

# **BORDER CARBON ADJUSTMENTS IN SUPPORT OF DOMESTIC CLIMATE POLICIES: EXPLAINING THE GAP BETWEEN THEORY AND PRACTICE**

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Stefan U. Pauer  
University of British Columbia

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# **Border Carbon Adjustments in Support of Domestic Climate Policies: Explaining the Gap Between Theory and Practice**

Stefan U. Pauer\*

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## *Abstract*

A growing number of scholars, environmentalists, politicians, and business leaders have recommended border carbon adjustments (BCAs) to support domestic climate policies, particularly market-based instruments for carbon pricing. By extending domestic policies beyond a jurisdiction's boundaries, BCAs can put domestic and foreign industries on a level playing field, counter carbon leakage, and incentivize other jurisdictions to take climate action. In theory, therefore, BCAs offer the promise of environmental, economic, and political benefits. However, BCAs are conspicuously absent in practice. Although an increasing number of carbon pricing policies is being adopted throughout the world, very few examples of BCAs exist, and so far none have been implemented at a general scale in any jurisdiction.

In order to explain this puzzle and investigate the conditions under which policy-makers do, or do not, adopt and implement BCAs, this research tested a series of hypotheses empirically using four case studies of experiences with and attitudes towards BCAs in the European Union and in California. The research drew on a wide range of published materials, including quantitative data, and supplements these sources with information from 43 expert interviews.

Based on the evidence in the case studies, the research finds several barriers that prevent the adoption and implementation of BCAs in practice. Policy-makers prefer alternative measures – such as free allocation – where they are available, are likely to meet domestic political opposition to BCAs, may run into opposition from other governments and thus face fears of trade war and retaliation, and may encounter concerns about the circumvention of BCAs. Contrary to popular belief among academics, therefore, the circumstances in which BCAs may be implemented successfully, and thus the scope for applying BCAs in practice, appear strikingly narrow.

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\* Doctoral candidate, Peter A. Allard School of Law, University of British Columbia. E-mail: stefan.pauer@alumni.ubc.ca. This report is based on the author's doctoral research: Stefan U. Pauer, *Border Carbon Adjustments in Support of Domestic Climate Policies: Explaining the Gap Between Theory and Practice* (PhD Thesis, Law, University of British Columbia) [forthcoming in 2019], which was kindly funded by: the Economics and Environmental Policy Research Network (EPRN), which is supported by Environment and Climate Change Canada (ECCC); the Centre for International Governance Innovation (CIGI); the Pacific Institute for Climate Solutions (PICS); the Peter A. Allard School of Law at the University of British Columbia (UBC); and the UBC Public Scholars Initiative.

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### **1. Introduction**

A growing number of scholars, environmentalists, politicians, and business leaders have recommended border carbon adjustments (BCAs)<sup>1</sup> to support domestic climate policies, particularly market-based instruments for carbon pricing. In theory, BCAs offer the promise of environmental, economic, and political benefits. However, although an increasing number of carbon pricing policies is being adopted throughout the world, very few examples of BCAs exist, and so far none have been implemented at a general scale in any jurisdiction.

By comparing experiences with BCAs, this research inquires why BCAs are conspicuously absent in practice, despite their potentially substantial benefits, backing from prominent leaders, and an increasing number of carbon pricing policies being adopted throughout the world. This report highlights the project’s key findings and presents evidence-based analytical insights about the adoption and implementation of BCAs in practice.

Experiences with and attitudes towards BCAs were examined using the following four case studies: the inclusion of international flights in the European Union’s (EU) cap-and-trade program, stationary installations in the EU’s cap-and-trade program, the inclusion of electricity imports in California’s cap-and-trade program, and industrial facilities in California’s cap-and-

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<sup>1</sup> Other terms used in the literature include border tax adjustments (BTAs), border adjustments (BAs), border adjustment measures (BAMs), border carbon measures (BCMs), border tax measures (BTMs), carbon border adjustments (CBAs), carbon border measures (CBMs), and carbon tariffs.

trade program. This project draws on a wide range of published materials, such as scholarly literature from different disciplines, government documents, and newspaper articles – including quantitative data, for instance from extant economic modelling and international trade statistics – and supplements these sources with information from 43 expert interviews.

Based on the evidence in these case studies, the research finds several barriers that prevent the adoption and implementation of BCAs in practice. Policy-makers prefer alternative measures – such as free allocation – where they are available, are likely to meet domestic political opposition to BCAs, may run into opposition from other governments and thus face fears of trade war and retaliation, and may encounter concerns about the circumvention of BCAs. Contrary to popular belief among academics, therefore, the circumstances in which BCAs may be implemented successfully, and thus the scope for applying BCAs in practice, appear strikingly narrow.

This report proceeds as follows. Part 2 offers relevant contextual information on BCAs. Part 3 sets out the research objective and the hypotheses used to investigate it. Part 4 explains the research method and data sources. Part 5 summarizes the case studies and their policy outcomes. Part 6 presents the research results in detail. Part 7 concludes with a summary, addresses the study’s limitations, and suggests areas for further research.

## 2. Context

BCAs can be used to extend market-based instruments for carbon pricing, namely carbon taxes and cap-and-trade systems, or other environmental policies beyond the domestic domain. Specifically, to put domestic and foreign industries on a level playing field, BCAs can extend a domestic carbon price to imported goods. Correspondingly, although symmetry is not required,<sup>2</sup> a domestic carbon price can also be rebated for exported goods to support the competitiveness of domestic producers on foreign markets.<sup>3</sup> While ordinary tariffs may be based on the value of a good, BCAs are based on the amount of greenhouse gas emitted during the production of a good. For example, the charge for a tonne of cement would be based on the amount of CO<sub>2</sub> and other greenhouse gases emitted during its production.

BCAs offer the promise of environmental, economic, and political benefits. In protecting the competitiveness of domestic industries relative to peers in jurisdictions with more lenient standards, these measures can avoid negative economic consequences, increase environmental

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<sup>2</sup> Gary Clyde Hufbauer, Steve Charnovitz & Jisun Kim, *Global Warming and the World Trading System* (Washington, DC: Peterson Institute for International Economics, 2009) at 39.

<sup>3</sup> See e.g. Mikael Skou Andersen, “Border Adjustment With Taxes or Allowances to Level the Price of Carbon” in Mona Hymel et al, eds, *Innovation Addressing Climate Change Challenges: Market-Based Perspectives* (Cheltenham: Edward Elgar, 2018) 20; Susanne Droege, “Using Border Measures to Address Carbon Flows” (2011) 11:5 *Climate Policy* 1191; Michael Mehling et al, “Beat Protectionism and Emissions at a Stroke” (2018) 559 *Nature* 321 [Mehling et al, “Beat Protectionism”]. Unless otherwise indicated, the term BCA used in this report refers to measures that comprise both import charges and export rebates.

benefits by countering carbon leakage,<sup>4</sup> and, in doing so, build greater political support for domestic carbon pricing or regulation. What is more, BCAs may even incentivize other jurisdictions to implement their own climate policies or join international efforts to cut emissions.<sup>5</sup>

Perhaps unsurprisingly, therefore, numerous leaders have advocated the use of BCAs over the years. Notable individuals that have called for such measures include economists and Nobel Prize winners Paul Krugman<sup>6</sup> and Joseph Stiglitz,<sup>7</sup> climate scientist and activist James Hansen,<sup>8</sup> former United States (US) Secretary of Energy and Nobel Prize winner Steven Chu,<sup>9</sup> French President Macron,<sup>10</sup> former French Presidents Chirac<sup>11</sup> and Sarkozy,<sup>12</sup> former French Prime Minister de Villepin,<sup>13</sup> former Italian Prime Minister Berlusconi,<sup>14</sup> former EU Commissioner Verheugen,<sup>15</sup> and Michael Morris, former Chief Executive Officer of American Electric Power.<sup>16</sup>

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<sup>4</sup> See e.g. Christoph Böhringer, Edward J Balistreri & Thomas F Rutherford, “The Role of Border Carbon Adjustment in Unilateral Climate Policy: Overview of an Energy Modeling Forum Study (EMF 29)” (2012) 34 *Energy Economics* S97.

<sup>5</sup> See e.g. Tracey Epps & Andrew Green, *Reconciling Trade and Climate: How the WTO Can Help Address Climate Change* (Cheltenham: Edward Elgar, 2010).

<sup>6</sup> Paul Krugman, “Building a Green Economy”, *The New York Times* (7 April 2010), online: The New York Times <<https://www.nytimes.com/>>.

<sup>7</sup> Joseph E Stiglitz, “A New Agenda for Global Warming” (2006) 3:7 *The Economists’ Voice*.

<sup>8</sup> Eric Holthaus, “The Point of No Return: Climate Change Nightmares Are Already Here”, *Rolling Stone* (5 August 2015), online: Rolling Stone <<https://www.rollingstone.com/>>; Michael Hopkin, “James Hansen: Emissions Trading Won’t Work, But My Global ‘Carbon Fee’ Will”, *The Conversation* (2 December 2015), online: The Conversation <<http://theconversation.com/>>.

<sup>9</sup> Ian Talley & Tom Barkley, “Energy Chief Says U.S. Is Open to Carbon Tariff”, *The Wall Street Journal* (18 March 2009), online: The Wall Street Journal <<https://www.wsj.com/>>; “Geht auch ohne die USA”, *Österreichischer Rundfunk* (30 November 2016), online: ORF <<https://orf.at/>>.

<sup>10</sup> Jean Chemnick, “Quitting Paris? Pay a Carbon Tax, Macron Says”, *E&E News* (4 December 2018), online: E&E News <<https://www.eenews.net/>>; Neil Roberts, “France Calls for EU Carbon Floor Price and Border Tariff”, *ENDS Europe* (22 March 2018), online: ENDS Europe <<http://www.endseurope.com/>>.

<sup>11</sup> Cited in Joost Pauwelyn, “Carbon Leakage Measures and Border Tax Adjustments under WTO Law” in Geert Van Calster & Denise Prévost, eds, *Research Handbook on Environment, Health and the WTO* (Cheltenham: Edward Elgar, 2013) 448 at 458 [Pauwelyn, “Carbon Leakage Measures”].

<sup>12</sup> Mike Szabo, “Europe Should Hit US With Carbon Tariffs for Paris Withdrawal -Sarkozy”, *Carbon Pulse* (14 November 2016), online: Carbon Pulse <<http://carbon-pulse.com/>>; “France Says EU Nations Would Back CO2 Border Tax”, *Bloomberg Businessweek* (26 March 2010), online: Bloomberg Businessweek <<https://www.bloomberg.com/>>, cited in Pauwelyn, “Carbon Leakage Measures”, *supra* note 11 at 458.

<sup>13</sup> “Dominique de Villepin Propose une Taxe sur le CO2 des Produits Importés”, *Le Monde* (13 November 2006), online: Le Monde <<https://www.lemonde.fr/>>.

However, success in implementing BCAs has proven elusive to date. BCAs are conspicuously absent in practice – despite their backing from prominent leaders and their potentially substantial benefits. Indeed, although an increasing number of carbon pricing policies is being adopted throughout the world,<sup>17</sup> very few examples of BCAs exist, and so far none have been implemented at a general scale in any jurisdiction.<sup>18</sup>

### 3. Research objective

This puzzle raises the question of what barriers there are to the adoption and implementation of BCAs. There appears to be a significant gap between extant theory and practice on the use of BCAs, which gives rise to the following research question: Why, given the benefits of using BCAs described in the literature and backing from prominent leaders, have policy-makers not embraced these measures?

A number of hypotheses are conceivable that may explain the apparent lack of BCAs in practice: (1) there may be concerns about the ability of BCAs to comply with World Trade Organization (WTO) law or other legal provisions; (2) practical concerns may exist about the administrative complexity and the effectiveness of BCAs to achieve their potential benefits; (3) there may be concerns about repercussions for international relations, such as fears of trade war and retaliation or that BCAs could hamper international climate efforts by reducing jurisdictions' willingness to cooperate; (4) policy-makers and stakeholders could prefer alternative measures that may be less controversial and may offer other advantages; (5) domestic political opposition may outweigh political demand for BCAs due to negative economic impacts from these measures or due to strategic opposition.

The objective of this research is to understand the conditions under which policy-makers do, or do not, adopt and implement BCAs. While there has been occasional speculation in the literature why BCAs are not implemented more widely in practice, to date no study has subjected this puzzle to specific and empirical analysis that focuses on actual decisions taken by policy-makers on the ground.

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<sup>14</sup> “Italy Joins French Calls for EU Carbon Tariff”, *EurActiv* (16 April 2010), online: EurActiv <<http://www.euractiv.com/>>.

<sup>15</sup> EU, European Commission, Letter from Commissioner for Enterprise and Industry Günter Verheugen to President José Manuel Barroso (21 November 2006).

<sup>16</sup> Michael Morris & Edwin Hill, “Trade Is the Key to Climate Change”, *The Energy Daily* (20 February 2007), online: The Energy Daily <<https://www.theenergydaily.com/>>, cited in Pauwelyn, “Carbon Leakage Measures”, *supra* note 11 at 458.

<sup>17</sup> See e.g. World Bank, *State and Trends of Carbon Pricing 2018* (Washington, DC: World Bank, 2018).

<sup>18</sup> Pauwelyn, “Carbon Leakage Measures”, *supra* note 11 at 458; also Michael Mehling et al, “Designing Border Carbon Adjustments for Enhanced Climate Action” (2017) Climate Strategies, Working Paper at 9 [Mehling et al, “Designing BCAs”]; David G Victor, *Global Warming Gridlock: Creating More Effective Strategies for Protecting the Planet* (Cambridge: Cambridge University Press, 2011) at 85.

#### 4. Method

In order to determine the conditions under which policy-makers do, or do not, adopt and implement BCAs, this study tested the above-mentioned hypotheses empirically using four case studies. Applying a uniform analytical approach, this research compared experiences with and attitudes towards BCAs in the following four cases in the EU and in California: (1) the inclusion of international flights in the EU's cap-and-trade system; (2) stationary installations in the EU's cap-and-trade system; (3) the inclusion of electricity imports in California's cap-and-trade program; and (4) industrial facilities in California's cap-and-trade program.

These cases include some of the very few examples of limited BCA development in the world. Both jurisdictions – the EU and California – represent major economies that have large-scale carbon pricing policies in place. In 2015, for instance, the EU and California had a gross domestic product of \$16.4tn and \$2.6tn, respectively.<sup>19</sup> In that year, the emissions coverage of the EU's cap-and-trade system was 2,009 Mt CO<sub>2</sub>-eq.,<sup>20</sup> while that of California's cap-and-trade program was 395 Mt CO<sub>2</sub>-eq.<sup>21</sup>

This case selection comprises two jurisdictions (the EU and California), three economic sectors (manufacturing industry, electricity, and aviation), and six policy outcomes (two intermediate outcomes, four eventual outcomes). This enables the analysis of experiences with and attitudes towards BCAs across political and legal systems, and levels of jurisdiction. These cases include examples of both limited adoption and rejection of BCAs as well as intermediate policy outcomes within cases. When including the aviation sector in its cap-and-trade system, the EU adopted a measure that was comparable to a BCA, although it suspended that measure subsequently.<sup>22</sup> In contrast, the EU foresees no BCAs for stationary installations in its cap-and-

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<sup>19</sup> World Bank, “GDP (Current US\$)”, online: World Bank Open Data <<https://data.worldbank.org/>> (retrieved 23 August 2018); US, Bureau of Economic Analysis, “Gross Domestic Product (GDP) by State”, online: BEA <<https://www.bea.gov/>> (retrieved 30 May 2018). These figures are in current US dollars.

<sup>20</sup> See EU, European Commission, “Emissions Trading: Questions and Answers Concerning the Second Commission Decision on the EU ETS Cap for 2013 (October 2010)”, online: European Commission <<http://ec.europa.eu/>> (retrieved 8 March 2019).

<sup>21</sup> US, Cal Code Regs tit 17 § 95841 (2011).

<sup>22</sup> While the inclusion of international flights is not a BCA as typically conceived, it is a measure akin to a BCA because it features the essential characteristics of a BCA. This conclusion is supported by the literature; see e.g. Kateryna Holzer, *Carbon-Related Border Adjustment and WTO Law* (Cheltenham: Edward Elgar, 2014) at 180-181; Pauwelyn, “Carbon Leakage Measures”, *supra* note 11 at 459; Dieter Helm, Cameron Hepburn & Giovanni Ruta, “Trade, Climate Change, and the Political Game Theory of Border Carbon Adjustments” (2012) 28:2 *Oxford Review of Economic Policy* 368 at 369; Joshua Meltzer, “Climate Change and Trade - The EU Aviation Directive and the WTO” (2012) 15:1 *Journal of International Economic Law* 111 at 154; Lorand Bartels, “The Inclusion of Aviation in the EU ETS: WTO Law Considerations” (2012) *International Centre for Trade and Sustainable Development, Issue Paper* 6 at iv; World Bank, *State and Trends of Carbon Pricing 2015* (Washington, DC: World Bank, 2015) at 79; Andersen, *supra* note 3 at 29; Aaron Cosbey et al, “Developing Guidance for

trade system. California's cap-and-trade program includes imports of electricity, although policy-makers weakened this BCA during implementation.<sup>23</sup> Lastly, California does not apply any BCAs for industrial facilities under its cap-and-trade program. This variation both across jurisdictions and over time within jurisdictions provides analytical leverage to understand the impact of various factors on the choice to use or not use BCAs, including stakeholder interests, political institutions, and policy-makers' views on and attitudes towards these measures.

In order to understand what actually happened in policy debates in each jurisdiction, it was essential to speak with those who participated in these discussions, including senior government officials and elites from business, industry, and the environmental community. Therefore, the research drew on scholarly literature from different disciplines, government documents, newspaper articles, and other published materials – including quantitative data, for instance from extant economic modelling and international trade statistics – and supplemented these sources with information from expert interviews.

In total, 43 individuals were interviewed for this study. This includes 14 government officials, 13 industry representatives, five representatives of the environmental community, six academics, and five other experts.<sup>24</sup> For the two EU case studies, 18 individuals were consulted in person in Brussels, Belgium, between October and November 2015, while four interviews were conducted over the phone in June 2016 and November 2017. For the two California case studies, 10 individuals were consulted in person in Sacramento, California, in October 2017, while 11

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Implementing Border Carbon Adjustments: Lessons, Cautions, and Research Needs from the Literature” (2019) 13:1 Review of Environmental Economics and Policy 3 at 4.

<sup>23</sup> Because BCAs are commonly envisaged for manufactured goods, the inclusion of electricity imports may not readily appear to be a BCA. However, the literature and policy-makers in California consider the measure to be a form of a BCA; see e.g. Economic and Allocation Advisory Committee, “Allocating Emissions Allowances Under a California Cap-and-Trade Program: Recommendations to the California Air Resources Board and California Environmental Protection Agency” (March 2010), online: EAAC <<http://www.climatechange.ca.gov/eaac/>> (retrieved 22 September 2017) at 46; US, California Air Resources Board, *Proposed Regulation to Implement the California Cap-and-Trade Program, Staff Report: Initial Statement of Reasons* (28 October 2010), online: ARB <<https://www.arb.ca.gov/>> (retrieved 7 March 2018) at K-33; US, California Air Resources Board, *California's Cap-and-Trade Program, Final Statement of Reasons* (October 2011), online: ARB <<https://www.arb.ca.gov/>> (retrieved 9 March 2018) at 1175; Mehling et al, “Beat Protectionism”, *supra* note 3; Cosbey et al, *supra* note 22 at 4 n 3; Thomas Cottier et al, “Differential Taxation of Electricity: Assessing the Compatibility with WTO Law, EU Law and the Swiss-EEC Free Trade Agreement” (2014) World Trade Institute, Universität Bern. Others hold that the measure at least resembles a BCA; see World Bank, *State and Trends of Carbon Pricing 2015* (Washington, DC: World Bank, 2015) at 79; Justin Caron, Sebastian Rausch & Niven Winchester, “Leakage from Sub-National Climate Policy: The Case of California's Cap-and-Trade Program” (2015) 36:2 The Energy Journal 167 at 169.

<sup>24</sup> Because industry interests were advocated by various associations representing individual sectors, more industry associations than environmental organizations were present both in the EU and in California.



interviews were conducted over the phone between October and November 2017 as well as in August 2018. While the interviewees informed the research through their statements, the participants do not necessarily endorse the conclusions reached in this research. The University of British Columbia's Behavioural Research Ethics Board approved the research for this project.

## 5. Case studies

This part summarizes the case studies and briefly explains the policy outcomes in each case.

The first case study examined the inclusion of the aviation sector in the EU's cap-and-trade system. As part of this endeavour, the EU sought to include international flights in this system, which is akin to a BCA. Although the aviation inclusion was passed into law, international flights were subsequently exempted from the policy. While strong support from policy-makers for the coverage of international flights was able to overcome opposition from EU stakeholders initially, the emergence of vigorous international opposition during the implementation of the policy sparked fears of trade war and retaliation that led to the subsequent exemption of international flights. Key EU stakeholders, notably airline Lufthansa and aircraft manufacturer Airbus, successfully lobbied policy-makers to exempt international flights.

The second case study concerned the EU's experience with BCAs for stationary installations under its cap-and-trade system. Although BCAs for stationary installations have been the subject of recurring, albeit relatively muted, debate throughout the existence of the EU's cap-and-trade system, no such BCAs have been used in the system. Stakeholders' predominantly negative attitude towards BCAs and policy-makers' limited willingness to engage in a discussion on these measures prevented their adoption. Both policy-makers and industry stakeholders preferred free allocation as an alternative to BCAs, which offered industry stakeholders significant financial value and policy-makers enjoyed the political advantages that came with this value. At the same time, the use of free allocation avoided the risk of repercussions for international relations.

The third case study analyzed the inclusion of electricity imports in California's cap-and-trade program. Although imports of electricity have been included from the start of the cap-and-trade program, policy-makers have been struggling to prevent market participants from circumventing this BCA. While a strong coalition of policy-makers and environmental non-governmental organizations (NGOs) was able to fend off opposition to the BCA initially, political opposition from a group of major utilities, driven by concerns about regulatory uncertainty and the BCA's effectiveness in achieving emissions reductions, subsequently led policy-makers to weaken the BCA by granting significant exemptions.<sup>25</sup>

The fourth case study investigated California's experience with BCAs for industrial facilities in its cap-and-trade program. Although BCAs for industrial facilities have received some degree of attention in California over the years, the state has not applied any such measures in its cap-and-trade program to date. Overwhelming opposition in combination with limited demand for these

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<sup>25</sup> For further details on this case study, see Stefan U Pauer, "Including Electricity Imports in California's Cap-and-Trade Program: A Case Study of a Border Carbon Adjustment in Practice" (2018) 31:10 *The Electricity Journal* 39.

measures explains this policy outcome. Both industry stakeholders and policy-makers preferred free allocation as an alternative to BCAs for industrial facilities, which offered industry stakeholders significant financial value and came with political advantages for policy-makers.

## 6. Results

This part presents the study's findings, which were generated by comparing experiences with BCAs across the case studies. The results are presented by hypothesis as follows: legal concerns (section 6.1), practical concerns about the administrative complexity of BCAs or their effectiveness (section 6.2), concerns about repercussions for governmental relations (section 6.3), a preference for alternative measures (section 6.4), and domestic political opposition (section 6.5). Each of these sections begins with a concise overview of the current state of the literature, which is followed by the empirical findings of this study. Section 6.6 contains additional insights gained from this research. Table 1 offers an overview of the study's findings, presented by hypothesis and for each policy outcome in all cases.

### 6.1. Legal concerns

Leading WTO law experts indicate that BCAs can indeed be designed to be WTO-compliant.<sup>26</sup> Furthermore, even if BCAs were to be found illegal by a WTO panel, the legal consequences are relatively limited.<sup>27</sup> Similarly, it appears that BCAs may be designed to be compatible with the Dormant Commerce Clause (DCC), which is a constitutional principle in the US that seeks to prevent protectionist policies.<sup>28</sup> Nevertheless, significant legal uncertainties do exist and the design of WTO- or DCC-compliant BCAs may not be trivial.

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<sup>26</sup> See e.g. Steve Charnovitz, "The Law of Environmental 'PPMs' in the WTO: Debunking the Myth of Illegality" (2002) 27:1 *The Yale Journal of International Law* 59 at 101, 110; Epps & Green, *supra* note 5 at 122; Patrick Low, Gabrielle Marceau & Julia Reinaud, "The Interface between the Trade and Climate Change Regimes: Scoping the Issues" (2012) 46:3 *Journal of World Trade* 485 at 506, 516; Pauwelyn, "Carbon Leakage Measures", *supra* note 11 at 505-506.

<sup>27</sup> See e.g. Epps & Green, *supra* note 5 at 166; Pauwelyn, "Carbon Leakage Measures", *supra* note 11 at 455-456; Joost Pauwelyn, "Testimony Before the Subcommittee on Trade of the House Committee on Ways and Means" (24 March 2009), online: United States House Committee on Ways and Means <<http://waysandmeans.house.gov/>> at 17; Joel P Trachtman, "WTO Law Constraints on Border Tax Adjustment and Tax Credit Mechanisms to Reduce the Competitive Effects of Carbon Taxes" (2016) *Resources for the Future, Discussion Paper* 16-03 at 1-2; Jean Fouré, Houssein Guimbar & Stéphanie Monjon, "Border Carbon Adjustment in Europe and Trade Retaliation: What Would Be the Cost for European Union?" (2013) *CEPII, Working Paper* 2013-34.

<sup>28</sup> See e.g. Thomas Alcorn, "The Constitutionality of California's Cap-and-Trade Program and Recommendations for Design of Future State Programs" (2013) 3:1 *Michigan Journal of Environmental & Administrative Law* 87 at 87; David Driesen, "Must the States Discriminate Against Their Own Producers Under the Dormant Commerce Clause?" (2016) 54 *Houston Law Review* 1 at 57.

Table 1: Barriers to adoption and implementation of BCAs in each case

		POLICY OUTCOMES						
		EU aviation		EU stationary installations	California electricity		California industrial facilities	
		<i>Adoption</i>	<i>Implementation</i>		<i>Adoption</i>	<i>Implementation</i>		
<b>HYPOTHESES</b>	<b>Legal concerns</b>	WTO	Policy-makers considered and did not regard as obstacle	Policy-makers convinced that in compliance	Policy-makers aware that compliance can be ensured and did not regard as obstacle	Policy-makers considered and did not regard as obstacle	No evidence that played any role	Policy-makers considered and did not regard as obstacle
		DCC	Not applicable	Not applicable	Not applicable	Policy-makers considered and did not regard as obstacle	No evidence that played any role	Policy-makers considered and did not regard as obstacle
	<b>Practical concerns</b>	Administrative complexity	Relatively simple and straightforward	Relatively simple and straightforward	Policy-makers considered practically feasible	Policy-makers adopted pragmatic and relatively straightforward approach	No evidence of such concerns	Policy-makers considered practically feasible
		Effectiveness	No evidence of such concerns	No evidence of circumvention	No evidence of such concerns	Policy-makers aware of concerns, but confident could be addressed in implementation	Policy-makers unable to prevent circumvention	No evidence of such concerns
	<b>Repercussions for governmental relations</b>	Trade war and retaliation	No international opposition	Strong international opposition consisting of threats and retaliation	Threats of retaliation, particularly from developing countries	No opposition from other governments, and no fear among policy-makers or stakeholders	No opposition from other governments, and no fear among policy-makers or stakeholders	No opposition from other governments, and no fear among policy-makers or stakeholders
		Hampering climate efforts	Minor concerns at the most, if any	Minor concerns at the most, if any	Policy-makers showed some concern, although likely not decisive	No evidence of such concerns	No evidence of such concerns	No evidence of such concerns
	<b>Alternative measures</b>		Policy-makers did not prefer any alternative measures	No alternative measures put in place	Industry stakeholders and policy-makers preferred free allocation	Policy-makers identified no preferable alternative measures	No alternative measures put in place	Industry stakeholders and policy-makers preferred free allocation
	<b>Domestic political opposition</b>		Strong support from policy-makers overcame domestic opposition	Opposition from key domestic stakeholders (particularly Airbus and Lufthansa)	Most stakeholders and policy-makers opposed, only limited support	Strong coalition of policy-makers and NGOs overcame domestic opposition	Opposition from group of major utilities	Most stakeholders and policy-makers opposed, only limited support

Barrier  
Not a barrier

In fact, there is strong evidence from all cases in this study that WTO law did not prevent the adoption or implementation of any BCAs. Likewise, evidence from both case studies in California shows that the US DCC did not prevent the adoption or implementation of any BCAs. Therefore, neither WTO law nor the DCC were barriers to BCAs in these cases.

In addition, none of the policy outcomes in any of the cases was driven by a false belief among policy-makers that designing BCAs in compliance with WTO law or the DCC would not be possible. No evidence was found of any such false belief among policy-makers. In fact, in all cases, policy-makers were keen not to violate the applicable legal regimes, namely WTO law in the EU, and WTO law as well as the DCC in California. Policy-makers carefully considered the relevant legal questions and were convinced that BCAs could meet the legal requirements of those regimes.<sup>29</sup> While legal concerns did not prevent the adoption or implementation of BCAs in these cases, there was incomplete information about the level of effort required to design BCAs in compliance with WTO law or the DCC.

In the two cases in which BCAs were first adopted before being suspended (EU aviation) or weakened (California electricity) during implementation, no cases have been brought on the grounds of WTO law or the DCC.

There is evidence that opponents to BCAs might have alleged legal concerns to reinforce their opposition. Opponents may have used legal concerns about WTO law and the DCC as smoke screens and to cast doubt on whether the design of BCAs in compliance with these legal regimes is possible, against assertions to the contrary from legal experts. Evidence suggesting such behaviour was found in the cases of EU stationary installations, California industrial facilities, and California electricity.

## 6.2. Practical concerns

### 6.2.1. Administrative complexity

Existing research demonstrates that the administrative complexity of BCAs differs from sector to sector and offers pragmatic and creative technical solutions to address administrative complexity concerns.<sup>30</sup> Nevertheless, the literature also warns about the practical challenges involved in implementing and administering BCAs.<sup>31</sup>

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<sup>29</sup> Although California is not a WTO member itself, its policy-makers were intent on complying with WTO law to ensure the legal viability of California state law.

<sup>30</sup> E.g. Mehling et al, “Designing BCAs”, *supra* note 18; Carbon Trust, “Tackling Carbon Leakage: Sector-Specific Solutions for a World of Unequal Carbon Prices” (2010); Susanne Dröge, “Tackling Leakage in a World of Unequal Carbon Prices” (2009) *Climate Strategies*.

<sup>31</sup> See e.g. Michael O Moore, “Implementing Carbon Tariffs: A Fool’s Errand?” (2011) 34:10 *The World Economy* 1679 at 1688, 1691; Peter Holmes, Tom Reilly & Jim Rollo, “Border Carbon Adjustments and the Potential for Protectionism” (2011) 11:2 *Climate Policy* 883 at 890-891; World Trade Organization & United Nations Environment Programme, *Trade and Climate Change* (Geneva: WTO & UNEP, 2009) at 101; Trevor Houser et al, *Leveling the Carbon*

In fact, there is strong evidence across all cases and policy outcomes in this research that no concerns about the administrative complexity prevented the adoption or implementation of the BCAs studied. Therefore, such concerns were no barrier to BCAs in these cases.

In the two cases in which BCAs were first adopted before being suspended (EU aviation) or weakened (California electricity) during implementation, policy-makers were able to apply relatively simple and straightforward approaches to implement and administer these measures, even when faced with practical difficulties, such as in the case of California electricity. Furthermore, the subsequent weakening or suspension of these BCAs was not due to any concerns about their administrative complexity. In the two cases in which BCAs were not adopted, namely those of EU stationary installations and California industrial facilities, no concerns about the administrative complexity determined these policy outcomes. In fact, policy-makers both in the EU and California were convinced that any concerns about the administrative complexity of implementing and administering BCAs for basic industrial products could be overcome.

As with legal concerns, there is evidence that opponents to BCAs might have alleged concerns about the administrative complexity of these measures to reinforce their opposition. Overstating the significance of practical difficulties, opponents may have used these concerns as smoke screens and to cast doubt on whether the implementation of BCAs is practically feasible, despite evidence to the contrary. Evidence suggesting such behaviour among opponents was found in all cases.

#### 6.2.2. Effectiveness in achieving the potential benefits of a BCA

The literature raises doubts with respect to BCAs' effectiveness in achieving their potential benefits. Specifically, there may be risks of avoidance of a BCA through fraud and circumvention, potentially offsetting all of the benefits of BCAs.<sup>32</sup>

There is strong evidence across all cases that no concerns about the effectiveness in achieving the potential benefits of a BCA prevented the adoption of these measures. However, depending on the ease with which market participants were able to circumvent the BCA, such concerns posed a barrier to their implementation.

The case of California electricity was the only one in which concerns about the effectiveness of a BCA were present and indeed found to have been a barrier to the implementation of the measure.

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*Playing Field: International Competition and US Climate Policy Design* (Washington, DC: Peterson Institute for International Economics, World Resources Institute, 2008) at 75-76; Christopher L Weber & Glen P Peters, "Climate Change Policy and International Trade: Policy Considerations in the US" (2009) 37:2 *Energy Policy* 432 at 438.

<sup>32</sup> See e.g. Moore, *supra* note 31 at 1699; Michael Jakob & Robert Marschinski, "Interpreting Trade-Related CO<sub>2</sub> Emission Transfers" (2013) 3:1 *Nature Climate Change* 19 at 22; Houser et al, *supra* note 31 at 56; Tancrediè Voituriez & Xin Wang, "Getting the Carbon Price Right Through Climate Border Measures: A Chinese Perspective" (2011) 11:5 *Climate Policy* 1257 at 1258; Cosby et al, *supra* note 22 at 18.

While policy-makers were already aware of these concerns before the adoption of the BCA, they were confident that these concerns could be addressed during the implementation of the measure. However, policy-makers were unable to overcome these concerns during implementation after all. The only other case in which a BCA was adopted is the one of EU aviation. However, policy-makers had no concerns about the effectiveness of the BCA before its adoption. Likewise, but in contrast to the case of California electricity, there were no such concerns that could explain the subsequent suspension of the BCA during its implementation.

The factor that explained the different policy outcomes during the implementation of these measures in the cases of California electricity and EU aviation was the ease with which market participants were able to circumvent these BCAs. In the case of California electricity, circumvention of the BCA was facilitated by incomplete information on emissions of so-called unspecified electricity in the electricity market as well as minimal transaction costs of sourcing electricity from different suppliers, which offered market participants opportunities for gaming. In contrast, in the EU aviation case, the availability of accurate data on fuels and thus emissions limited compliance entities' opportunities for circumvention.

In the two cases in which BCAs were not adopted, policy-makers had only limited concerns about the effectiveness in achieving the potential benefits of such a measure that did not prevent its adoption (EU stationary installations) or had no such concerns at all (California industrial facilities). In these cases, either policy-makers were confident in their ability to address these concerns during implementation, or the discussions of the BCAs did not advance far enough to evoke more of these concerns.

Given that – in contrast to the electricity and aviation sectors – BCAs have not been adopted for manufacturing industries, these measures remain untested and the risk of circumvention uncertain for manufacturing industries. The case of California electricity suggests that the extent to which market participants circumvent a BCA that compromises its effectiveness may only become evident after the adoption of such a measure. Concerns about the circumvention of BCAs may also signal the limits of any one jurisdiction's leverage over regulating emissions in foreign markets.

### 6.3. Concerns about repercussions for governmental relations

#### 6.3.1. Fear of trade war and retaliation

There are suggestions in parts of the literature that policy-makers might be concerned that BCAs could ignite “retaliatory tit-for-tat trade wars,” fearing that BCAs could lead to trade measures spiralling out of control.<sup>33</sup>

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<sup>33</sup> Jason E Bordoff, “International Trade Law and the Economics of Climate Policy: Evaluating the Legality and Effectiveness of Proposals to Address Competitiveness and Leakage Concerns” in Lael Brainard & Isaac Sorkin, eds, *Climate Change, Trade, and Competitiveness: Is a Collision Inevitable?* (Washington, DC: Brookings Institution Press, 2009) 35 at 41; also Charles E McLure, “Border Adjustments for Carbon Taxes and the Cost of Emissions Permits” in Gilbert

Indeed, there is evidence from all case studies and policy outcomes in this study that the presence of opposition from other governments prevented the adoption or implementation of BCAs. Therefore, opposition from other governments was a barrier to BCAs in these cases.

Where opposition from other governments existed, namely in the two EU cases, it prevented the adoption (EU stationary installations) or implementation (EU aviation) of BCAs. In contrast, where no such opposition was present, namely in the two California cases, it was unable to influence the policy outcome. Opposition from other governments also explains why, in the EU aviation case, policy-makers at first were able to adopt the BCA because this opposition only emerged during the implementation of the BCA following its adoption two years earlier. Similarly, in the case of EU stationary installations, opposition from other governments emerged in response to EU legislation that foresaw the possibility of introducing BCAs. Once policy-makers recommended not adopting BCAs, however, other governments no longer exercised that opposition.

Depending on the scope of the opposition from other governments, even an economically powerful and politically influential jurisdiction was unable to overcome such opposition. Specifically, the opposition from foreign governments in the EU aviation case was significant in both breadth and depth, which prevented the implementation of the BCA even for a large economy and dominant political player like the EU.

The degree of export-orientation of the jurisdiction's economy appeared to determine the existence of opposition from other governments and a corresponding fear of trade war and retaliation among policy-makers. This is because exports are the trade flows that other jurisdictions would target in retaliation to a BCA. The more export-oriented an economy, the more likely policy-makers were susceptible to threats and measures of retaliation, and the more likely a fear of trade war and retaliation played a role in determining the policy outcome. Stakeholders representing export-oriented sectors of the economy opposed BCAs for the same reason. In contrast, stakeholders representing import-oriented sectors were able to support BCAs because any retaliation would have limited effects on them.

This explains why policy-makers in the two EU cases (export-oriented economy) were concerned about retaliation from other countries once retaliatory threats and measures emerged, and why policy-makers in the two California cases (imported-oriented economy) showed no such concerns. It also explains why Germany (export-oriented) opposed BCAs for stationary installations and why France (neutral balance of trade) was able to support such measures. Furthermore, it explains why Airbus (with exports of manufactured aircraft) and Lufthansa (with operations outside the European Economic Area (EEA)) were concerned about retaliatory measures on their businesses. Likewise, the EU chemicals sector (export-oriented) opposed BCAs. In contrast, airlines operating predominantly within the EEA, such as Ryanair and

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E Metcalf, ed, *US Energy Tax Policy* (Cambridge: Cambridge University Press, 2010) 193 at 199; Jagdish Bhagwati & Petros C Mavroidis, "Is Action Against US Exports for Failure to Sign Kyoto Protocol WTO-Legal?" (2007) 6:2 *World Trade Review* 299 at 309-310; Weber & Peters, *supra* note 31 at 438; Scott Barrett, "Climate Treaties and the Imperative of Enforcement" (2008) 24:2 *Oxford Review of Economic Policy* 239 at 245.

EasyJet, were not vulnerable to retaliation. Similarly, California's cement industry (import-oriented) was able to support a BCA on imports of cement because the sector was not vulnerable to retaliation. Moreover, due to concerns that their exports could be targeted by retaliation, stakeholders representing export-oriented industries even opposed the development of BCAs for other sectors. This was encountered in the case of EU stationary installations.

### 6.3.2. Fear of hampering international climate efforts

Political and economic tensions between the world's major powers are likely to make collective progress on climate mitigation and adaptation more difficult,<sup>34</sup> and the literature indicates that BCAs could increase animosity and thus reduce the goodwill between jurisdictions and their willingness to find cooperative solutions to climate change.<sup>35</sup>

The evidence in these cases, however, shows that concerns among policy-makers about hampering international climate efforts were limited at the most. If anything, any such fears acted as a minor barrier to BCAs and depended on the level of government of the jurisdiction putting in place or considering a BCA. Such concerns played only a minor role for policy-makers from nation states or supranational organizations, while it played no role at all for those of subnational jurisdictions.

This was evident in both EU cases. Although policy-makers from a nation state or supranational organization could be concerned about hampering international climate efforts to some extent, such concerns did not play more than a minor role in these cases, if any. For policy-makers from a subnational jurisdiction, which has no formal role in international climate negotiations, such concerns are likely to play an even lesser role, if any. This was evident in the two California cases, in which policy-makers showed no such concerns, even if its leaders sought to engage in so-called climate diplomacy and assert the state as a quasi-nation state in the area of climate policy-making.

### 6.4. Alternative measures

Despite the environmental, economic, and political benefits in theory, policy-makers and stakeholders could prefer alternative measures to pursue these benefits. Because alternative measures may be less controversial and may offer other advantages,<sup>36</sup> their availability could act as a barrier to the adoption and implementation of BCAs.

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<sup>34</sup> See e.g. World Economic Forum, "The Global Risks Report 2019, 14th Edition" (2019) at 6; see also Larry Elliott, "Global Tensions Holding Back Climate Change Fight, Says WEF", *The Guardian* (16 January 2019), online: The Guardian <<http://www.theguardian.com/>>.

<sup>35</sup> Epps & Green, *supra* note 5 at 218-219.

<sup>36</sup> See e.g. Lawrence H Goulder & Ian W H Parry, "Instrument Choice in Environmental Policy" (2008) 2:2 *Review of Environmental Economics and Policy* 152 at 164; Nathaniel O Keohane, "Cap and Trade, Rehabilitated: Using Tradable Permits to Control U.S. Greenhouse Gases" (2009) 3:1 *Review of Environmental Economics and Policy* 42 at 45.



Indeed, there is consistent evidence in this study that BCAs were not put in place whenever free allocation was available as an alternative measure, and that the presence of free allocation as an alternative measure explains the absence of BCAs. Therefore, free allocation was a barrier to the adoption of BCAs in these cases. It should be noted that, while all four case studies concerned cap-and-trade systems, output-based credits offer an equivalent alternative to BCAs under a carbon tax.<sup>37</sup>

The availability of free allocation as an alternative in a cap-and-trade system depends on the purpose policy-makers intend to use BCAs for. Free allocation offers an alternative to BCAs where policy-makers aim to address the nexus of competitiveness concerns and carbon leakage. However, where the goal is to increase the coverage of carbon pricing by imposing a carbon price on emissions associated with imports – in other words, to extend a policy’s scope and thus environmental reach beyond the domestic domain – free allocation cannot achieve that aim and therefore offers no alternative to BCAs. In the cases of manufacturing industries in the EU and in California, where policy-makers sought to address competitiveness and leakage concerns, free allocation was available as an alternative to BCAs. In these cases, both policy-makers and stakeholders preferred free allocation to BCAs, thus preventing the adoption of the latter. In the cases of EU aviation and California electricity, in contrast, free allocation was not available as an alternative measure to maximize the scope and thus environmental reach of the policy. Therefore, free allocation was unable to act as a barrier in these cases.

The reason for policy-makers’ and stakeholders’ preference for free allocation is found in the overgenerous levels of free allocation and the ensuing economic, political, and institutional inertia of free allocation, which created a path dependency that led to its perpetuation. Economically, free allocation limits increases in downstream product prices, which appealed to industry stakeholders that experienced relatively elastic demand for their products. It also appealed to policy-makers who sought to avoid that the costs of climate policies were visible to voters. Importantly, free allocation also offered other political advantages to policy-makers. Enabling them to control the distributional impacts under cap-and-trade, policy-makers were able to “buy off” compliance entities. Indeed, the levels of compensation policy-makers offered industry stakeholders through free allocation appear to be overgenerous. This generosity created a vested interest not only in cap-and-trade, but also in free allocation itself. Once free allocation was introduced, recipients did not want to risk losing it given the enormous financial value of free allowances. In addition, both industry stakeholders and policy-makers resisted a change from a known, existing system of free allocation to an unknown, new approach using BCAs. Therefore, both the recipients of free allocation and policy-makers had incentives to adopt free allocation and maintain the status quo once it was introduced. This explains why generous levels of free allocation persisted despite policy-makers’ assertions that this form of assistance was transitional and would be phased out over time.

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<sup>37</sup> For instance, Canada’s federal “Output-Based Pricing System,” which is a form of carbon taxation designed to apply to provinces or territories that do not have their own carbon pricing in place, foresees output-based credits for industrial facilities; see Canada, *Greenhouse Gas Pollution Pricing Act*, SC 2018, c 12, s 186, Part 2.

In fact, driven by these reasons, industry stakeholders even opposed the development of BCAs for other sectors to prevent these measures from subsequently being implemented for their own industries. This was encountered in the case of California industrial facilities.

Where free allocation was available as an alternative measure to BCAs, namely in the cases of EU stationary installations and California industrial facilities, there were divergent views among stakeholders about whether or not BCAs and free allocation are mutually exclusive alternatives or may be applied in combination. Industry stakeholders viewed these measures as complementary and were not willing to forego free allocation in exchange for BCAs. NGOs, in contrast, saw BCAs and free allocation as mutually exclusive alternatives. Policy-makers either considered them mutually exclusive, which was the case in the EU, or they were open to putting BCAs in place in addition to free allocation as long as industry would not be overcompensated for their compliance costs, which was the case in California.

### 6.5. Domestic political opposition

In theory, because of the ability of BCAs to protect the competitiveness of domestic industries relative to peers in jurisdictions with more lenient standards,<sup>38</sup> industries subject to domestic climate policy would be expected to support BCAs.<sup>39</sup>

However, there is strong evidence from all case studies and policy outcomes in this study that the presence or absence of domestic political opposition determined the policy outcome. In other words, domestic political opposition acted as a barrier to BCAs in these cases. In general, there was only scant support for BCAs from a limited number of stakeholders, while an overwhelming number of stakeholders opposed BCAs.

In all case studies, domestic political opposition consistently prevented the implementation of BCAs. In the two cases with intermediate policy outcomes, in which BCAs were first adopted before later on being suspended (EU aviation) or weakened (California electricity), strong support for these measures from policy-makers (and NGOs in the case of California electricity) was able to overcome domestic political opposition temporarily. During implementation, however, domestic political opposition led to the eventual policy outcome. Therefore, the temporary absence of domestic political opposition enabled the adoption of BCAs in the two intermediate policy outcomes.

Several factors determined stakeholders' attitudes towards BCAs. This includes stakeholders' exposure to the carbon price under a BCA. For instance, in the case of EU aviation, airlines that operated mostly within the EEA supported the extension of the cap-and-trade program to flights outside the EEA because the extension left most of their flights unaffected. However, the extension was opposed by airlines operating long-haul flights between the EEA and third countries because it put in place a carbon price for flights outside of the EEA. In the case of California electricity, producers of in-state electricity supported the BCA, while importers of electricity from carbon-intensive sources opposed the measure. The BCA did not increase costs

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<sup>38</sup> See e.g. Böhringer, Balistreri & Rutherford, *supra* note 4.

<sup>39</sup> See e.g. Pauwelyn, "Carbon Leakage Measures", *supra* note 11 at 452.

for the former but exposed the latter to carbon pricing for its imports. In the cases of EU stationary installations and California industrial facilities, import-oriented industries supported BCAs to fend off competition from abroad. In contrast, opposition came from industries with corporate structures and industrial supply chains extending beyond these jurisdictions because products from installations owned by the same stakeholder but located abroad and exported into the jurisdiction would face the carbon price under a BCA. Other factors that determined stakeholders' attitudes towards BCAs are the potential or actual exposure to retaliation from other countries and stakeholders' preference for free allocation where it was available as an alternative measure.<sup>40</sup>

Policy-makers supported BCAs in the cases of EU aviation and California electricity but opposed them in the cases of EU stationary installations and California industrial facilities. The reason for this difference lies in policy-makers' preference for free allocation, which was available in the latter two cases but not in the former two.<sup>41</sup> NGOs' attitudes towards BCAs were diverse and depended on the motivation behind such measures. Where environmental concerns were in the foreground, NGOs supported BCAs. Where competitiveness concerns were in the foreground, NGOs did not support or even opposed BCAs. For instance, in the cases of EU aviation and California electricity, in which the BCAs were mainly motivated by a desire to maximize the reach of the carbon price, NGOs strongly supported the BCAs. In contrast, in the cases of EU stationary installations and California industrial facilities, the BCAs were mainly motivated by a desire to address competitiveness and carbon leakage concerns. NGOs in California were not opposed to BCAs but did not support such measures either. NGOs in the EU showed skepticism and even opposition towards BCAs due to doubts about the significance or incidence of carbon leakage and because of concerns about retaliation from other countries.<sup>42</sup>

## 6.6. Additional insights

Comparing the initial policy outcomes in the two EU case studies, it appears striking that the EU adopted a BCA in the aviation case but none for stationary installations. The explanation for this difference is found in domestic political opposition that was predicated upon the availability of alternative measures and fears of trade war and retaliation. In the EU aviation case, strong support from the European Parliament and the European Commission was able to overcome domestic political opposition initially. For stationary installations, however, there never was sufficient support for BCAs to begin with, due to preferences for free allocation and fears of trade war and retaliation. For aviation, no alternative measure was available to increase the coverage of the cap-and-trade program by extending its scope and thus environmental reach beyond the domestic domain. For stationary installations, however, both policy-makers and stakeholders preferred free allocation to BCAs as an alternative to address the nexus of competitiveness concerns and carbon leakage. Regarding fears of trade war and retaliation, third country opposition to the aviation BCA only emerged during its implementation, which explains why the EU was able to pass it into law initially. In the case of stationary installations, however,

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<sup>40</sup> See section 6.3.1 and part 6.4, above, respectively.

<sup>41</sup> See part 6.4, above.

<sup>42</sup> See section 6.3.1, above.

third countries exerted early opposition after the EU passed a provision that foresaw the mere possibility of introducing BCAs in the future.

Similarly, the initial policy outcomes in the two California cases were markedly different, with policy-makers having adopted a BCA in the electricity sector but none for industrial facilities. This is because of differences in stakeholder attitudes, which shifted depending on the availability of alternative measures. In the electricity case, a strong coalition of policy-makers and NGOs was able to overcome opposition from utilities at first. In the case of industrial facilities, however, overwhelming opposition combined with limited demand for BCAs meant that there was actually never any meaningful support for BCAs. This was due to a preference for free allocation to address the nexus of competitiveness concerns and carbon leakage. In contrast, no alternative measures were available to address emissions from imported electricity.

The case studies also offer opportunities for thought experiments. If, hypothetically, alternative measures – specifically free allocation – had not been available for stationary installations in the EU and industrial facilities in California, would policy-makers have adopted and implemented BCAs? In the EU case, fears of trade war and retaliation likely would still have prevented the adoption of BCAs for stationary installations, or at least thwarted efforts to implement them even if policy-makers would pass such measures into law initially. In California, the policy outcome would likely depend on the extent of domestic political opposition from industries with corporate structures and supply chains that extend beyond the state. As long as such opposition proves to be prohibitive, policy-makers would not adopt BCAs for industrial facilities. In both jurisdictions, however, the question remains if concerns about circumvention would emerge during any implementation and derail policy-makers' efforts after all. The answer to this question depends on the ease with which market participants would be able to circumvent any such BCAs.

Another thought experiment relates to the barrier of opposition from other governments. If, hypothetically, EU policy-makers and stakeholders were not concerned about trade war and retaliation, for instance if the EU economy was more import-oriented and thus not as vulnerable to retaliation – would policy-makers have adopted and implemented BCAs? It remains unclear whether the BCA in the aviation case would have been implemented under such circumstances. However, BCAs for stationary installations would likely still not have been adopted due to a preference for free allocation among both policy-makers and stakeholders.

A further insight relates to legal concerns. The fact that BCAs may be designed to be WTO- and DCC-compliant appears to be of little relevance as long as policy-makers continue to be reluctant to rely on their legal rights due to a preference for free allocation, concerns about repercussions for governmental relations, domestic political opposition, or practical concerns about the circumvention of BCAs. Ultimately, policy-makers gave considerations other than law more weight in designing their domestic climate policies, particularly political considerations.

Another insight concerns the trade flows targeted by BCAs. In all four case studies, the discourse on BCAs focused almost exclusively on imports, with BCAs on exports mostly absent from the discussions. In the two cases in which BCAs were adopted (EU aviation, California electricity),

BCAs on exports were not included in these measures.<sup>43</sup> Several factors explain this observation: stakeholders that supported BCAs represented predominantly import-oriented sectors (e.g. California’s cement industry, which experienced significant imports but hardly any exports); some practitioners lacked familiarity with or even misunderstood the concept of BCAs on exports; policy-makers focused on protecting domestic producers rather than those producing abroad, even if they are owned by domestic companies; policy-makers considered rebating exports environmentally perverse if those exports were not subject to carbon pricing abroad.

Furthermore, in none of the four case studies, policy-makers or stakeholders sought to leverage the potential benefit of BCAs to incentivize other jurisdictions to take climate action. Instead, policy-makers and stakeholders either focussed on addressing the nexus of competitiveness concerns and carbon leakage or sought to increase the coverage of carbon pricing by extending its scope and thus environmental reach beyond the domestic domain.

Lastly, BCAs were adopted only in those cases in which policy-makers sought to extend a policy’s scope and thus environmental reach beyond the domestic domain (EU aviation, California electricity). Nevertheless, no BCA effectively endured in any of the four case studies. Policy-makers either opted not to adopt BCAs in the first place (EU stationary installations, California industrial facilities), or they adopted BCAs but subsequently weakened (California electricity) or suspended (EU aviation) these measures during their implementation.

## **7. Conclusion**

In theory, BCAs offer the promise of economic, environmental, and political benefits. In practice, however, there are several reasons why both policy-makers and stakeholders oppose BCAs. Using four case studies, this research has identified empirically a number of barriers that prevented the adoption and implementation of BCAs in practice. These barriers consist of a preference for free allocation as an alternative measure, opposition from other governments that sparked fears of trade war and retaliation, domestic political opposition to BCAs, and practical concerns about the circumvention and thus the effectiveness of BCAs. In the cases examined, these barriers have outweighed the potential benefits of BCAs.

At the same time – and contrary to what the theory suggests – this research has shown that several other potential concerns did, in fact, not prevent the adoption and implementation of BCAs in these case studies. This applies to legal concerns about WTO law and the US DCC, and practical concerns about the administrative complexity of BCAs for basic industrial products. However, opponents to BCAs may have alleged such concerns to reinforce their opposition, despite evidence and expert assertions to the contrary. Furthermore, policy-makers at the most showed limited concerns about hampering international climate efforts, which thus presented only a minor barrier to BCAs, if any.

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<sup>43</sup> Note that in the EU aviation case, the BCA covered both incoming and outgoing flights, which resembles a BCA on imports. The equivalent of a BCA on (i.e. rebate for) exports in this case would be exempting outgoing flights from the measure’s coverage.

Although the theory suggests that policy-makers would embrace BCAs because of their potential benefits, the evidence from these case studies shows that policy-makers prefer alternative measures – such as free allocation – where they are available, are likely to meet domestic political opposition to BCAs, may run into opposition from other governments and thus face fears of trade war and retaliation, and may encounter concerns about the circumvention of BCAs. Similarly, industry stakeholders also prefer free allocation where this alternative is available, oppose BCAs for export-oriented sectors due to their potential or actual exposure to retaliation from other countries, and oppose BCAs if they increase their exposure to carbon pricing and where industries have corporate structures and supply chains that extend beyond the jurisdiction. Furthermore, while the theory suggests that NGOs would support BCAs due to their ability to counter carbon leakage and potential to incentivize other jurisdictions to take climate action, NGOs, in fact, supported BCAs only where environmental concerns were in the foreground and opposed these measures where the focus was to address competitiveness concerns.

Given these significant constraints, and contrary to popular belief among academics, the scope for applying BCAs in practice appears to be strikingly narrow. This insight aligns with the observation that BCAs are conspicuously absent in practice despite their potential benefits.

The following remarks address the study's limitations and suggest areas for further research. First, research that draws on qualitative data from interviews must recognize and be explicit about the possibility that research participants may be influenced by vested interests. In order to guard against the risk that such influences skew the research results, the interviews were carried out and evaluated critically and with this awareness in mind. Additionally, wherever possible, the evidence drawn on for this study was corroborated through multiple sources and documentary materials. These safeguards minimized the risk that vested interests influenced the research results.

Second, the case studies investigated all concern the carbon pricing instrument of cap-and-trade; no carbon taxes were studied explicitly. Although there are no obvious indications that the hypotheses investigated would play out fundamentally differently in a carbon tax regime,<sup>44</sup> the case study selection arguably may limit the relevance of the study's findings for carbon taxes.

Third, this research was able to draw conclusions regarding concerns about repercussions for governmental relations, namely through opposition from other governments that sparked fears of trade war and retaliation or of hampering international climate efforts, based on case studies in two jurisdictions. Investigating further jurisdictions besides the European Union and California could help verify the findings relating to BCAs' possible impact on governmental relations.

Another area for further research concerns the risk of circumventing BCAs. Given that the extent to which market participants can circumvent a BCA may only become evident during the implementation of such a measure, investigating further cases in which BCAs have been adopted could help further assess the risk of circumvention. Because this research has examined case

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<sup>44</sup> Regarding the alternative measure of free allocation, note that also carbon taxes offer an equivalent alternative to BCAs. Under a carbon tax, policy-makers may allocate output-based credits to compliance entities, which is equivalent to free allocation in a cap-and-trade system.

studies in which BCAs were adopted for the electricity and aviation sectors, a case in which a BCA was adopted for manufacturing industries would be particularly illuminating to corroborate the findings regarding the risk of circumvention.

Of course, case studies of BCAs are challenging to come by. It appears difficult to find cases in which BCAs have been the subject of serious consideration and deliberation among policy-makers and stakeholders, let alone cases in which BCAs have been adopted or – even less likely – successfully implemented.

Indeed, for reasons investigated in this study, success in implementing BCAs has proven elusive to date. By studying some of the few experiences with BCA development, this research has explored why these measures are glaringly absent in policy-making practice. As the evidence presented has shown, the circumstances in which BCAs may be implemented successfully, and thus the scope for applying BCAs in practice, appear strikingly narrow.

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