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**The Dynamics and Global Implications of
Subglobal Carbon-Restricting Regimes**

JUSCELINO F. COLARES

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The Dynamics and Global Implications of Subglobal Carbon-Restricting Regimes

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The European Union and Australia have enacted comprehensive carbon-restricting reforms that will affect both domestic and foreign industries. After describing these reforms in detail, the article develops a microeconomic analytical model that explains the impact these regimes have on the dynamics of inter-firm competition in carbon-restricting nations and how they will also influence technology choices by certain industries in carbon-friendly nations. Specifically, exporters and producers operating in vertically-integrated industries in carbon-friendly nations will increasingly elect carbon-efficient technologies to minimize costs as they adjust to a changing international regulatory environment. The article hypothesizes that this shift in the carbon intensity of production will cause these industries to form coalitions with other pro-environment groups to pressure national governments for legislative and global carbon-restricting reforms that reduce carbon leakage and losses from trading with industries in carbon-laggard nations. Because these cumulative developments will eventually lead to a binding global emissions-stabilizing agreement, pursuant to which border measures will be taken, the article offers a few suggestions for reducing potential conflicts between the trade and climate change regimes.

INTRODUCTION[‡]

When considering technological options in a world where restricting emissions is increasingly the policy response to climate change, firms must choose between lower present-cost/lower future-benefit carbon-friendly production and higher present-cost/higher future-benefit carbon-efficient production. This article argues that firms will increasingly favor the latter over time, whether they are based in carbon-restricting nations or whether they intend to continue selling goods and services in those markets. That is the case because one of the effects of

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carbon-restricting policies is the creation of a market price for carbon, which turns carbon into a factor of production,¹ thus affecting firms' cost-minimization strategies. This article explains in detail the economic dynamics² that support this technological switch both at the firm and inter-firm levels in carbon-restricting countries and how this trend to carbon efficiency will extend to producers in carbon-friendly nations.

The mere possibility that carbon-restricting governments might resort to adopting level-the-playing field measures, such as border carbon adjustments ("BCAs"),³ increases regulatory uncertainty for carbon-friendly producers and, thus, steers their decisions toward more carbon-efficient production. Gradually, the economic interests of exporters of goods and services to these markets become more closely aligned with climate-friendly action, increasing the level of support for adopting carbon-restricting policies in former carbon-friendly countries. National legislatures may respond to these developments by enacting statutes providing for domestic carbon-restricting regimes that further reinforce the trend toward carbon efficient production. Pursuit of such legislation by industries exposed to foreign carbon-restrictions will be driven by either level-the-playing field or purely rent-seeking rationales, as such stakeholders will want to subject their competitors in climate-friendly nations to the same rules.⁴ The successive adoption of climate-friendly legislation at the subglobal level by different nations will eventually increase the pace of negotiations for a multilateral GHG stabilization agreement.⁵

1. See Ronald H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1, 44 (1960) ("If factors of production are thought of as rights, it becomes easier to understand that the right to do something which has a harmful effect . . . is also a factor of production.").

2. This dynamic, which involves explaining how firms engage in cost minimization by choosing among different factors of production, has been neatly formalized in microeconomics. See HAL R. VARIAN, *INTERMEDIATE MICROECONOMICS: A MODERN APPROACH* 339 (4th ed. 1996). I use this approach in Part III.

3. A BCA is a tariff designed to offset the cost disadvantage producers of goods and services operating in climate-leading countries face when in competition with more carbon-intensive imports from climate-laggard countries, thus reducing the potential leakage of CO₂ emissions to the latter. See Paul-Erik Veel, *Carbon Tariffs and the WTO: An Evaluation of Feasible Policies*, 12 J. INT'L ECON. L. 749, 751-52 (2009). In practice, a BCA could be enforced by either requiring importers to purchase emission allowances from an existing emissions trading scheme (i.e., where the importing country has implemented a cap-and-trade system), or by subjecting an import to a levy based on a preset measure of its emissions footprint (i.e., where the importing country has imposed similar carbon taxes on domestic goods). See WORLD TRADE ORGANIZATION, *WORLD TRADE REPORT 2012* 83 (2012), available at http://www.wto.org/english/res_e/booksp_e/anrep_e/world_trade_report12_e.pdf.

4. Briefly stated, rent-seeking refers to economic actors' pursuit of narrow, concentrated, unearned benefits or collective goods (i.e., rents), provided by governments through legislation or other public means, that imposes socially-spread distributed costs. See generally Robert Tollison, *Rent-Seeking: A Survey*, 35 KYKLOS 575, 577 (1982) (defining rent-seeking as the "activity of wasting resources in competing for artificially contrived transfers").

5. I borrow the term "subglobal" from Daniel Farber's article, *Carbon Leakage Versus Policy Diffusion: The Perils and Promise of Subglobal Climate Action*, 13 CHI. J. INT'L L. 359-62 (2013), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2102060. While Farber explains why subglobal mitigating efforts can become important steps toward a global agreement, I focus on explaining *how* the economic and legal dynamics of subglobal mitigating efforts are likely to influence global cooperation in the coming years.

Whereas the role BCAs will play in this process remains uncertain, their adoption is not strictly essential to the spread of carbon-restricting regimes to other countries. Arguably, adoption of a WTO-compliant BCA⁶ by either the E.U., Australia, or any other early reformer would accelerate the pace of carbon-restriction reform and expand the reach of these policies worldwide. Indeed, it is not surprising that the United States' failed attempt to pass such a statute provided for this type of border measure,⁷ clearly anticipating the obvious trade and carbon leakage effects⁸ the new regime would have on U.S. industry.⁹ That the currently operating E.U. and Australian regimes have not yet established a BCA may partially explain the slower pace of reform elsewhere (so far, at least). However, this says nothing about the likelihood of future BCA adoption in a binding multilateral carbon-restricting agreement where BCAs will be favored due to the need to avoid carbon leakage and non-neutral trade measures. Furthermore, when temporary alleviating measures (e.g., grants, free allowances, tax rebates) expire, and carbon prices stabilize at higher levels, the likelihood of BCAs will only increase.

This article explains the major features of the current carbon emission regimes in the E.U. (Part I) and Australia (Part II). With the aid of microeconomics, it explains the impact these regimes have on the dynamics of inter-firm competition

6. In principle, a BCA or any other trade-impacting measure that discriminates among products from different foreign nations or among products from foreign and domestic sources solely on the basis of carbon-efficiency would be deemed neutral. Such a measure would be deemed WTO-compliant if it came within the scope of one of the exceptions of and satisfied the requirements set forth in the chapeau of Article XX of GATT. See General Agreement on Tariffs and Trade, Oct. 30, 1947, 61 Stat. A-11, 55 U.N.T.S. 194 [hereinafter GATT] art. XX(b) & (g). A number of commentators have argued this point persuasively, although with some qualifications. See Christopher Tran, *Using GATT, Art XX to Justify Climate Change Measures in Claims Under the WTO Agreements*, 27 ENVTL. & PLAN. L. J. 346, 349-53 (2010); Veel, *supra* note 3, at 777-78; Francesco Sindico, *The EU and Carbon Leakage: How to Reconcile Border Adjustments with the WTO?* 17 EUR. ENERGY & ENVTL. L. R. 328, 338-39 (2008); Zhong Xiang Zhang, *Domestic Climate Policies and the WTO*, 27 WORLD ECON. 359, 379-81 (2004).

7. See American Clean Energy and Security Act, H.R. 2454, 11th Cong. §§ 766-67 (2009) [hereinafter "Waxman-Markey"].

8. Carbon leakage can fully or partially negate a country's efforts in reducing emissions in two ways: (i) higher emission costs may shift production of carbon-intensive goods and services to carbon-friendly nations, where such costs are not imposed; and (ii) the reduction in fossil fuel use in carbon-restricting nations may lower global energy prices, thereby inducing more energy consumption in carbon-friendly nations. See, e.g., Niven Winchester et al., *Will Border Carbon Adjustments Work?*, 11 B.E. J. ECON. ANALYSIS & POL'Y art. 7, at 1 (2011) (describing carbon leakage); NICHOLAS STERN, *THE ECONOMICS OF CLIMATE CHANGE: THE STERN REVIEW 551* (Cambridge: Cambridge University Press, 6th prtg. 2009) (explaining how carbon leakage creates competitiveness concerns).

9. See, e.g., Zack Hale, *Democrats Try to Walk Fine Line on Tariffs*, NAT'L J. (July 9, 2009), http://www.nationaljournal.com/njonline/no_20090708_2274.php (referring to Democratic Senators' competitiveness concerns and citing Ohio Senator Sherrod Brown's comment that "I don't think you can fully take care of manufacturing without some border equalization."); John Kerry & Lindsey Graham, *Yes We Can (Pass Climate Change Legislation)*, NY TIMES (Oct. 10, 2009), <http://www.nytimes.com/2009/10/11/opinion/11kerry-graham.html?pagewanted=all> (demonstrating that at least one Republican Senator was concerned with not "surrender[ing] our marketplace to countries that do not accept environmental standards," and who favored adopting "a border tax on items produced in countries that avoid these standards.").

in carbon-restricting nations and how these developments will also influence technology choices by exporting industries in carbon-friendly nations (Part III). At this point, the article hypothesizes that, as these industries shift to more carbon-efficient technologies and production methods, they are likely to form coalitions with other pro-environment groups to pressure national governments for legislative and global carbon-restricting reforms that reduce carbon leakage and losses from trading with industries in carbon-laggard nations. Because these cumulative developments eventually lead to a binding global emissions-stabilizing agreement, pursuant to which border measures will be taken, the article offers a few suggestions for reducing potential conflicts between the trade and the climate change regimes (Part IV).

I. THE E.U. EMISSIONS TRADING SCHEME

A. DESCRIBING QUALIFYING EMITTERS AND THE ROLE OF NATIONAL PLANS

The E.U. set up ETS, its cap-and-trade system, with Directive 2003/87/EC.¹⁰ This directive requires that all operators of installations that emit GHGs within the E.U. obtain permits from their respective member states.¹¹ Although six different types of GHGs come within its scope,¹² the Founding Directive is limited to regulating installations that emit CO₂.¹³ The E.U. Commission has reserved the right to include new installations, if monitoring and reporting of the emissions “can be carried out with sufficient accuracy.”¹⁴ All EU-based, CO₂-emitting operators must submit an application for a permit.¹⁵ To obtain the permit, they must be capable of monitoring and reporting emissions and agree to surrender allowances equal to the total amount of emissions for a given year.¹⁶

The Founding Directive set up different time periods, assigning to each a different objective. The first period went from January 1, 2005, through December 31, 2007; the second from January 1, 2008, through December 31, 2012; and the third began on January 1, 2013.¹⁷ Member states retained the authority to develop national plans for the total number of allowances issued in each time period, but this authority is subject to several E.U. criteria.¹⁸ The number one

10. See Council Directive 2003/87/EC [hereinafter the “Founding Directive”], 2003 O.J. (L275) 32-46 (EC).

11. *Id.*, art. 4, 2003 O.J. (L275) 35.

12. *Id.*, annex II, 2003 O.J. (L275) 43.

13. *Id.*, annex I, 2003 O.J. (L275) 42.

14. *Id.*, art. 24(3), 2003 O.J. (L275) 39.

15. See *id.*, art. 4, 2003 O.J. (L275) 35.

16. *Id.*, art. 6, 2003 O.J. (L275) 35.

17. See *id.*, art. 11, 2003 O.J. (L275) 36.

18. *Id.*, art. 9, 2003 O.J. (L275) 35-36. The Founding Directive lists 11 different criteria for national plans. *Id.*, annex III, 2003 O.J. (L275) 43.

criterion is to meet the member states' obligations under the Kyoto Protocol.¹⁹ Although the member states create the national plans, the E.U. Commission retains the ultimate authority to reject the plan if it is not compatible with the Founding Directive's criteria.²⁰ As such, the total cap for the ETS is the sum of all member states' national plans.

Each member state must punish operators who do not comply with the national plan.²¹ These penalties must be "effective, proportionate, and dissuasive."²² In addition to member states' penalties, member states must apply a fee on any excess emissions.²³ They must charge €100 for each metric tonne (i.e., 1,000 kg) of CO₂ in excess of an allowance.²⁴ However, during the first period, member states were authorized to charge €40.²⁵

B. ALLOWANCE DISTRIBUTION BY MEMBER STATES

Just as member states retained the authority to create their own national plans, under the Founding Directive they also reserved the power to distribute allowances pursuant to their own plans. For the first period (2005-07), the member states had to issue at least 95% of the allowances for free, leaving a maximum of 5% for auctions.²⁶ For the second period (2008-12), the directive allowed member states to auction up to 10% of all allowances (i.e., at least 90% of allowances must be distributed free of charge).²⁷ Thus, a member state could theoretically issue 100% free allowances, so long as doing so would be consistent with its commitments under the Kyoto Protocol.²⁸

In the first period (2005-07), four member states auctioned allowances; in the second (2008-12), eight member states did so.²⁹ Overall, only 0.13% of all allowances were auctioned in the first period.³⁰ This percentage rose to 3% in the second period.³¹ Ellerman et al. explain that the limited auctioning by members operates both as a way to facilitate "political acceptance of the new system" and as a form of compensation to those entities "that had made prior investments when no CO₂ price existed and that might be disadvantaged by the new

19. *Id.*

20. *Id.*, art. 9(3), 2003 O.J. (L275) 36.

21. *Id.*, art. 16, 2003 O.J. (L275) 37.

22. *Id.*, art. 16(1), 2003 O.J. (L275) 37.

23. *Id.*, art. 16(3), 2003 O.J. (L275) 37.

24. *Id.*

25. *Id.*, art. 16(4), 2003 O.J. (L275) 37.

26. *Id.*, art. 10, 2003 O.J. (L275) 36.

27. *See id.*

28. *See id.*, annex III, 2003 O.J. (L275) 43.

29. A. DENNY ELLERMAN ET AL., PRICING CARBON: THE EUROPEAN UNION EMISSIONS TRADING SCHEME 62 (2010).

30. *Id.*

31. *Id.*

system,”³² which, without free allowances, would charge them for emissions from a lower baseline.

C. AUCTIONING AND FREE ALLOWANCES GOING FORWARD

Allowance distribution under the ETS will undergo substantial changes in 2013. Directive 2009/29/EC, which amended the Founding Directive, requires member states to auction a substantially higher percentage of their national allowances.³³ According to the E.U. Commission, “about half of the allowances are expected to be auctioned.”³⁴ With member states and industries accustomed to measuring, reporting, and either receiving or paying for allowances since 2005, ETS is on a path to establish a more robust carbon price starting in 2013. Its major limitation remains the current crisis in the Eurozone and its macroeconomic effects, which have depressed carbon prices due to lower general levels of economic activity and emissions in the region.³⁵

Crisis aside, only a few important exceptions will allow deviations from the prescribed, increasing trend toward emission auctioning.³⁶ The first exception covers the energy sectors of mostly former soviet bloc countries; nations that share a “connection to the European grid, per capita GDP, and dependence on single fuel.”³⁷ In these countries, third-period free allowances cannot exceed 70% of the annual average verified emissions in 2005-2007 from the energy sector.³⁸ After 2013, the free allocations must continually decrease until total elimination by 2020, where they are expected to finally converge with other E.U. members.³⁹

The second exception to ordinary emission auctioning requirements covers sectors exposed to a “significant risk” of carbon leakage, i.e., sectors particularly exposed to losses due to direct competition with similar sectors in non-carbon-restricting nations.⁴⁰ Companies in these at-risk sectors may receive up to 100% free allowances based on benchmarks set by “the average performance of the

32. *Id.*, at 63.

33. See Council Directive 2009/29/EC [hereinafter the “Amending Directive”], art. 10, 2009 O.J. (L140) 63, 71 (EC).

34. *Emissions Trading System: Auctioning*, EUR. COMM’N (Jan. 10, 2011), http://ec.europa.eu/clima/policies/ets/auctioning/index_en.htm.

35. See Stephen Gardner, *E.U. Data Shows Decline in Greenhouse Gas Emissions Covered by Cap-and-Trade System*, BLOOMBERG BNA WORLD CLIMATE CHANGE REP., Apr. 3, 2012, available at http://news.bna.com/clln/CLLNWB/split_display.adp?fedfid=25773129&vname=ccnotallissues&fcn=2&wsn=502270000&fn=25773129&split=0 (explaining that “the lower [member-state] emissions led to a fall in the price of ETS allowances to about €6.50 (\$8.65), with prices at one stage dropping to a record low of €6.14 (\$8.20)”).

36. Amending Directive, art. 10(1), 2009 O.J. (L140) 71.

37. ELLERMAN ET AL., *supra* note 29, at 76 (paraphrasing the Amending Directive, art. 10c 1(a)-(c), 2009 O.J. (L140) 76).

38. Amending Directive, art. 10c(2), 2009 O.J. (L140) 76.

39. *Id.*, art. 10c(2).

40. See *id.*, art. 10a, 10b, 2009 O.J. (L140) 72-76. For a definition of carbon leakage, see note 8.

10% most efficient installations” from 2007-2008 in the same sector.⁴¹ To qualify, a sector must show that:

- (1) the direct CO₂ costs and indirect CO₂ costs from the pass-through of CO₂ costs in power prices are more than 30% of gross value added (GVA); or
- (2) that the non-E.U. trade intensity (exports plus imports as a share of production plus imports) is greater than 30%; or
- (3) the cost to GVA criteria is ten per cent or larger and the non-E.U. trade intensity is greater than ten per cent and other qualitative criteria (investments, market structures, profit margins) indicate exposure to a significant risk of carbon leakage.⁴²

The push for carbon efficiency is clear: After measuring emissions and distributing, initially, free allowances, the E.U. cap-and-trade system transitions into auctioning allowances, with criteria-based exceptions playing a mitigating role.

D. CARBON LEAKAGE AND GOVERNMENT ASSISTANCE

In addition to free allowances, member states may adopt “financial measures” to support emitters that are at significant risk of carbon leakage.⁴³ These financial measures are expressly designed to offset the greater energy “costs relating to greenhouse gas emissions passed on in electricity prices,” resulting from the E.U.’s carbon-restricting regime.⁴⁴ Although opaque at this point, the as-applied industry-specificity of such financial assistance may run afoul of the anti-subsidy provisions in the WTO Subsidies and Countervailing Measures Agreement.⁴⁵ Regardless, the European carbon regime described so far, though prepared to mitigate the competitive effects of its carbon restrictions, does not contain a broad BCA, unlike Waxman-Markey (e.g., §§ 766-767).⁴⁶

While proposing to offset the eventual initial competitive disadvantages of carbon-efficient production with free allowances and bestowal of financial assistance on the most affected industries, the E.U. directives generally stop short of imposing level-the-playing-field extraterritorial measures. The only extraterri-

41. Amending Directive, art. 10a(2), 2009 O.J. (L140) 73.

42. ELLERMAN ET AL., *supra* note 29, at 77 n. 14 (paraphrasing the Amending Directive, art. 10a 15-16, 2009 O.J. (L140) 75).

43. Amending Directive, art. 10a (6), 2009 O.J. (L140) 73; *see also Carbon Leakage: Possibility of Financial Compensation for Indirect Emissions*, EUR. COMM’N (Jan. 25, 2011), http://ec.europa.eu/clima/policies/ets/leakage/index_en.htm (“Article 10a6 . . . provides for the possibility for Member States to compensate the most electro-intensive sectors for increases in electricity costs resulting from the ETS through national state aid schemes. Therefore, the Commission will correspondingly modify the Environmental State Aid Guidelines. The adoption of the new rules is foreseen for 2011.”).

44. Amending Directive, art. 10a (6), 2009 O.J. (L140) 73.

45. *See* Agreement on Subsidies and Countervailing Measures, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization [hereinafter the “SCM Agreement” or “SCM”], art. 2, Legal Instruments—Results of the Uruguay Round, 1867 U.N.T.S. 14.

46. *See* Waxman-Markey *supra* note 7.

torial foray under the current rules is the inclusion of foreign-based airlines in the ETS, which, once in operation, will be the E.U.'s first *de facto* BCA.

E. THE ADDITION OF AVIATION

The E.U. included the aviation sector in the ETS in 2008;⁴⁷ yet, actual allocation of allowances for airlines did not begin until January 1, 2012, a year prior to the start of ETS's third period.⁴⁸ Like the ETS Founding Directive it amends, the Aviation Directive describes covered activities (i.e., qualifying flights), but goes further by providing an industry-specific (i) emissions cap; (ii) 15% allowance-auctioning requirement; and (iii) residual free allowances. Qualifying flights are flights that "arrive at or depart from an aerodrome situated in the territory of a Member State to which the Treaty applies."⁴⁹

The inclusion of non-E.U. based airlines has raised the concerns of U.S. airlines, which have attempted to challenge what they perceive as impermissible extra-territorial regulatory jurisdiction. In *Air Transport Ass'n of America v. Secretary of State for Energy & Climate Change*,⁵⁰ they challenged such action on three grounds: (i) violation of international law by reaching intercontinental flights; (ii) failure to negotiate a multi-lateral treaty under the auspices of the International Civil Aviation Organization ("ICAO")⁵¹; and (iii) creation of a tax in violation of international commitments (e.g., Chicago Convention on Civil Aviation⁵² and the "Open Skies" Agreement⁵³). The European Court of Justice ("ECJ") rejected these claims on two grounds: (i) the E.U. is not a party to the Chicago Convention and is, therefore, not bound by its restrictions; and (ii) the Open Skies agreement does not proscribe compliance with ordinary regulatory measures that do not amount to a tax, which is how the ECJ characterized the sector's inclusion into the ETS.⁵⁴ Airlines for America, an industry lobby, claims

47. See Council Directive 2008/101/EC [hereinafter the "Aviation Directive"], 2009 O.J. (L8) 3-21 (EC).

48. See *id.*, art. 3c, 2009 O.J. (L8) 8.

49. *Id.*, annex, 2009 O.J. (L8) 17. The directive excludes different types of flights based on specific purposes, including, *inter alia*, flights by official members of non-member-state governments and military and other rescue service flights. *Id.*

50. Case C-366/10, *Air Transp. Ass'n Am. v. Sec'y St. Energy & Climate Change*, ¶ 42, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:62010CC0366:EN:HTML> (Advocate General's Opinion), (Oct. 6, 2011).

51. See Convention on International Civil Aviation, art. 44, Dec. 7, 1947, 61 Stat. 1180, 1192, 15 U.N.T.S. 295 [hereinafter the "Chicago Convention"] (establishing the ICAO whose goals include fostering the development of international air transport), available at <http://www.icao.int/publications/pages/doc7300.aspx>.

52. See *id.*, art. 24, 61 Stat. 1180, 1186, 15 U.N.T.S. 295.

53. The official name of the EU-US "Open Skies" agreement is the Air Transport Agreement, which exempts "aircraft operated in international air transportation" between the parties from "taxes, levies, duties, fees and charges . . . with the exception of charges based on the cost of the service provided." Air Transport Agreement, art. 11, Apr. 30, 2007, 46 I.L.M. 470, 478-479, 2007 O.J. (L134) 4, 11 (EC), available at <http://www.state.gov/documents/organization/114872.pdf>.

54. Case C-366/10, *Air Transp. Ass'n Am. v. Sec'y St. Energy & Climate Change*, 2011 ECJ EUR-Lex LEXIS 3289 at * 1-2 (Dec. 21, 2011).

that its members will have to pay more than \$3.1 billion to the EU.⁵⁵

As of this writing, the official position of the E.U. is that the system is in full force despite current controversy over the desirability of multi-lateral agreement.⁵⁶ Chinese and Indian airlines, however, have yet to comply with the Directive's requirement to report emissions in flights to and from Europe, an indication that legal battles loom ahead.⁵⁷ United States officials have exhorted the E.U. to pursue these matters through ICAO,⁵⁸ which does have the authority to impose obligations on parties engaged in international commercial aviation, but has so far failed to impose any emission reduction requirements.⁵⁹ This failure within ICAO makes E.U. action more, not less likely, however. Domestically, the E.U. has authority to proceed (and it has indicated it will) and it is probably prepared to meet any future WTO challenge to its aviation measures with a defense on environmental grounds under GATT, Article XX. In such a defense, the E.U. will argue that measures including the aviation sector in ETS come within the scope of GATT as "measures relating to the conservation of exhaustible natural resources," made in conjunction with restrictions on domestic industry,⁶⁰ which were only resorted to after years of multilateral obstruction and inaction within ICAO and other international fora.⁶¹

Controversy apart, the aviation scheme, now in operation, divides the issuing of allowances for airline operators into two time periods. Under each period, emissions are capped by reference to historical aviation emissions. The latter are calculated by using the covered aircraft operators' "mean average of the annual

55. Nicola Clark, *Carbon Emission Fees for Flights Upheld*, NY TIMES, Dec. 21, 2011, at B1, available at <http://www.nytimes.com/2011/12/22/business/global/court-upholds-europes-plan-to-charge-airlines-for-carbon-emissions.html>.

56. Daniel Pruzin & Stephen Gardner, *Air Industry Group Leader Cites Hardening Positions in Global Emissions*, BLOOMBERG BNA WORLD CLIMATE CHANGE REP., Mar. 20, 2012, available at http://news.bna.com/clln/CLLNWB/split_display.adp?fedfid=24841999&vname=ccrnotallissues&fcn=4&wsn=502660000&fn=24841999&split=0.

57. See Stephen Gardner, *Chinese, Indian Airlines Fail to Submit Greenhouse Gas Emissions Data Required by EU*, BLOOMBERG BNA WORLD CLIMATE CHANGE REP., May 15, 2012, available at http://news.bna.com/clln/CLLNWB/split_display.adp?fedfid=26056113&vname=ccrnotallissues&fcn=1&wsn=501272000&fn=26056113&split=0.

58. See, e.g., *The European Union's Emissions Trading System before the Comm. on Commerce, Sci., and Transp.*, (June 6, 2012) (statement of Ray LaHood, U.S. Sec'y of Transp.), available at http://commerce.senate.gov/public/?a=Files.Serve&File_id=9f35bb3b-c8bd-4ee0-87aa-57819b7b914f.

59. ICAO has so far succeeded in establishing important, though mostly aspirational, fuel efficiency targets for the aviation industry. See ICAO, Declaration by the High-level Meeting on International Aviation and Climate Change, *Summary of Discussions*, at A-2, HLM-ENV/09-SD/2, ¶ 2 (Oct. 19, 2009).

60. See GATT, *supra* note 6, art. XX(g).

61. Unfortunately, the prospects for such a case to arise have increased recently. "High-level" officials meeting under the auspices of ICAO have failed to reach any consensus on how to forge a global agreement to limiting GHG emissions from the aviation sector. See Daniel Pruzin, *Officials Cite Limited Progress on Global Deal to Curb Aviation's Greenhouse Gases*, BLOOMBERG BNA WORLD CLIMATE CHANGE REP., Feb. 6, 2013, available at http://news.bna.com/ieln/IELNWB/split_display.adp?fedfid=29623566&vname=inemotallissues&wsn=500112000&searchid=19490483&doctypeid=1&type=date&mode=doc&split=0&scm=IELNWB&pg=0.

emissions in the calendar years 2004, 2005, and 2006.”⁶² Each airline’s emissions are calculated by multiplying fuel consumption times an emission factor.⁶³ Emissions for the first aviation-specific period (January 1, 2012-December 31, 2012) are capped at 97% of historical aviation emissions (i.e., a cap that restricts emissions by 3%).⁶⁴ During this initial one-year period, members must auction 15% of the allowances.⁶⁵ Thus, the other 85% will be allocated free of charge. The second period—beginning on January 1, 2013, and ending on December 31, 2017⁶⁶—will further reduce emissions: Total allowances shall be 95% of the historical emissions for each five-year period.⁶⁷ Again, as in the first aviation-specific period, 15% of the allowances will be auctioned, with the remaining balance to be allocated free of charge and the difference being that allowances will be allocated from a lower cap.⁶⁸

The E.U. Commission has reserved the right to amend the aviation caps for subsequent periods,⁶⁹ thereby leaving room for future economic, legal, and political contingencies. In fact, a contingency emerged even before the start of the second period (i.e., the period starting on January 1, 2013): E.U. officials suspended plans to include flights into and out of the E.U. in the ETS “to allow time to reach a global solution through ICAO,” with the proviso that the suspension would be revoked should an appropriate international consensus not be achieved through ICAO in 2013.⁷⁰ President Obama’s recent signing of legislation forbidding U.S. airlines from complying with the E.U. aviation measures⁷¹ undoubtedly influenced the recent failure of ICAO-sponsored negotiations and increased the chances of trade litigation under the WTO in the near future.⁷²

More recently, the E.U. Commission also expressed interest in setting up a similar scheme for the maritime shipping industry.⁷³ It explained that “while energy efficiency requirements for certain categories of new ships have been set

62. Aviation Directive, art. 1(3)(b)(s), 2009 O.J. (L8) 8.

63. *Id.*, annex, 2009 O.J. (L8) 18.

64. *Id.*, art. 3c, 2009 O.J. (L8) 8.

65. *Id.*, art. 3d(1), 2009 O.J. (L8) 8.

66. *See* Founding Directive, art. 11(2), 2003 O.J. (L275) 36.

67. *See* Aviation Directive, art. 3c(2), 2009 O.J. (L8) 8.

68. *See id.*, art. 3d(2), 2009 O.J. (L8) 8.

69. *Id.*, art. 3c (2), 2009 O.J. (L8) 8.

70. *See* Pruzin, *supra* note 61 (reporting E.U. officials as having declared that “airlines automatically will be included in its cap-and-trade program in 2014 if a suitable international measure is not adopted at the September (2013) meeting of the ICAO Assembly.”).

71. *See* European Union Emissions Trading Scheme Prohibition Act of 2011, S. 1956, § 2(a). The new law also directs federal officials to pursue international negotiations with the aim of ensuring US airlines are “held harmless” from the E.U. scheme. *Id.*, § 3(a)(2).

72. *See* Pruzin, *supra* note 61.

73. Stephen Gardner, *E.U. Consultation Marks Start of Process to Regulate Carbon Emissions from Shipping*, BLOOMBERG BNA INT’L ENV’T REP., Jan. 20, 2012, available at http://news.bna.com/ieln/IELNWB/split_display.adp?fedfid=24363709&vname=inemotallissues&fcn=11&wsn=502880000&fn=24363709&split=0.

by the [International Maritime Organization] . . . no international regulation aiming to reduce GHG emissions from existing ships has been adopted.”⁷⁴ Once again, the E.U. seems to have responded to the slow progress on multilateral negotiations by acting unilaterally. Remarkably, this latest move also signals the EU’s willingness to enlarge the scope of its carbon-restricting extraterritorial measures. In light of this commitment, defiance by Chinese, Indian, and other airlines may subside or result in the E.U. imposing surcharges that will result in trade friction and, probably, litigation. Thus, carbon-related airline fees may trigger a WTO challenge and an eventual *binding* response from the WTO on the use (and limits) of extraterritorial carbon-restricting policies.⁷⁵ While a WTO Dispute Settlement Body (“DSB”) pronouncement on an as-applied challenge would help reduce the uncertainty regarding the role of extraterritorial, trade-impacting measures, such uncertainty is not keeping the E.U. from implementing its regulations on the aviation sector. Nor has this uncertainty inhibited other countries from adopting other carbon-restricting methods, such as the Australian Carbon Tax.

II. THE AUSTRALIAN CARBON TAX

A. RESTRICTING EMISSIONS IN TWO PHASES

In the summer of 2012, Australia joined the E.U. in restricting GHG emissions, pursuant to the Clean Energy Act of 2011.⁷⁶ A major goal of the CEA is “to give effect to Australia’s obligations under . . . the Kyoto Protocol.”⁷⁷ The CEA is divided into two time periods, each having a different method for pricing carbon. For the first period (July 1, 2012-June 30, 2015), the CEA sets a fixed price for carbon by means of a “fixed charge”⁷⁸ or “carbon tax.”⁷⁹ In the second period, a cap-and-trade system will replace the tax.⁸⁰

During the first period, the government will charge a per-tonne tax on facilities that produce or consume at least 25,000 carbon metric tonnes a year.⁸¹ For the first year (July 1, 2012-June 30, 2013) the price of each carbon tonne will be

74. *Id.* (quoting from an E.U. document).

75. The WTO Secretariat and the United Nations Environment Program (“UNEP”) have jointly issued a white paper discussing the WTO-compatibility of different types of carbon-restricting border measures with WTO rules. See WTO-UNEP REPORT, TRADE AND CLIMATE CHANGE (Geneva: World Trade Publications 2009), available at http://www.wto.org/english/res_e/booksp_e/trade_climate_change_e.pdf. This document, however, contains the disclaimer that “[a]ny opinions reflected in this publication are the sole responsibility of the . . . WTO Secretariat,” not the WTO Dispute Settlement Body (“DSB”). See *id.* at i.

76. *Clean Energy Act 2011* (Cth) (Austl.) [hereinafter “CEA”].

77. *Id.*, pt 1, s 3.

78. *Id.*, pt 4, div 2, s 100.

79. Enda Curran & Ray Brindal, Australia’s Carbon Tax Clears Final Hurdle, WALL ST. J. (Nov. 8, 2011, 6:40 AM), <http://online.wsj.com/article/SB10001424052970204554204577025153789673004.html>.

80. See CEA pt 2, s 17.

81. See *id.*, pt 3, div 2, s 22, pt 4, div 2, s 100.

A\$⁸²23.⁸³ The A\$23 price per tonne of carbon dioxide equivalent, around €17, was also the prevailing price in the E.U. ETS in May 2011.⁸⁴ However, Ross Garnaut, the leading Australian climate change economist and author of the cost-benefit report that spurred parliamentary action, recommended that considerations, such as Australia's climate change mitigating "commitments, domestic credibility and other countries' climate change mitigating policies and their associated implicit carbon prices" also weigh in setting this price.⁸⁵ The cost of each carbon tonne will rise with inflation, that is calculated by selecting the mid-point of the Reserve Bank of Australia's inflationary target range or 2.5% per annum.⁸⁶ Thus, the tax will be A\$24.15 and A\$25.40 per tonne in the second (2013-2014) and third (2014-2015) years, respectively.⁸⁷

However, the CEA will replace the tax with a cap-and-trade system as the second period (July 1, 2015) begins.⁸⁸ The emissions cap in that first year (July 1, 2015-June 30, 2016) will be determined by subtracting thirty-eight million carbon tonnes from the total emissions during the inaugural year of the carbon tax (July 1, 2012-June 30, 2013).⁸⁹ In each subsequent year, the cap will be reduced by twelve million tonnes.⁹⁰ Given these constraints, market forces will set the price for each carbon tonne.⁹¹

B. ASSISTING HOUSEHOLDS AND WORKING WITH COAL-FIRED ELECTRICITY PRODUCERS

The CEA exempts households from the carbon tax and the cap-and-trade system. Although households are not regulated, they will not be free from the consequences of higher prices due to the new carbon-restricting regime. To alleviate these economic effects, the government will offer assistance in the form of "tax cuts, higher family payments and increases in pensions and allowances."⁹²

Coal-fired electricity producers will also receive assistance under both carbon tax and cap-and-trade systems. Currently, "coal-fired generation . . . accounts for

82. The symbol "A\$" stands for Australian dollars.

83. *Id.*, pt 4, div 2, s 100.

84. ROSS GARNAUT, *THE GARNAUT REVIEW 2011: AUSTRALIA IN THE GLOBAL RESPONSE TO CLIMATE CHANGE* 72 (2011). The notion that the gap between Australian carbon prices and prices in countries with economy-wide carbon-restrictions should be minimized is both intuitive (i.e., avoidance of major price fluctuations in the path to a global carbon price) and foretelling, as it will become clear.

85. *Id.*

86. COMMONWEALTH OF AUSTRALIA, *SECURING A CLEAN ENERGY FUTURE: THE AUSTRALIAN GOVERNMENT'S CLIMATE CHANGE PLAN 26* (Sydney: Commonwealth of Australia 2011), available at <http://www.cleanenergyfuture.gov.au/wp-content/uploads/2011/07/Consolidated-Final.pdf>.

87. CEA pt 4, div 2, s 100.

88. *See id.*, pt 2, s 17.

89. *Id.*

90. *Id.*, pt 2, s 18.

91. *See id.*, pt 4, div 1 s 93.

92. COMMONWEALTH OF AUSTRALIA, *supra* note 86, at 37.

around 75% of Australia's electricity."⁹³ Coal-fired plants release more GHGs than generators using other energy sources, such as natural gas.⁹⁴ To provide for a smooth transition into the carbon-restricting regime, the government will negotiate the closure of some plants and provide assistance through free allowances and loans to plants that demonstrate plans to invest in lowering emissions.⁹⁵ The government will cover 23% of these facilities' total carbon unit liability until June 30, 2017.⁹⁶

C. ADDRESSING CARBON LEAKAGE

To prevent carbon leakage, the CEA establishes the Jobs and Competitiveness Program ("JCP").⁹⁷ The JCP "provides assistance to the most emissions-intensive activities in the economy that are highly exposed to international competition—either on export markets or from importers."⁹⁸ According to the Australian Government, "almost all emissions-intensive and trade-exposed activities are in the manufacturing sector."⁹⁹ For this reason, "[t]he [JCP] will provide assistance to activities that generate over 80% of emissions within the manufacturing sector."¹⁰⁰ The government expects forty to fifty activities to be eligible. Sectors affected range from aluminum, steel, paper, glass, and cement manufacturers to oil refineries.¹⁰¹

Like the E.U. ETS, the government will distribute free carbon permits to protect the activities that are at-risk of carbon leakage.¹⁰² To qualify as an Emissions-Intensive Trade-Exposed activity due to a high risk for carbon leakage, an activity must pass both a preliminary and formal assessment.¹⁰³ Under the preliminary assessment, trade exposure is determined through quantitative and qualitative measures.¹⁰⁴ The quantitative threshold requires a ratio of value of imports and exports (i.e., total trade) to value of domestic production greater than 10% in any one year from 2004 to 2008.¹⁰⁵ The qualitative test looks at a producer's inability to pass through costs (measured on a per-activity basis) due

93. *Id.* at 71.

94. *See id.* at 72.

95. *Id.* at 74-75.

96. *See id.* at 75.

97. *See id.* at 53 ("Carbon leakage is not in Australia's interests—either from an environmental or an economic point of view. The Jobs and Competitiveness Program is designed to reduce this risk.").

98. COMMONWEALTH OF AUSTR., *supra* note 86, at 54.

99. *Id.*

100. *Id.*

101. *Id.*

102. *See* CEA pt 7, div 1, s 144.

103. *See* COMMONWEALTH OF AUSTR., *supra* note 86, at 54-55; AUSTR. GOVT. DEP'T CLIMATE CHANGE & ENERGY EFFICIENCY, GUIDANCE PAPER: ASSESSMENT OF ACTIVITIES FOR THE PURPOSES OF THE JOBS AND COMPETITIVENESS PROGRAM 7 (Canberra: Department of Climate Change and Efficiency 2011).

104. *See* COMMONWEALTH OF AUSTR., *supra* note 86, at 115.

105. *Id.*

to the potential for international competition.¹⁰⁶ Still at the preliminary assessment stage, the government will also look at an activity's emissions intensity, calculated as the ratio of "emissions per million dollars of revenue or emissions per million dollars of [value] added."¹⁰⁷

Should the preliminary assessment indicate that the activity has the potential for inclusion in the JCP, the analysis proceeds to a three-step formal assessment.¹⁰⁸ In the first step, the government drafts a definition that delineates the boundaries of the activity.¹⁰⁹ In the second step, the government collects emissions, trade, and financial data from the entity (again, on a per-activity basis).¹¹⁰ Finally, the government makes its final determination using the collected data.¹¹¹

If the activity passes both the preliminary and formal assessments, the entity will be entitled to assistance under the JCP. The JCP divides eligible activities into two categories according to their exposure to carbon leakage based on the information collected during the preliminary and formal assessments. The higher-risk category, which includes "[t]he most emissions-intensive and trade-exposed activities," will receive "94.5% shielding from the carbon price"¹¹² (i.e., 94.5% of emissions will be covered by free allowances). On the other hand, 66% of the emissions from lower-risk activities will be covered by free allowances.¹¹³ To provide both categories with incentives for further emissions reductions, the government will reduce assistance rates by 1.3% per year.¹¹⁴

D. GOING FORWARD: SURVIVABILITY MECHANISM DESIGN AND CONVERGENCE WITH THE E.U. REGIME

Like the E.U. regime, the Australian emissions legislation has not yet introduced a BCA, although legislators recently added "a matching charge of A\$23 per metric ton (in carbon-equivalent terms)"¹¹⁵ to a preexisting tariff charged on imports of synthetic carbon-based refrigerants (i.e., GHGs that are also ozone depleting).¹¹⁶ Remarkably, the lack of a domestic industry that produces these GHG gases largely explains Australia's willingness to resort to a BCA: Where

106. *See id.*

107. *Id.* The emissions data will come from the years 2006-08 and the revenue or value added data will come from 2004 through the first half of 2008-09. *Id.*

108. *See* AUSTL. GOV'T: DEP'T CLIMATE CHANGE & ENERGY EFFICIENCY, *supra* note 103, at 7.

109. *Id.*

110. *See id.*

111. *See id.*

112. COMMONWEALTH OF AUSTL., *supra* note 86, at 55.

113. *Id.*

114. *Id.*

115. Murray Griffin, *Australia's Carbon Price Scheme Starts Up; Large Emitters to Pay \$23.50 Per Metric Ton*, BLOOMBERG BNA WORLD CLIMATE CHANGE REP., July 2, 2012, available at http://news.bna.com/clln/CLLNWB/split_display.adp?fedfid=27244009&vname=ccrnotallissues&jd=a0d3j8y9u6&split=0.

116. *See Ozone Protection and Synthetic Greenhouse Gas (Import Levy) Amendment Regulation 2012 (No. 1)* (Cth) sch 1, reg 5.

there is no domestic industry producing a particular class of heat-forcing gases, internal taxes and cap-and-trade measures (normally applicable only to domestic activities) are no longer relevant policy tools. Under these circumstances, the imposition of a tariff is the only mechanism that can ensure the true cost of a given group of GHGs is reflected on market prices of downstream activities. Arguably, the E.U. also resorted to a somewhat similar externally focused approach in one particular setting, where domestic standards could not apply because domestic suppliers, operating under E.U. laws, simply could not supply the relevant good. Similar to the Australian example above is the inclusion of all incoming flights into the E.U. in the EU's cap-and-trade system (see Part I.E). By including the entire incoming portion of such flights in the ETS, the E.U. can ensure that the GHG impact of the input (e.g., jet fuel) not supplied by an industry operating under E.U. regulations (i.e., foreign-based suppliers to incoming flights) is fully captured in the downstream activity's overall GHG emissions. This willingness to cover extraterritorial activity, through the imposition of a BCA or inclusion in a cap-and-trade scheme, reveals that carbon-restricting regimes can be adjusted to affect industrial sectors that would otherwise be less exposed to (or even completely bypass) the regular effects of inward-directed carbon pricing.

More recent events indicate the Australian carbon-restricting regime might face some serious political challenges in the near future. Liberal (i.e., conservative) opposition to carbon pricing has strengthened and its leader has vowed to repeal the scheme should they return to power after the next election, which might happen by the end of 2013.¹¹⁷ However, experts suggest that repeal, though a possibility and an easy campaign promise, would be laborious, due to obstruction under parliamentary rules, and would require addressing serious budgetary considerations, such as the revenue shortfall that would result from the loss of emission permit revenue.¹¹⁸ Currently, emission permits are valued around A\$9 billion per year, with close to A\$5 billion per year going back to households as tax cuts and other energy offset assistance.¹¹⁹ While a blanket repeal would avoid these budgetary implications, it would not be a panacea. Climate inaction "would not end the debate over climate change policy."¹²⁰ Should the liberal government attempt to address climate change following a repeal, foregoing carbon pricing while imposing a non-market based regulatory approach would not necessarily cost Australians any less. As Professor Garnaut warned, inaction (or repeal) may merely "end the possibility of action at a relatively low cost."¹²¹ Moreover, the alternative, outright abandonment of Australia's emission reduction commit-

117. See Frank Jotzko, *Australia's Carbon Price*, 2 NATURE CLIMATE CHANGE 475, 476 (2012).

118. *Id.*

119. *Id.*

120. GARNAUT, *supra* note 84, at xvii.

121. *Id.*

ments, may not be as appealing to a liberal government at a time when its major trading partners are moving in the other direction.

In the meantime, the current labor/green governing coalition is not a mere spectator. Between now and late 2013, the government, keen on ensuring the preservation of one of its proudest achievements, is likely to increase the costs of abandoning the current carbon restrictions. While the CEA's mechanism design features¹²² can be abrogated by a new parliamentary majority, even a quick repeal will not immediately affect CCA's current work and the initiatives already set in motion to ensure compliance with emission targets.¹²³ Tellingly, the recently announced linking of the Australian scheme with the E.U. ETS system will make repeal much more costly than before by adding commitments with a major trading party.¹²⁴ Under this linking scheme, Australian businesses currently subject to the carbon tax can immediately buy E.U. emission allowances, hold on to them, and eventually use them when Australia switches to cap and trade on July 1, 2015.¹²⁵ The linking of the two carbon-restricting regimes will be complete on that date, when E.U. parties will be able to buy Australian allowances, thus effectively equalizing Australian and E.U. carbon prices.¹²⁶ This will certainly have a long-term stabilizing effect on carbon prices, thus reducing uncertainty for industries currently covered by carbon-restricting regulations.

The E.U. and Australian carbon-restricting regimes, though originally set up differently (one, a carbon tax with a fixed price for carbon, the other, a cap-and-trade system with a floating market price for allowances), are set to converge into cap and trade, with linked emission trading systems that will provide another boost to the creation of a global robust market price for carbon. As they evolve, both systems are likely to keep focusing on major emission sources while providing assistance to trade-sensitive, carbon-leakage-prone sectors at declining rates over time, under a logic that pairs government subsidies to incentives for continued carbon efficiency. As carbon prices converge and stabilize, industries in carbon-restricting nations will be under constant pressure to improve carbon efficiency to satisfy regulatory and competitive needs. Competitors in carbon-friendly nations will not overlook the emergence of newer carbon-efficient

122. See generally CEA pt 22 (creating the Climate Change Authority ("CCA") and establishing that members of the CCA, who serve five-year, fixed terms, are to establish long-term emission-reduction targets, which must be considered by the Climate Change Minister, tabled in parliament and specifically addressed by the government).

123. See Roger J. Keenan et al., *Science and the Governance of Australia's Climate Regime*, 2 NATURE CLIMATE CHANGE 477, 478 (2012).

124. See Murray Griffin & Stephen Gardner, *EU, Australia to Link Carbon Schemes with First Phase Starting in 2015*, BLOOMBERG BNA WORLD CLIMATE CHANGE REP., Aug. 28, 2012, available at http://news.bna.com/ieln/IELNWB/split_display.adp?fedfid=27703916&vname=inernotallissues&jd=a0d4g7w9w3&split=0.

125. *Id.*

126. *Id.*

production and the technological breakthroughs that will accompany this transformation. The terms of this new competition and the effects it will have in other countries will prove critical to furthering the development of a binding legal framework for multilateral action on climate change.

III. CROSS-BORDER REPERCUSSIONS FROM THE E.U. AND AUSTRALIAN CARBON-RESTRICTING REGIMES

A. PRODUCTION DECISIONS IN A CARBON-FRIENDLY WORLD

To understand the competitive pressures that carbon-restricting policies in some countries exert on producers in carbon-friendly nations, one needs to come to grips with how these different production regimes affect the way technological innovations are introduced. The discussion of these two competing production regimes focuses initially on microeconomic analyses, taking the theory of the firm as the locus of decisions regarding the adoption of alternative technologies. I then use some microeconomic insights to explore causal linkages between changes in the regulatory environment and producers' responses to such changes in light of their competitive concerns. These linkages are fundamental to triggering the chain of pro-climate action events explained in this article.

One can gain some valuable insight on firms' decision-making processes regarding the use of different technologies in terms of carbon intensity by first looking at how firms make such decisions in a carbon-friendly world: a world where the true cost of carbon emissions is not reflected in market prices. At this initial stage, firm managers often face decisions regarding the economic feasibility of using the existing technology—which involves known costs—compared to the long-run gains involved in the implementation of some new technology that will likely have higher short-term costs. When faced with decisions of this kind, managers usually resort to a specific type of microeconomic analysis: the theory of the firm. The central assumption under this theory is that firms choose the bundle of factors of production (e.g., combinations of different inputs and technologies) that minimizes the cost of producing a given level of output.¹²⁷

However, to illustrate the different choices available to producers in a carbon-friendly world, a couple of additional assumptions are necessary. Assume that, to compete in a particular product market, a manager faces two alternatives: (i) using a new, carbon-efficient technology that has higher average costs; or (ii) using a lower-average-cost, carbon-intensive technology currently available in the market.¹²⁸ In figure 1, *HH* depicts the cost structure that can potentially be

127. See VARIAN, *supra* note 2, at 339.

128. Average cost curves are U-shaped because they are the combination of two curves: (i) the average fixed cost curve, which slopes downward because fixed costs decrease as output increases; and (ii) the average variable cost curve, which slopes upward because variable costs eventually increase as output increases. *Id.* at 350.

generated by the high average cost (“HAC”) strategy if the firm invests and effectively deploys the new carbon-efficient technology. These investments significantly raise fixed costs in the lower range of output, that is illustrated by the leftward/upward tilt in *HH*. In contrast, *LL* depicts the cost structure the firm faces if it decides to compete on the basis of a low average cost (“LAC”) strategy associated with one of the existing carbon-intensive technologies. As such, *LL* requires little or no new investment, which means lower fixed costs across the lower range of output, resulting in the more classic parabolic shape.

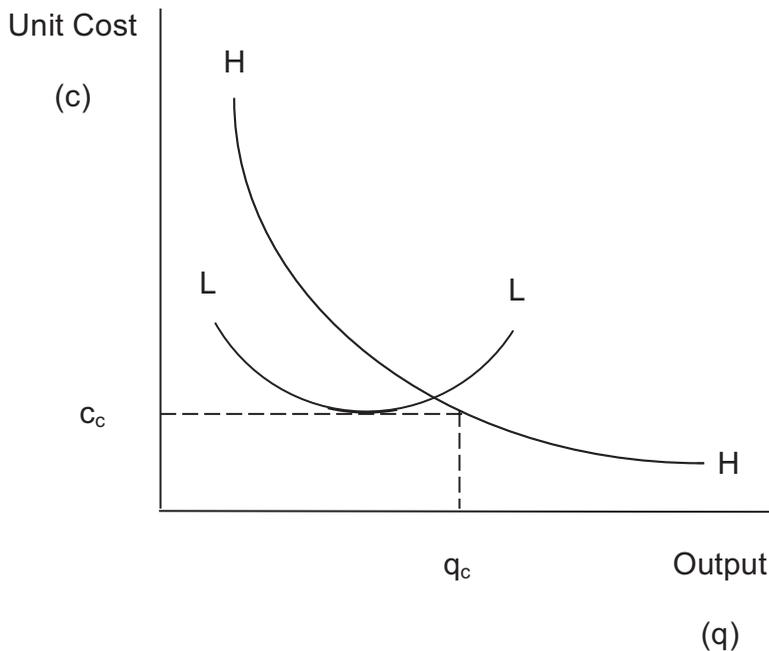


FIGURE 1. Cost Strategies and Competition Among Firms Operating in a Carbon-Friendly World

Assuming both *LL* and *HH* curves in figure 1 are known cost structures, it will make sense for firms in this environment to choose the HAC strategy that generates *HH* only if each could supply a market demand as great as q_c . Where industry demand is simply not large enough to enable an HAC firm to supply output at least equal to q_c , *LL* will displace *HH* as the best cost structure, hence the carbon-efficient technology will not be adopted.

However, the introduction of carbon-restricting policies, in particular, the emergence of a market-based price for carbon, pushes firms in such countries not only to look for small improvements in production under existing LAC technologies, but also to consider alternative HAC technologies, which become increas-

ingly competitive. This change happens at both the intra-firm and inter-firm level and makes HAC technologies more appealing for the reasons discussed below.

B. COST MINIMIZATION AND PRODUCTION DECISIONS UNDER A CARBON-RESTRICTING REGIME

To illustrate the effects of carbon-restricting legislation at the intra-firm level, one first makes the standard assumption that a firm chooses among factors of production so as to minimize the cost of producing a given optimal level of output. It follows that a firm's factor allocation changes in response to changes in its factor prices. Suppose that a firm faces two sets of prices (w_1^t, w_2^t) and (w_1^s, w_2^s) that are associated with production choices (x_1^t, x_2^t) and (x_1^s, x_2^s) , where t and s stand for choices at different times. Suppose, further, that different combinations of these factors of production produce the same level of output, y .¹²⁹ Because each allocation is, by assumption, a cost-minimizing choice to produce y , it follows that the firm's choices satisfy the following inequalities:

$$w_1^t x_1^t + w_2^t x_2^t \leq w_1^s x_1^s + w_2^s x_2^s, \quad (\text{A})$$

and

$$w_1^s x_1^s + w_2^s x_2^s \leq w_1^t x_1^t + w_2^t x_2^t. \quad (\text{B})$$

After making some substitutions and rearranging B,¹³⁰ one obtains:

$$(w_1^t - w_1^s)(x_1^t - x_1^s) + (w_2^t - w_2^s)(x_2^t - x_2^s) \leq 0,$$

which, rewritten in "delta notation" to depict more succinctly changes in the firm's factor demands and prices, becomes:

$$\Delta w_1 \Delta x_1 + \Delta w_2 \Delta x_2 \leq 0.$$

This last inequality shows that an increase in the price of factor 1 (i.e., $\Delta w_1 > 0$)—say, due to the emergence of carbon pricing and to factor 1's carbon intensity—accompanied by no change in factor 2's price (i.e., $\Delta w_2 = 0$)—say, due to the latter's negligible carbon intensity—changes this inequality to:

$$\Delta w_1 \Delta x_1 \leq 0.$$

This change will force the firm to decrease its demand for factor 1, if it is to keep

129. This section borrows heavily from Professor Varian's discussion of revealed cost minimization. *See id.*

130. For a more detailed description of the steps involved see *id.*

its output constant (i.e., at y) while adhering to cost minimization. The upshot of the transition to a carbon-restricting regime and thus the pricing of carbon emissions as a factor of production is a reordering of the firms' priorities regarding resource use and input selection. Of course, this may push the firm to look for less carbon-intensive substitutes for factor 1, that may be nominally more costly. However, the firm's profitability may remain at the same level, despite higher costs, if it receives some kind of government assistance (e.g., tax rebates, green subsidies, etc.).

In terms of figure 1, the net effect of the transition to a carbon-restricting regime at the inter-firm level will be an upward shift in the LL curve due to increased prices for more carbon-intensive inputs, a result of the shift to a carbon-restricting regime. This will make strategies that generate HH curves more competitive for firms that can supply a market demand at any quantity within in the $q_c'-q_c$ range, as illustrated in figure 2:

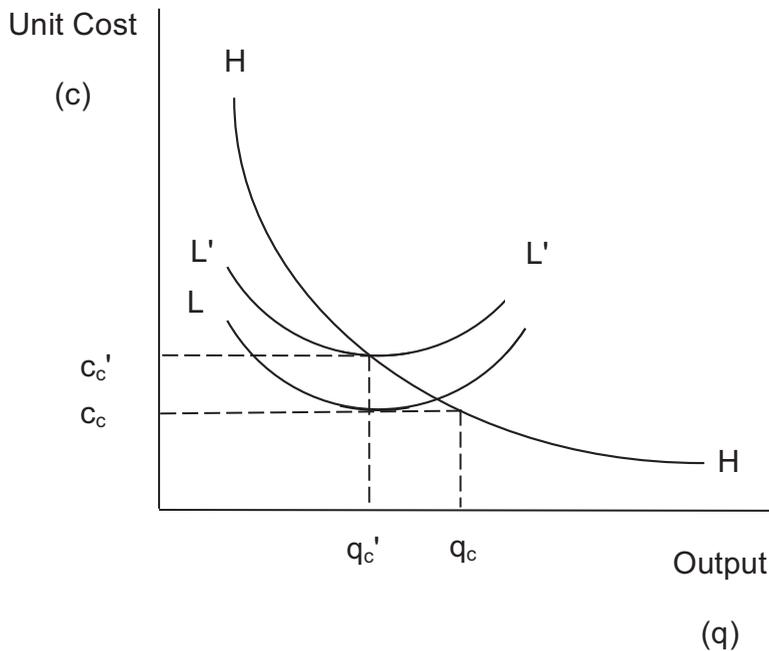


FIGURE 2. Cost Strategies and Competition Among Firms Operating in a Carbon-Restricting Regulatory Environment

In fact, where market demand is exactly q_c' , any attempt to keep production along the LL curve (i.e., the more carbon-intensive technology) will be ill-advised. As more firms make the transition to production under technologies that generate HH , scale economies and learning effects are likely to shift HH inward, further

displacing *LL*-like curves as lower cost alternatives for quantities below q_c' should market demand fall to such levels.¹³¹ Moreover, as carbon prices rise over time due to the expiration of free allowances and elimination of initial green subsidies, *LL*-like curves will shift upwards, further eroding the market for firms that continue using more carbon intensive technologies. These changes demonstrate how the shift to carbon pricing affects firm choice at both the individual and collective level in carbon-restricting countries in the short-run (i.e., where firms contemplate fixed costs).¹³² These changes will also influence firm decisions in the long run, where sticking with sunk, higher costs associated with older technologies will make even less sense.¹³³ More importantly, this shift in the energy intensity of production will not go unnoticed by firms abroad.

C. HOW COMPETITIVENESS CONCERNS & REGULATORY UNCERTAINTY AFFECT
TRADE-EXPOSED FIRMS IN CARBON-FRIENDLY NATIONS

Exporting firms in carbon-friendly nations, though initially not affected by restrictions on carbon emissions ought to be concerned by these developments. Although only producers in carbon-restricting countries face these costly regulations, their burden of switching to less carbon-intensive production is somewhat assuaged by a combination of different government policies designed to mitigate initial transition costs and avoid carbon leakage (see Parts I and II). As E.U. and Australian competitors receive different forms of government assistance (e.g., free allowances, tax rebates, green subsidies) and are otherwise eased into these new regulations, they develop more carbon-efficient production methods, that may lead to the emergence of technological gaps and a resulting competitive advantage in certain industries.

131. See STERN, *supra* note 8, at 397.

132. The economic distinction between the short run and the long run rests on the notion that the long run is, by definition, the period when “all the factors of production can be varied.” VARIAN, *supra* note 2, at 313. In other words, there are no fixed costs in the long run.

133. Behavior economists and psychologists argue that loss aversion—manifested in the fear of economic losses due to the abandonment of prior equipment or technology—causes actors to insist on an endeavor once an investment is made due to the operation of the endowment effect and other mental quirks that lead to deviations from rational thinking. See, e.g., Hai R. Arkes & Catherine Blumer, *The Psychology of Sunk Costs*, 35 ORGANIZATIONAL BEHAV. AND HUM. DECISION PROCESSES, 124, 132 (1984) (demonstrating, through questionnaires, “the sunk cost effect” and how the desire not to “appear wasteful” inflates individuals’ estimates of the success of their “prior spending” decisions). Thus, Behavior Economics (prospect theory, to be precise) challenges the traditional microeconomic argument that rational economic actors do not take prices paid (i.e., sunk costs) as benchmarks for future investments because, as explained (see note 127), in the long run, all costs are variable. To traditional microeconomists, focusing on incurred costs, when all options are open, amounts to throwing good money after bad, which is irrational. This difference between the two theories need not trouble us here. In an environment of aggravating climate change and growing pressure for carbon-restricting measures that turn carbon into a factor of production, it is unlikely that firms would retain costs associated with formerly cheaper, yet increasingly costly carbon-inefficient technologies due to the sunk cost effect. In other words, if firms are already minimizing expenditures on a factor of production due its increasing cost in the short run, they are likely to continue doing so in the long run.

The notion that environmental regulations can spur innovation that may offset compliance costs is not a novel concept. Several studies have credited the imposition of environmental measures with leading companies to achieve both product and process offsets.¹³⁴ A changing technological environment will also give rise to the development of new industry standards where achievements in lower carbon intensity will gain increasing notoriety and even influence technology choices by firms operating under other, less stringent regulatory regimes. Using an empirical approach (i.e., a computational general equilibrium model) that also endogenizes technological innovation, Di Maria and van der Werf show that technical innovations in emissions-constraining nations can influence production decisions in unconstrained nations and may reduce or even eliminate carbon leakage.¹³⁵ They explain that carbon leakage between two highly developed countries may be reduced depending on the extent to which the supply of carbon-based energy is sensitive to price declines arising from the reduction in consumption of such energy in the restricting country. Specifically, they demonstrate that if small decreases in fossil fuel prices can trigger sizeable reductions in fossil fuel production (i.e., fossil fuel production is price-elastic), then, as energy-saving technological effects take place, fossil fuels will become increasingly costly to produce (and even trade, if transportation costs are high), thus inducing carbon-efficiency in non-restricting developed nations.¹³⁶ A more recent computational general equilibrium model that looks at carbon leakage between Annex B and non-Annex B countries (i.e., developed vs. less developed countries, broadly speaking) bears these findings by demonstrating that leakage rates, though higher between these two sets of countries, decline as the price elasticity of supply of fossil fuels increases.¹³⁷

Yet the mere possibility of carbon leakage (whatever the actual price elasticity of supply might be) and the expected phasing out of initial forms of assistance and flexible rules in the E.U. and Australia will create pressures for greater regulatory scrutiny of foreign-sourced, carbon-friendly goods and services. In fact, the E.U. Commission already has the authority and may choose to impose a

134. See, e.g., Michael E. Porter & Claas van der Linde, *Towards a New Conception of the Environment-Competitiveness Relationship*, 9 J. ECON. PERSPS. 97, 102-103 (1995) (citing several studies and providing examples of how innovation offsets have reduced or eliminated the cost of compliance with environmental regulations).

135. See Corrado Di Maria & Edwin van der Werf, *Carbon Leakage Revisited: Unilateral Change Policy with Directed Technical Change*, 39 ENVTL. RESOURCE ECON. 55, 57, 69-70 (2008).

136. See *id.* at 70.

137. See Joshua Elliott et al., *Unilateral Carbon Taxes, Border Tax Adjustments and Carbon Leakage* 31 fig. 10 (Univ. of Chicago and Nat'l Argonne Lab., Working Paper No. 12-04, 2012). A US government study has also shown that relocation costs and various characteristics of certain carbon-intensive sectors may dampen the potential for carbon leakage. See ENVTL. PROT. AGENCY, THE EFFECTS OF H.R. 2454 ON INTERNATIONAL COMPETITIVENESS AND EMISSION LEAKAGE IN ENERGY-INTENSIVE TRADE-EXPOSED INDUSTRIES: AN INTERAGENCY REPORT RESPONDING TO A REQUEST FROM SENATORS BAYH, SPECTER, STABENOW, MCCASKILL, AND BROWN 21-23 (2009).

carbon equalization system anytime.¹³⁸ It issued a formal decision listing numerous E.U. sectors and subsectors “deemed to be exposed to a significant risk of carbon leakage” as candidates for free allocations or competitive assistance via carbon equalization under the terms of the Amending and Founding Directives.¹³⁹ Although to date, the E.U. Commission has not turned to BCAs, and exporters to the E.U. are taking notice.¹⁴⁰

The resulting regulatory uncertainty gradually pushes exporters and certain producers in carbon-friendly nations to voluntarily engage in the pursuit of carbon-restricting strategies. This occurs because exporters and producers generally abhor regulatory disuniformity and the significant costs it imposes. Exporters, multinational corporations, and businesses who operate in vertically integrated industries closely monitor regulatory developments in several jurisdictions, focusing on how new and likely forthcoming regulations may affect entire production chains that may be located in different jurisdictions with distinct regulations. From the perspective of exporters and highly integrated industries, regulatory convergence may reduce overall compliance costs and simplify operational choices and planning even at the cost of accepting newer regulations. For instance, although initially opposed by industry, the international regime for ozone-depleting gases was eventually supported by industry favoring the predictability of regulatory convergence over the regulatory fragmentation that would result if different countries pursued varied abatement approaches to ozone depletion.¹⁴¹ Arguably, the same phenomenon is likely to occur as producers take note of different nations’ evolving climate change mitigating efforts. Moreover, the desire of producers of tradable products to remain competitive in foreign markets and avoid the development of technological gaps in carbon efficiency provides an added incentive to internalize aspects of foreign carbon-restricting regimes even before formal regulatory convergence takes place.¹⁴²

138. See Amending Directive, pmbl. ¶ 25, 2009 O.J. (L140) 66-67 (stating that “[e]nergy-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 and those from third countries on a comparable footing.”).

139. See Commission Decision of 24 December 2009 [hereinafter “December 2009 E.U. List”], art. 1 & annex, 2009 O.J. (L1) 10, 13-18 (EC).

140. See, e.g., Katsuri Das, *How Vulnerable is India’s Trade to Possible Border Carbon Adjustments in the EU?*, 46(2) J. WORLD TRADE 249, 274 (2012) (demonstrating that at least 82% of India’s exports to the E.U. could “eventually come under the purview of any future [BCA],” based on a study that matches the sectors and subsectors identified in the December 2009 E.U. List with the tariff classifications of India’s current exports to the EU).

141. Kristen Engel, *State and Local Climate Change Initiatives: What is Motivating State and Local Governments to Address a Global Problem and What Does this Say about Federalism and Environmental Law*, 38 URB. L. 1015, 1027 (2006).

142. For an empirical, U.S.-focused discussion of how carbon mitigation failed in the U.S. Congress in the past and how foreign subglobal carbon-restricting efforts might tip industry support in the other direction in the future, see Juscelino F. Colares, *Paths to Carbon Stabilization: How Foreign Carbon-Restricting Reforms Will*

The emergence of business interest in carbon-efficient production, though originally reactive, will gradually evolve into the active pursuit of climate-friendly legislative and regulatory action. In this effort, carbon-efficient producers will join forces with environmental groups.¹⁴³ A separate set of concerns with transition costs, carbon leakage and maintaining competitiveness with respect to *domestic* nonexporting producers will motivate innovating exporters to engage in efforts that ensure the cost of investing in newer, less carbon-intensive technologies is also borne by their domestic, nonexporting counterparts.¹⁴⁴ Because carbon leakage does not stop at the border, these leading carbon-efficient producers will also want to bring their competitors from carbon-laggard nations under similar rules.¹⁴⁵ These parallel cost neutrality considerations will lead industry stakeholders to take an increasing interest in the enactment of national carbon-restricting regimes.

D. GROWING MOMENTUM TOWARD A BINDING MULTILATERAL CARBON-RESTRICTING AGREEMENT

Although the enactment of legislation will substantially reduce regulatory and competitive uncertainty in home markets, a growing number of carbon-efficient national industries will vie for international disciplines that harmonize the different proliferating carbon-restricting regimes and their level-the-playing-field measures. In fact, this trend toward adopting carbon-restriction reforms reaches beyond the E.U. and Australia (although these nations have the most comprehensive systems) and is intensifying (e.g., Brazil,¹⁴⁶ China,¹⁴⁷ Mexico,¹⁴⁸

Affect U.S. Industry, Climate Policy and the Prospects of a Binding Emission Reduction Treaty, 47.3 J. WORLD TRADE 281 (forthcoming 2013).

143. See Daniel A. Farber, *Politics and Procedure in Environmental Law*, 8 J.L. ECON. & ORG. 59, 64 (1992) (explaining how, in the U.S. context, “[o]n occasion, environmental groups and industry also may form a coalition, to obtain legislation that for varying reasons is beneficial to both.”). Farber’s intuition that industry “does not seem to provide the primary impetus for environmental legislation” is confirmed in this context by the realization that industry engagement here will be a second-best, strategic alternative derived from a desire to reduce regulatory uncertainty and address competitive challenges. See *id.*

144. See *id.* (noting that “large textile or chemical firms may support environmental standards that discriminate against their smaller [domestic] competitors”).

145. See *id.* (noting that “domestic car producers may support safety standards that discriminate against foreign producers”).

146. See Michael Kepp, *Brazilian City Sells \$2M in Emissions Reduction Credits*, [2012] ENERGY AND CLIMATE REP. (BNA) No. 113, (Jun. 16, 2012), available at http://news.bna.com/clln/CLLNWB/split_display.adp?fedfid=27055009&vname=ccnotallissues&fcn=5&wsn=500538000&fn=27055009&split=0 (describing how São Paulo sold €1.749 million worth of GHG emissions credits).

147. See Michael Standaert, *Policies for Pilot Carbon Trading Projects in China Nearly Completed, but Delays Still Likely*, [2012] ENERGY AND CLIMATE REP. (BNA) No. 98, (May 21, 2012), available at http://news.bna.com/clln/CLLNWB/split_display.adp?fedfid=26218485&vname=ccnotallissues&fcn=3&wsn=501016000&fn=26218485&split=0 (noting that about 2,000 businesses have decided to join China’s pilot trading schemes which should start launching in 2013 and that the Chinese national trading scheme most likely will launch in 2016).

148. See Michael Kepp, *Environment Minister Says Mexico Aims Higher Than Proposed Rio+20 Agree-*

New Zealand,¹⁴⁹ South Africa,¹⁵⁰ South Korea,¹⁵¹ Turkey¹⁵²). The same can be said about the need for a multilateral GHG emissions reduction agreement, which Parties to the United Nations Framework Convention on Climate Change recently committed to finalize by 2015.¹⁵³ Delay in finalizing these negotiations will create incentives for carbon-restricting countries to adopt dreaded, disruptive unilateral action to combat freeriding.

IV. TRADE IMPLICATIONS OF CARBON-RESTRICTING POLICIES

A. EARLY STAGE OFFENSIVE AND DEFENSIVE USE OF TRADE LITIGATION

So far, Australia and the E.U. have been somewhat surprisingly hesitant to use BCAs. Arguably, these regimes have not deployed a general BCA largely due to their greater willingness to use broad government assistance programs as an offsetting strategy to carbon restrictions,¹⁵⁴ unlike the United States where there is more ideological opposition to near economywide or even industry-specific subsidization (except in the case of the politically powerful defense, financial

ment, [2012] ENERGY AND CLIMATE REP. (BNA) No. 120, (June 21, 2012), available at http://news.bna.com/clln/display/no_alpha.adp?mode=si&frag_id=27135790&item=country%3amx&prod=clln&cat=country (discussing a law signed on June 5, 2012 that “obligates Mexico to meet its international commitments to cut GHG emissions . . . [and] also authorizes the government to establish a voluntary emissions cap-and-trade scheme for emissions”).

149. See Eduard Goldberg, *New Zealand Plans to Soften Economic Impact of Emissions Trading System*, 35 INT’L ENV’T REP. (BNA) No. 15, (Jul. 6, 2012), available at http://news.bna.com/ieln/display/no_alpha.adp?mode=si&frag_id=27273112&item=country%3anz&prod=ieln&cat=country (discussing possible ways to prolong transition measures for New Zealand’s own ETS).

150. See Paul Stinson, *South Africa’s Cabinet Endorses Road Map for Deploying Carbon Capture and Storage*, [2012] ENERGY AND CLIMATE REP. (BNA) No. 91, (May 10, 2012), available at http://news.bna.com/clln/CLLNWB/split_display.adp?fedfid=26040167&vname=ccrnotallissues&fcn=4&wsn=501276000&fn=26040167&split=0 (reporting that South Africa’s cabinet “has approved a carbon capture and storage plan as one avenue for reducing the country’s GHG emissions” and the Finance Minister is seeking public comment regarding a possible carbon tax).

151. See James Lim, *South Korea to Require Disclosure of Environmental Performance as of September*, [2012] ENERGY AND CLIMATE REP. (BNA) No. 130, (Jul. 6, 2012), available at http://news.bna.com/clln/CLLNWB/split_display.adp?fedfid=27272742&vname=ccrnotallissues&fcn=4&wsn=500014000&fn=27272742&split=0 (discussing how 490 companies that are responsible for more than 125,000 metric tons of carbon dioxide annually have joined a disclosure program along with a “cap-without-trade” GHG program which will start in January 2015).

152. See Rick Mitchell, *Turkey Should Boost Fuel Taxation’s Role in Climate Change Policy*, *OED Says*, [2012] ENERGY AND CLIMATE REP. (BNA) No. 134, (Jul. 12, 2012), available at http://news.bna.com/clln/CLLNWB/split_display.adp?fedfid=27307359&vname=ccrnotallissues&jd=a0d3m9r1b3&split=0 (noting that Turkey “has one of the world’s most active carbon voluntary carbon markets” although it is “exempt from setting quantitative emission targets under the [Kyoto] treaty”).

153. See Conference of the Parties to the United Nations Framework Convention on Climate Change, *Report of the Conference of the Parties on its seventeenth session, held in Durban from 28 November to 11 December 2011*, Dec. 1/CP.17, pmb1. & ¶ 4, U.N. Doc. FCCC/CP/2011/9/Add.1, at 2 (Mar. 15, 2012).

154. See, e.g., Patrick Low, Gabrielle Marceau & Julia Reinaud, *The Interface Between the Trade and Climate Change Regimes: Scoping the Issues* 26 (World Trade Org., Working Paper No. ERSD-2011-1, 2011) (explaining how “governments may also choose to encourage GHG mitigation through subsidies.”).

services, and agriculture lobbies).¹⁵⁵ In contrast, a climate-friendly, bottom-up lobbying effort on the part of trade-exposed U.S. industries would feature BCAs as a preeminent offsetting tool. With lower prospects of securing government assistance, their best chance of competing under carbon-restricting conditions might be the combination of a defensive, sectorally-targeted BCA and an aggressive lobbying campaign to push the United States toward challenging forbidden and industry-specific green subsidies before the WTO. That the United States has already started challenging green subsidies abroad even before committing to domestic, economy-wide carbon-restricting reforms is a good indication of how litigious it might become when it finally moves in that direction. Despite vowing support for “the rapid deployment of solar energy around the world,” the United States has recently requested consultations with India (the first official step in bringing a dispute before the WTO Dispute Settlement Body) due to the domestic content requirements prescribed under India’s national solar program, the “Jawaharlal Nehru National Solar Mission.”¹⁵⁶

Thus, political differences aside, trade policy will have a critical role in the emerging carbon-restricting economy. Indeed, it is proving its importance even now, where the E.U./Australian choice of not adopting a BCA may well arise from a desire to avoid retaliatory challenges against the broad assistance programs designed to mitigate the effects of their carbon-restricting regulations. This strategy also has an offensive dimension. Currently, the E.U. is challenging (with Japan) a Canadian province’s green energy program that requires electric grid utilities “to purchase electricity from [local] renewable sources.”¹⁵⁷ This program, however, conditions access to such guaranteed supply contracts to solar and wind producers’ usage of “minimum amounts of goods and services that originate in [the Province of] Ontario.”¹⁵⁸ Because this dispute targets “subsidies contingent . . . upon the use of domestic over imported goods,”¹⁵⁹ that as prohibited subsidies, are *de lege* specific¹⁶⁰ and thus easy-to-prosecute, the risk of exposing the E.U. cap-and-trade system to a retaliatory challenge on these grounds is slight, as it currently does not incorporate such subsidies (see discussion in Part I).

However, the E.U. probably expects eventual challenges to more difficult to

155. See, e.g., Chantal Thomas, *Challenges for Democracy and Trade: The Case of the United States*, 41 HARV. J. ON LEGIS. 1, 10-11 (2004) (suggesting that free trade has been the dominant political ideology in the US Congress for some time).

156. See USTR Press Release (Feb., 2013) (statement by United States Trade Representative, Ambassador Ron Kirk), available at <http://www.ustr.gov/about-us/press-office/press-releases/2013/february/us-challenges-india-restrictions-solar>.

157. Daniel Pruzin, *EU Joins Japanese Trade Challenge of Ontario Alternative Energy Program*, [2011] ENERGY AND CLIMATE REP. (BNA) NO. 157, (Aug. 11, 2011), available at http://news.bna.com/clln/CLLNWB/split_display.adp?fedfid=21797443&vname=ccnotallissues&fcn=2&wsn=507096000&fn=21797443&split=0.

158. *Id.*

159. SCM Agreement, *supra* note 45, art. 3.1(b).

160. *Id.*, art. 2.3.

prove subsidies, such as to the “financial measures” it adopts in support of emitters deemed at significant risk of carbon leakage.¹⁶¹ Should such a challenge arise, the E.U. is likely to defend its anti-carbon-leakage measures on non-specificity grounds (i.e., probably claiming eligibility to such assistance is automatic, open to various industries and based on firm, objective criteria prescribed in current written regulations).¹⁶² The E.U. would also affirmatively defend its measures by arguing they come within the scope of GATT’s Article XX(b)¹⁶³ and/or (g)¹⁶⁴ exceptions, adding that they fully comply with the requirements of Article XX’s chapeau.¹⁶⁵ Of course, the success of such a defense will greatly depend on the manner in which any such measure is implemented and on other case-specific aspects. Implementation of these programs may also give rise to other grounds for challenge under the GATT and other WTO agreements, which are beyond the scope of this article.¹⁶⁶

Thus, the E.U. has, so far, successfully balanced implementing its carbon-restricting programs and avoiding challenges to them while not shying away from targeting other members’ overt industrial policies that favor the renewable energy sector. In fact, the E.U. seems to have incorporated trade litigation as a supplementary policy tool to assist E.U. industries that have a particular role to play in the emissions reduction area: the biofuels and the solar panel industries. Not only has the E.U. imposed anti-dumping duties (“AD”) and countervailing (“CVD”) (i.e., anti-subsidization) duties against U.S. biodiesel imports into the E.U., the E.U. Commission is currently conducting AD and CVD investigations on U.S. bioethanol imports¹⁶⁷ and Chinese solar panels.¹⁶⁸ This suggests that the E.U. will not hesitate to resort to trade law to further the interests of its several

161. See Amending Directive, art. 10a (6), 2009 O.J. (L140) 73. The same can be said about Australia’s JCP (carbon leakage assistance program), which I discussed in Part II.C.

162. SCM Agreement, *supra* note 45, art. 2.1(b).

163. See GATT, *supra* note 6, art. XX(b) (covering measures “necessary to protect human, animal or plant life or health”).

164. See *id.* art. XX(g) (covering “measures relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption.”).

165. See *id.*, art. XX (requiring that measures be not applied arbitrarily and neither discriminate unjustifiably among members “where the same conditions prevail” nor constitute “a disguised restriction on international trade”).

166. Any differential treatment (e.g., differential internal taxation) between domestic and foreign products premised on different conditions of production (i.e., carbon-restricting vs. carbon-friendly) could be deemed to violate the “like product” requirement under GATT Article III. However, these charges could be defended under GATT Article XX as well as under other grounds. See Henrik Horn & Petros 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, 1915-20 (2011).

167. Joe Kirwin, *EU Launches Trade Remedy Investigation Into Subsidies for U.S. Bioethanol Imports*, [2011] INT’L TRADE REP. (BNA) NO. 19, (Dec. 1, 2011), available at http://news.bna.com/itln/ITLNBW/split_display.adp?fedfid=23697460&vname=itnotallissues&fcn=13&wsn=494329000&fn=23697460&split=0.

168. Joe Kirwin, *EU Launches Antidumping Probe Into Chinese Solar Panel Imports*, [2011] INT’L ENV’T REP. (BNA) NO. 198, (Sept. 9, 2012), available at http://news.bna.com/ieln/IELNBW/split_display.adp?fedfid=27793784&vname=inernotallissues&jd=a0d4k9h1b6&split=0.

trade-exposed industries operating in the renewables sector. This willingness to resort to both WTO and domestically-based trade/administrative remedies, whether in furtherance of pro-carbon-restriction goals or to ensure trade fairness, illustrates the important role trade law has played and will continue to play in climate policy. Yet, this also demonstrates that trade law can often undercut policies designed to boost the development of new pro-climate industries, where such policies (e.g., subsidization, discrimination in favor of domestic producers, etc.) conflict with trade's liberalizing, neutral goals. In fact, this is true even among carbon-friendly regimes that are currently taking measures against each other's renewable industries.¹⁶⁹

B. KEEPING TRADE FROM UNRAVELING THE CLIMATE CHANGE REGIME

The importance of trade policy coordination to any future binding multilateral emissions treaty cannot be overstated: An emission-stabilizing world requires a high level of multilateral coordination in the use of trade-impacting measures, lest trade frictions derail national investment plans and, with them, emission targets. The potential mismatch between trade disciplines and environmental goals can be at least partially overcome if countries converge on a common strategy: phasing out industry-specific green subsidies, reducing or eliminating domestic content requirements, and transitioning to truly neutral BCAs.¹⁷⁰ As tariffs, BCAs are the most transparent and easily monitored border measures.¹⁷¹ They also have two other attractive qualities: (i) they can help level the playing field for a growing number of industries operating under carbon-restricting conditions; and (ii) because tariffs mean “the country where the consumption takes place gets the revenue,” they create incentives for exporters to adopt carbon-restrictions to reduce or eliminate the duty.¹⁷² In fact, as E.U. industries become more carbon efficient and the E.U. phases out subsidies (whether countervailable or not under WTO law), resorting to BCAs will be an increasingly appealing option. The same can be said of Australia, especially after it transitions from a carbon tax to a cap-and-trade system in 2015 and gradually

169. See, e.g., Rossella Brevetti, *ITA Preliminarily Assigns CV Duties On Imports of Wind Towers From China*, [2012] INT'L TRADE REP. (BNA), (June 7, 2012), available at http://news.bna.com/itln/ITLNWB/split_display.adp?fedfid=26849421&vname=itnrotallissues&fcn=34&wsn=493255500&fn=26849421&split=0 (describing how the US Commerce Department made a preliminary assessment against China for “providing countervailable subsidies to producers/exporters of utility-scale wind towers ranging from 13.74 percent to 26.00 percent” and that the Commerce Department made a preliminary finding that China was dumping photovoltaic cells and solar panels).

170. See *supra* text accompanying note 6.

171. For these reasons, tariffs have long been “the preferred trade barrier” under the WTO/GATT system. See JOHN H. JACKSON, WILLIAM J. DAVEY & ALAN O. SYKES, *LEGAL PROBLEMS OF INTERNATIONAL ECONOMIC RELATIONS* 423 (5th ed. 2008).

172. See Elliott et al., *supra* note 137, at 11. Of course, these distributional “effects can be offset through transfer payments between the countries.” *Id.*

phases out free allowances. Moreover, as more countries adopt carbon-restricting regimes and are tempted by subsidization, BCAs may become more attractive since they are more transparent and thus less prone to generate trade friction.

However, the spread of BCAs as the least opaque, trade-neutral, pro-climate border measure is not a panacea. For GHG stabilization to occur, trade law must evolve beyond the narrow, activist liberal teleology that has characterized WTO jurisprudence since the creation of the Dispute Settlement Body.¹⁷³ In fact, the pro-environment preamble to the WTO Charter,¹⁷⁴ despite leading to seemingly environment-friendly dicta, inspired WTO adjudicators to produce one single decision, on a substantive dispute, upholding environmental or health-protecting restrictions.¹⁷⁵ With the exception of *Brazil–Retreaded Tires*, the regulations WTO adjudicators struck down in these cases were not opaque, industry-specific subsidies or disguised protectionist regulations designed to favor national champions. Rather, WTO adjudicators, and in particular the Appellate Body, have repeatedly rejected national regulations as trade restrictions that were not owed deference due to a perceived failure by the challenged countries to first pursue multilateral negotiations before adopting regulations unilaterally.¹⁷⁶

173. See Juscelino F. Colares, *The Limits of WTO Adjudication: Is Compliance the Problem?*, 14.2 J. INT'L ECON. L. 403 (2011); Juscelino F. Colares, *A Theory of WTO Adjudication: From Empirical Analysis to Biased Rule Development*, 42 VAND. J. TRANSNAT'L L. 383, 392 (2009); Daniel K. Tarullo, *The Hidden Costs of International Dispute Settlement: WTO Review of Domestic Anti-Dumping Decisions*, 34 LAW & POL'Y INT'L BUS. 109, 153, 159 (2002).

174. See Marrakesh Agreement Establishing the World Trade Organization, Apr. 15, 1994, 1867 U.N.T.S. 154, pmb1. (recognizing that trade relations should “allow[] for the optimal use of the world’s resources in accordance with the objective of sustainable development, seeking both to protect and preserve the environment . . .”) [hereinafter “WTO Charter”].

175. See Appellate Body Report, *European Communities–Measures Affecting Asbestos and Asbestos-Containing Products (Hormones)*, WT/DS135/AB/R (Mar. 12, 2001) (holding a French embargo on asbestos and asbestos-containing products was not inconsistent with the EC’s obligations under the WTO agreements and that it came within the scope of Article XX(b)). *But see* Appellate Body Report, *United States–Standards for Reformulated and Conventional Gasoline*, WT/DS2/AB/R (Apr. 29, 1996) (holding a US regulation violated Article III without justification under Article XX) [hereinafter “*United States–Gasoline*”]; Appellate Body Report, *United States–Import Prohibition of Certain Shrimp and Shrimp Products*, WT/DS58/AB/R (Oct. 12, 1998) (holding US ban on shrimp imports from countries not certified under US regulations violated Article XI without justification under XX) [hereinafter “*US–Shrimp*”]; Appellate Body Report, *European Communities–Measures Concerning Meat and Meat Products*, WT/DS26/AB/R, WT/DS48/AB/R (Jan. 16, 1998) (holding EC ban on beef from hormone treated cattle in violation of risk assessment rules under Article 3 of the Agreement on the Application of Sanitary and Phytosanitary Measures); Appellate Body Report, *Brazil–Measures Affecting Imports of Retreaded Tires*, WT/DS332/AB/R (Dec. 3, 2007) (holding Brazil’s imposition of an import ban on retreaded tires was within the scope of Article XX(b) but not justified under the chapeau) [hereinafter “*Brazil–Retreaded Tires*”]. In one compliance dispute, however, the Appellate Body did uphold a US environmental conservation measure (Section 609 of the Endangered Species Act). However, this occurred because Malaysia, one of the Complainants in the original substantive case (i.e., *US–Shrimp*), challenged the revised turtle-safe shrimp harvesting US certification program, after failing to respond to repeated US requests to file for certification. See Appellate Body Report, *United States–Import Prohibition of Certain Shrimp and Shrimp Products: Recourse to Article 21.5 of the DSU by Malaysia*, ¶ 123, WT/DS58/AB/RW (Oct. 22, 2001) [hereinafter “*United States–Shrimp Compliance*”].

176. See e.g., *United States–Gasoline*, *supra* note 175, at 28–29 (faulting the United States for failing to

Thus, not only should the new, binding multilateral emissions reduction agreement expressly endorse adoption of neutral BCAs and discourage opaque subsidies and unjustifiably discriminatory measures, but members of the WTO, meeting as the Ministerial Conference, should adopt a binding declaration, under Article IX.2 of the WTO Charter, that would enshrine emissions stabilization as one of the foremost goals informing the interpretation of WTO law.¹⁷⁷ Of course, the history of WTO adjudication on Article XX's environmental and health exceptions shows a definite trend of rejecting pro-environment national measures when these collide with free trade. Yet, in none of those decisions were WTO adjudicators operating under a declaration that expressly requires deference to measures enacted pursuant to emissions stabilization schemes. Furthermore, though not speaking for the DSB, the WTO Secretariat and UNEP have already commented favorably on the compatibility of carbon-restricting border measures with *current* WTO rules.¹⁷⁸ Arguably, the influence of the WTO/UNEP white paper, the spread of national carbon-restricting programs, and the multilateral effort to achieve an emissions reduction agreement may persuade the Appellate Body to uphold trade-restricting, yet neutral carbon-restricting regulations. Indeed, the WTO Charter's current prefatory language, which the Appellate Body openly professes to endorse each time it imputes to the chapeau of Article XX a "preference for multilateral approaches,"¹⁷⁹ would support such an interpretation.

Either way, only the close interlinking of these two systems will help reduce trade disputes and ensure the joint interjurisdictional effects of domestic carbon-restricting measures lead to GHG stabilization. In fact, it is no accident that *both* Waxman-Markey (as any future U.S. statute) and current E.U. law expressly recognize the need for an international legal framework that manages the

explore cooperation with the governments of Venezuela and Brazil before rejecting individual baselines for foreign refiners that resulted in discrimination that "was not merely inadvertent or unavoidable," thus constituting "unjustifiable discrimination" and a "disguised restriction on international trade."); *United States-Shrimp*, *supra* note 175, ¶ 166 (declaring that the United States was obligated to engage in "serious, across-the-board negotiations with the objective of concluding bilateral or multilateral agreements . . . before enforcing the import prohibition.") (emphasis added); *United States-Shrimp Compliance*, *supra* note 175, ¶ 122 (attributing to "the decided preference for multilateral approaches voiced by WTO members and others in the international community in various international agreements for the protection and conservation of endangered sea turtles . . ." as legitimizing their view that the United States "would be expected to make good faith efforts to reach international agreements . . .").

177. A decision to adopt such a binding interpretation would require a "three-fourths majority of the [WTO] Members." WTO Charter, *supra* note 174, art. IX.2. This suggestion could be cumulated with negotiation and adoption of other binding interpretations. One such interpretation could allow for the differential tariff treatment of carbon-efficient and carbon-inefficient products that are currently treated as "like products" under GATT Article III. Such express deviations from the traditional "like product" classifications would greatly contribute to the climate regime while reducing future litigation under article III. Further discussion of this and other potential reforms is outside the scope of this article.

178. See WTO-UNEP REPORT *supra* note 75.

179. See *United States-Shrimp Compliance*, *supra* note 175, ¶ 122.

growing climate change and trade interface, that both view as necessary to the success of their efforts.¹⁸⁰ To ensure compliance with future emission commitments, these regimes should also consider authorizing the imposition of trade measures against members that refuse to meet future binding emission targets, a solution that has been adopted by at least three other environmental agreements: the Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973); The Montreal Protocol on Substances that Deplete the Ozone Layer (1987); and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (1989).

CONCLUSION

Whether these medium-term events will come to pass exactly as conjectured here matters less than realizing that implementing carbon-restricting reform poses both domestic and international coordination problems. The more difficult problem at the moment is how domestic political-economic interests in carbon-friendly nations will align to achieve such coordination. This article's original contribution lies in presenting, arguably, the first explanation of how these forces will converge to support national adoption of carbon-restricting regimes and participation in a binding global agreement that harmonizes these emerging regimes. While trade-effect equalization through BCAs is not essential to steer carbon-friendly nations toward adopting their own carbon restrictions, only the combined eventual adoption of neutral BCAs in a multilateral treaty and the increased receptivity of environmental measures under the WTO system would ensure a path toward GHG stabilization.

180. *Compare* H.R. 2454 §§ 761-762 (finding that “[t]he purposes of this part are—(1) to promote a strong global effort to significantly reduce [GHG] emissions, and, through this global effort, stabilize [GHG] concentrations in the atmosphere . . .” which “can be most effectively addressed and achieved through agreements negotiated between the United States and foreign countries.”) *with* Aviation Directive, pmb. ¶ 5, 2009 O.J. (L8) 4 (“The European Council emphasized that the E.U. is committed to a global and comprehensive agreement for reductions in [GHG] emissions beyond 2012, providing an effective, efficient and equitable response on the scale required to face climate change challenges.”).