be accompanied by *ex ante* studies to identify vulnerable sectors and possible downstream impacts. Typically, the inclusion threshold will be defined as a combined metric of carbon intensity, calculated as the emission levels and compliance cost in a sector relative to its value added, and trade intensity, measured as the value of imports and exports in a sector relative to total production plus imports.³⁰³ Together, these two criteria can help establish whether the carbon price will substantially raise production costs, and whether competition on international markets will prevent passing through these cost increases to consumers without resulting in substitution by foreign products.

3. Geographic Scope

To ensure observance of Article I of the GATT and prevent avoidance (“trans-shipment”) strategies by importers,³⁰⁴ the BCA should opt for a sectoral focus and avoid exempting entire countries based on country-specific attributes, such as domestic climate policies or participation in a common climate agreement.³⁰⁵ Exempting countries can also risk that flows of carbon-intensive goods shift to and through such countries. Uniform application to all countries would compromise the leveraging effect of a BCA, however, and be at odds with the principle of common

²⁹⁸ Böhringer et al., *The Role of Border Carbon Adjustment*, *supra* note 72; Fischer & Fox, *Comparing Policies*, *supra* note 56.

²⁹⁹ OECD, EFFECTIVE CARBON PRICES 12 (2013).

³⁰⁰ Böhringer et al., *Unilateral Climate Policy Design*, *supra* note 51.

³⁰¹ Aaron Cosbey et al., *A Guide for the Concerned*, *supra* note 216, at 13.

³⁰² Carolyn Fischer, *Options for Avoiding Carbon Leakage*, in TOWARDS A WORKABLE AND EFFECTIVE CLIMATE REGIME 297 (Scott Barrett et al. eds., 2015).

³⁰³ Aaron Cosbey & Carolyn Fischer, *International Guidance for Border Carbon Adjustments to Address Carbon Leakage*, in TOWARD A NEW CLIMATE AGREEMENT: CONFLICT, RESOLUTION AND GOVERNANCE 220, 223 (Todd L. Cherry et al. eds., 2014).

³⁰⁴ Kortum & Weisbach, *The Design of Border Adjustments for Carbon Prices*, *supra* note 12.

³⁰⁵ Olivier Godard, *Unilateral European Post-Kyoto Climate Policy and Economic Adjustment at EU Borders*, EDF-ÉCOLE POLYTECHNIQUE CAHIER NO. DDX 07-15 (2007), <http://www.rgte.centre-cired.fr/IMG/pdf/OG-BTA-UK-0907-FIN.pdf>; Pauwelyn, *US Federal Climate Policy and Competitiveness Concerns*, *supra* note 162.

but differentiated responsibilities and respective capabilities in the climate regime and the special and differential treatment provisions of the trade regime. This is particularly important because undifferentiated application of a BCA would disproportionately affect developing countries.³⁰⁶ Although desirable, therefore, differentiation should be based on differences in the carbon content of products, not their country of origin. A way to introduce differentiation without introducing a link to any specific country is to give foreign producers an opportunity to demonstrate the actual climate performance of their products, thereby averting the imposition of the BCA or reducing the adjustment level (see below, Part VI.B.5). Moreover, an exemption of Least Developed Countries—who contribute only minimally to global emissions—can be reconciled with the environmental objective of the BCA, would find legal support in principles applied both in the international trade and climate regimes (see Parts V.A.1.c and V.B), and has been a consistent feature in past policy proposals.³⁰⁷

4. *Policy Coverage*

Determining a differential in ambition is easiest with policies that create an explicit carbon price, rendering the latter a natural starting point for a BCA. Less than 20 percent of global emissions are currently covered by an explicit price on carbon, however, and price levels tend to be significantly lower than the cost of compliance with other non-price carbon constraints.³⁰⁸ Over time, as data and methodologies improve, a BCA could seek to adjust for the differential between effective carbon prices faced by domestic and foreign producers in a sector, including both explicit and implicit carbon prices (see Part VI.C). Inclusion of policies addressing carbon dioxide emissions would already capture a significant share of emissions associated with imported products, although extension to policies for emissions of other relevant gases and black carbon, converted using accepted global warming potential metrics, could be pursued to successively increase the efficiency of the BCA. Policy coverage has implications for the applicable provisions of the GATT (see Part V.A.1).

5. *Carbon Content*

Because BCAs adjust for differences in embedded carbon and applicable carbon constraints, they also have to include a decision on the scope of included emissions and a methodology to calculate those emissions.

a. *Emissions Scope and Benchmarks*

Applying a BCA requires first determining (or estimating) the amount of embodied carbon in a given product. The carbon content of a product can be determined by calculating the emissions from the production process, which involves emissions from energy inputs such as electricity and heat, as well as emissions from the production process itself. Ideally, this determination would occur at each production facility based on actual emissions.³⁰⁹ But direct emissions measurement

³⁰⁶ Christoph Böhringer et al., *Embodied Carbon Tariffs*, 120 SCAND. J. ECON. 183 (2018).

³⁰⁷ van Asselt & Brewer, *Addressing Competitiveness and Leakage Concerns in Climate Policy*, *supra* note 105.

³⁰⁸ WORLD BANK AND ECOFYS. STATE AND TRENDS OF CARBON PRICING 2018 17 (2018).

³⁰⁹ Joshua Elliott et al., *Unilateral Carbon Taxes, Border Tax Adjustments, and Carbon Leakage*, 14 THEOR. INQUIRIES IN L. 207 (2012).

is not always practicable, and may face legal challenges.³¹⁰ Therefore, measures such as a BCA will generally be based on standardized benchmarks serving as a proxy for the carbon intensity of products, with the benchmark values reflecting average performance, best available technology, or worst available technology in a sector, either at a national, regional, or global level.

For the BCA design proposed here, limiting the scope of emissions to those originating from the production process itself as well as emissions from electricity and heat generated offsite and used as inputs for production will cover a majority of relevant emissions without unduly adding to technical complexity. Direct and indirect emissions should be determined using different methodologies:

- *Global average sectoral benchmarks for direct emissions:* For direct emissions from production, the Carbon Inclusion Mechanism proposal of 2009 (Part IV.A) envisioned focusing on sectors instead of countries, and thereby reducing the link to specific country attributes that might have given rise to accusations of discrimination under GATT Article I (see Part V.A.1.b). Applying the global average emissions intensity of sectors affected by a BCA on imports strikes a balance between legal concerns about a country focus, broader fairness considerations, and the need to provide a sustained incentive for continued emission reductions. Multiple benchmarks may be needed in some sectors to reflect different production technologies.
- *Regional emission factors for indirect emissions:* Indirect emissions from electricity and heat generated offsite should be included, provided they are also subject to a carbon constraint domestically. Because energy is often traded across national borders, and interconnected electricity markets do not always follow political boundaries, determination of indirect emissions should be based on average grid emission factors in electricity markets rather than national averages. Again, applying this approach helps avoid a legally problematic link to country-specific characteristics, and also better represents the local characteristics of energy supply.

In the absence of suitable or accurate data, a jurisdiction imposing a BCA could also base the determination of embedded carbon on the average direct and indirect emissions intensity of its own domestic goods.³¹¹ Past policy proposals, such as the 2007 Future Allowance Import Requirement and the 2009 Carbon Inclusion Mechanism proposals (see Part IV.A), avoided technical complexity and legal risk by basing the calculation of embedded carbon on the average carbon intensity of domestic goods.

As aggregate values, however, standardized benchmarks will invariably fail to represent the emissions performance of individual emitters accurately. Foreign producers should therefore be afforded a transparent, accessible process to document actual emissions with third-party-verified data, and thereby demonstrate that their carbon intensity is lower than a sectoral average benchmark.³¹² Importantly, that option introduces a permissible element of differentiation, which contributes to the leveraging purpose of the BCA and incentivizes mitigation in exporting countries. It can also raise administrative challenges and strain capacities of some affected trading

³¹⁰ Kortum & Weisbach, *The Design of Border Adjustments for Carbon Prices*, *supra* note 12.

³¹¹ Jennifer Hillman, *Changing Climate for Carbon Taxes*, *supra* note 178.

³¹² Cosby et al., *A Guide for the Concerned*, *supra* note 51, at 1; Cosby et al., *Developing Guidance*, *supra* note 51, at 14.

partners,³¹³ justifying allocation of some or all of the revenue to foreign capacity building efforts. A more ambitious – but, given current political realities, probably unattainable – option would involve creating a joint body under the WTO and the UNFCCC to develop a common international standard for the calculation of the carbon content of goods, coupled with a waiver for certain trade restrictive climate policies based on embodied carbon.³¹⁴

b. Data Sources

A growing number of multi-regional input-output databases³¹⁵ and ongoing projects such as the Carbon Loophole project³¹⁶ provide continuously improving datasets for the determination of carbon embedded in internationally traded goods. Likewise, increasing granularity of life cycle and life cycle sustainability assessment approaches³¹⁷ and standardization of methodologies for quantification of the carbon footprint of products³¹⁸ are helping provide a more robust body of data for BCA implementation. Accounting of emissions associated with consumption is now published consistently for a number of countries, and may eventually become a standard component of national environmental accounts.³¹⁹

C. Adjustment Level

Once embedded emissions have been calculated, the level of adjustment needs to be determined, factoring in any exemptions and rebates afforded to domestic producers. As a default, the adjustment will be based on the sectoral benchmark multiplied by an explicit carbon price and the amount of product, which, in the case of a variable carbon price (e.g., in an emissions trading system), can be averaged across a specified period. Where no explicit carbon price exists, or the importing jurisdiction has introduced multiple complementary instruments in the covered sector, determination of the net policy differential is considerably more difficult. In such situations, we suggest identifying the effective carbon price in that sector, and multiplying it by the relevant benchmark.

³¹³ Sofia Persson, *Practical Aspects of Border Carbon Adjustment Measures: Using a Trade Facilitation Perspective to Assess Trade Costs*, ICTSD PROGRAMME ON COMPETITIVENESS AND SUSTAINABLE DEVELOPMENT ISSUE PAPER NO. 13 (2012), <https://www.ictsd.org/downloads/2012/03/persson-ictsd-practical-aspects-of-border-carbon-adjustment-measures.pdf>.

³¹⁴ James Bacchus, *Global Rules for Mutually Supportive and Reinforcing Trade and Climate Regimes*, E15 EXPERT GROUP ON MEASURES TO ADDRESS CLIMATE CHANGE AND THE TRADE SYSTEM POLICY OPTIONS PAPER (2016), http://www3.weforum.org/docs/E15/WEF_Climate_Change_POP.pdf.

³¹⁵ See, e.g., EXIOBASE, the World Input-Output Database (WIOD), the Global Resource Accounting Model (GRAM), the Global Trade Analysis Project (GTAP), EoRA, and the OECD's Inter-Country Input-Output (ICIO) Database, as described by van de Lindt et al., *Carbon Emission Mitigation by Consumption-Based Accounting and Policy*, *supra* note 16; Wiebe et al., *Policies and Consumption-Based Carbon Emissions from a Top-Down and a Bottom-Up Perspective*, *supra* note 16.

³¹⁶ Moran et al., *The Carbon Loophole in Climate Policy*, *supra* note **Error! Bookmark not defined.**

³¹⁷ Nuri C. Onat et al., *Systems Thinking for Life Cycle Sustainability Assessment: A Review of Recent Developments, Applications, and Future Perspectives*, 9 SUSTAINABILITY 706 (2017).

³¹⁸ International Organization for Standardization, *Greenhouse Gases/Carbon Footprint of Products/Requirements and Guidelines for Quantification and Communication*, ISO/TS 14067:2013 (May 2013), <https://www.iso.org/standard/59521.html>.

³¹⁹ Dawkins & Croft, *Consumption-based Accounting Reveals Global Redistribution of Carbon Emissions*, *supra* note 66.

An effective carbon price is the sum of explicit and implicit carbon prices under applicable carbon constraints, and is based on the notion that even policies which do not generate an explicit carbon price—such as a carbon tax or emissions trading system—still impose a compliance cost on covered emitters, based on their marginal abatement cost and the mandated level of emission reductions, as well as a cost to society.³²⁰ Determining the effective carbon price applicable to a given sector, that is, the sum of can build on existing methodologies, for instance by correlating energy taxes with the carbon content of the underlying fuels, identifying the average sectoral abatement cost and multiplying it by mandated emission reductions, or using economic models to identify the carbon price needed to achieve mandated emission reductions in a sector.³²¹

Importantly, the BCA is only meant to adjust for the differential between the foreign and domestic climate policy cost in covered sectors. For that reason, the level of the BCA has to reflect any exemptions, rebates or free allocation in the importing country, as well as carbon constraints applied to imports in their country of origin, all of which are then deducted these from the determined level in order to comply with the non-discrimination principle of GATT Article III (see Part V.A.1.b). As with the calculation of embedded emissions, moreover, each exporting emitter should be given an opportunity to submit third-party-verified data on marginal abatement cost under all applicable carbon constraints. A transparent and impartial process involving independent third parties or an international body could help avoid political or judicial challenges.

D. Revenue Use

Rather than accrue to the general budget or be recycled to the public, any revenue collected through the application of a BCA can be used to further its environmental objective and benefit developing countries affected by it. To that end, revenue can be partly or entirely allocated to developing countries in order to support domestic climate change mitigation and adaptation efforts as well as build capacity on measurement, reporting, and verification, ultimately favoring the emergence of a more homogenous climate landscape. Designed this way, a BCA can result in net financial flows to beneficiary countries³²² while measurably contributing to the climate finance obligations of implementing countries. Although this can weaken the domestic benefits of introducing a BCA,³²³ it avoids shifting a disproportionate burden on developing countries and being inconsistent with the differential treatment rules under the climate and trade regimes (see Part V.A.1.c and V.B). Additionally, it strengthens the nexus to legitimate policy objectives required under GATT Article XX(b) and (g). Internationally, moreover, this can lower the likelihood of political or legal challenges against the BCA, and has parallels in international law, for instance under the Multilateral Fund for the Implementation of the Montreal Protocol.³²⁴

³²⁰ See generally Richard A. Posner, *Taxation by Regulation*, 2 BELL J. ECON. & MGMT SCI. 22 (1971).

³²¹ OECD, EFFECTIVE CARBON PRICES, *supra* note 299.

³²² Böhringer et al., *The Role of Border Carbon Adjustment*, *supra* note 72.

³²³ McKibbin et al., *The Role of Border Adjustments in a U.S. Carbon Tax*, *supra* note 98.

³²⁴ The Multilateral Fund was established in 1990 to assist developing country parties to the Montreal Protocol, and provides financial support for the implementation of projects including industrial conversion, technical assistance, training and capacity building that result in the phase-out of substances that harm the Earth's ozone layer, see Richard E. Benedick, OZONE DIPLOMACY: NEW DIRECTIONS IN SAFEGUARDING THE PLANET 252 (1991).

E. Expiration

Instruments that generate revenue can become entrenched even after their primary objective has long been achieved. To avert that risk, a BCA should expect to be temporary in nature, and contain a sunset clause prescribing its expiration unless its extension is expressly warranted to counteract emission leakage. More generally, while demand for BCAs—and indeed their political viability—are likely to increase in the medium term, BCAs are not a desirable and stable framework for climate action in the long run, as a scenario with multiple BCAs operating in parallel would incur considerable administrative complexity.³²⁵ Given their leveraging effect, they ideally prompt their own obsolescence. As countries gradually expand and deepen their domestic climate policy frameworks, the need to adjust for policy differentials subsides, and with it the utility of a BCA.

F. Process

To improve political acceptance and the odds of passing legal muster, the design and implementation of a BCA should occur through a deliberate process that ensures fairness, transparency, and predictability, and that provides opportunities for participation by affected countries as well as appellate and review procedures (see Part V.A.2.c). Serious and inclusive negotiations, conducted in good faith, should precede the application of a BCA and aim to reduce the differential in carbon constraints that raise concerns of leakage. Such bi- or multilateral engagement is critical to evade assumptions of protectionism. Because individual climate efforts remain within the discretion of each individual party rather than being centrally negotiated, with policy heterogeneity a sanctioned feature of the international climate regime, the Paris Agreement may not be enough to satisfy this requirement.

As suggested in the proposed BCA for the European cement sector (see Part IV.A), moreover, introduction of the BCA and subsequent extension to additional sectors should ideally be informed by *ex ante* impact studies which also consider the effects on the downstream sectors. Actual implementation should then be preceded by an early announcement and sufficient lead time to maximize the leveraging effect of the BCA on other countries and afford them adequate time to prepare and implement more ambitious climate action of their own.³²⁶

G. Measures in the Trade Regime

So far, all design recommendations have taken the doctrines and provisions of the international trade regime as a given. In effect, however, the body of rules constituting the WTO legal system are themselves a dynamic product of negotiation, and thus not immutable. A country or coalition of countries looking to implement a BCA could therefore request clarification of the legal conditions and implications within the WTO or a subset of affected countries. Although such a step could increase legal certainty and coherence across regimes, the required political endorsement will be difficult to secure,³²⁷ as evidenced by an earlier—and ultimately fruitless—attempt by Singapore to launch a discussion of BCAs in the WTO Committee on Trade and

³²⁵ Persson, *Practical Aspects of Border Carbon Adjustment Measures*, *supra* note 313.

³²⁶ GERNOT WAGNER, BUT WILL THE PLANET NOTICE? HOW SMART ECONOMICS CAN SAVE THE WORLD 201 (2011).

³²⁷ Tamiotti, *The Legal Interface between Carbon Border Measures and Trade Rules*, *supra* note 162, at 1207.

Environment.³²⁸ In the current climate of multilateral gridlock and trade hostilities (see Part II), securing an agreement may be all but impossible, yet we still outline the options as a potential perspective for the longer term and a changed political context.

At an informal level, a country or group of countries preparing to introduce a BCA could pursue several measures related to process and institutional cooperation, such as improved procedures for deliberation and knowledge transfer between the trade and climate regimes, mandatory assessment of climate impacts in the context of trade policy reviews, or enhanced transparency through notification and review practices and information repositories.

Additionally, they could pursue a number of more formal options to shape the trade regime or obtain legal certainty for BCAs, including, in the order of scope and ambition:³²⁹

- Seeking an amendment of relevant WTO rules to affirm the permissibility of a BCA, either positively through inclusion or negatively through exemption from affected trade disciplines. Such an amendment would be conditional on the approval of at least two-thirds of WTO Members,³³⁰ and has therefore been rarely achieved in practice;
- One such amendment—subject to the same procedural requirement—could see inclusion of a moratorium or “peace clause,” pursuant to which WTO Members would wait before challenging national climate measures, or refrain from using countermeasures that restrict trade or otherwise have trade effects in WTO dispute settlement;
- A high approval threshold also applies to temporary waivers of WTO obligations, which can be adopted by under “exceptional circumstances” by a three-quarters majority of members.³³¹ Such a waiver could, for instance, allow trade discrimination based on carbon content, coupled with an assurance of mutual restraint. Given their temporary nature, waivers have proven somewhat more amenable to passage.
- An authoritative interpretation of relevant provisions in the GATT and other WTO Agreements, stating, for instance, that a BCA falls within the scope of Article XX of the GATT, would likewise require a three-quarters majority of WTO members.³³²
- Finally, another approach would be to modify the product classification system used in trade negotiations, the World Custom Organization’s Harmonized Commodity Description and Coding System, in order to account for different processes and production methods.³³³

Despite employing different formal and procedural channels, these options have in common some form of affirmation that BCAs are in compliance with WTO obligations, thereby preempting judicial proceedings and offering a more predictable context for implementation of a BCA. While this justifies their appeal, any steps to newly calibrate the balance between trade and climate policy would also have to ensure it does not create a defense for excessive protectionism.

³²⁸ Committee on Trade and Environment, Promoting Mutual Supportiveness Between Trade and Climate Change Mitigation Actions: Carbon-related Border Tax Adjustments, WTO Doc. WT/CTE/W/248 (Mar. 30, 2011).

³²⁹ Bacchus, *Global Rules for Mutually Supportive and Reinforcing Trade and Climate Regimes*, *supra* note 314; HUFBAUER ET AL., GLOBAL WARMING AND THE WORLD TRADING SYSTEM, *supra* note 54.

³³⁰ Marrakesh Agreement Establishing the World Trade Organization, Annex IA, 1867 U.N.T.S. 187 [hereinafter WTO Agreement], art. X.

³³¹ *Id.*, art. IX:3. See also HUFBAUER ET AL., GLOBAL WARMING AND THE WORLD TRADING SYSTEM, *supra* note 54, at 97.

³³² WTO Agreement, *supra* note 330, art. IX:2.

³³³ Henrik Horn & Petros C. Mavroidis, *To B(TA) or Not to B(TA)? On the Legality and Desirability of Border Tax Adjustments from a Trade Perspective*, 34 WORLD ECON. 1911 (2011).

VII. CONCLUSION

Under the Paris Agreement, climate cooperation has become broader, and is expected to deepen over time. For the time being, however, domestic climate efforts remain heterogeneous and asymmetrical, elevating concerns about emissions leakage and competitiveness impacts in the political debate. BCAs can help level uneven carbon constraints, and are the only unilateral policy option that offers both effective protection against leakage and an incentive for other countries to strengthen their climate efforts. Based on a survey of the academic literature, relevant case law, and practical case studies, this article has outlined a BCA design that seeks to balance legal risks, environmental efficacy, and political and administrative feasibility.

Still, the general parameters proposed in this article cannot avoid some remaining legal uncertainties. While the proposed design can lower the likelihood of infringing GATT Articles I and III, it also improves the prospects for a successful defense under the exceptions of Article XX. Affording the appropriate weight to avoidance of discrimination and differentiation, and ensuring a fair, inclusive and transparent process, should help a BCA prove resilient to legal challenges under international trade law. Moreover, the revenue it would generate can serve to accelerate climate action in trade partners, and can also be used to help lower political resistance.

If successful, the need for BCAs should wane over time, as climate ambition across trading partners converges and any BCAs in place address diminishing leakage rates. Given their complexity and tradeoffs, BCAs are neither a desirable nor stable option for global climate action in the long run. Collective climate action at the required level of stringency will always remain preferable over unilateral efforts, even with BCAs. But under the climate regime established by the Paris Agreement, such convergence will take time, and time is currently of the essence. If BCAs are able to remove even one of the many barriers to more ambitious climate action and thereby accelerate this convergence, the residual risks and trade-offs associated with their use may be a price worth paying.