

Addressing the Leakage/Competitiveness Issue in Climate Change Policy Proposals*

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Abstract

We will likely see increasing efforts to minimize leakage of carbon to non-participating countries and to address concerns on behalf of the competitiveness of carbon-intensive industry.

Environmentalists on one side and free traders on the other side fear that border measures such as tariffs or permit-requirements against imports of carbon-intensive products will collide with the WTO. There need not necessarily be a conflict, if the measures are designed sensibly. There are precedents -- the shrimp-turtle case and the Montreal Protocol -- that could justify border measures to avoid undermining the Kyoto Protocol or its successors, if the measures are carefully designed. But if the design is dominated by politics, as is likely, import penalties are likely to run afoul of the WTO, to distort trade, and perhaps even to fail in the goal of preventing leakage. Border measures should follow principles along the following lines:

- They should follow guidelines multilaterally-agreed by countries participating in the emission targets of the Kyoto Protocol and/or its successors, against countries that are not doing so, rather than being applied unilaterally or by non-participants.
- Measures to address leakage to non-members can take the form of either tariffs or permit-requirements on carbon-intensive imports; they should not take the form of subsidies to domestic sectors that are considered to have been put at a competitive disadvantage.
- Independent panels of experts, not politicians, should be responsible for judgments as to findings of fact -- what countries are complying or not, what industries are involved and what is their carbon content, what countries are entitled to respond with border measures, or the nature of the response.
- Import penalties should target fossil fuels and a half dozen or so of the most energy-intensive major industries -- perhaps aluminum, cement, steel, paper, glass, iron and chemicals -- rather than penalizing industries that are further removed from the carbon-intensive activity, such as firms that use inputs produced in an energy-intensive process.

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Of all the daunting obstacles faced by the effort to combat global climate change, the problem of leakage was perhaps the last to gain heavy attention from policy-makers. Assume that a core of rich countries is able to agree for the remainder of the century on a path of targets for emissions of greenhouse gases (GHGs), following the lead of the Kyoto Protocol, or to agree on other measures to cut back on emissions, and that the path is aggressive enough at face value to go some way toward achieving the GHG concentration goals that environmental scientists say are necessary. Will global emissions in fact be reduced? Even under the business-as-usual scenario—that is, the path along which technical experts forecast that countries’ emissions would increase in the absence of a climate change agreement—most emissions growth was expected to come from China and other developing countries. If these nations are not included in a system of binding commitments, global emissions will continue their rapid growth. But the problem is worse than that. Leakage means that emissions in the nonparticipating countries would actually rise above where they would otherwise be, thus working to undo the environmental benefits of the rich countries’ measures. Furthermore, not wanting to lose “competitiveness” and pay economic costs for minor environmental benefits, the rich countries could lose heart and the entire effort could unravel. Thus, it is important to find ways to address concerns about competitiveness and leakage, but without undue damage to the world trading system.

Developing Countries, Leakage, and Competitiveness

We need the developing countries inside the emissions control program, for several reasons.¹

As noted, these countries will be the source of the big increases in GHG emissions in coming

¹ An additional reason we need developing countries inside the cap-and-trade system is to give the United States and other industrial countries the opportunity to buy relatively low-cost emissions abatement from developing countries, which is crucial to keep low the economic cost of achieving any given goal in terms of concentrations. This would increase the probability that industrial countries comply with the system of international emissions commitments.

years, according to the business-as-usual path. China, India, and other developing countries will represent up to two-thirds of global carbon dioxide emissions over the course of this century, vastly exceeding the expected contribution of countries belonging to the Organization for Economic Cooperation and Development of roughly one-quarter of global emissions. Without the participation of major developing countries, emissions abatement by industrial countries will not do much to mitigate global climate change

If a quantitative international regime is implemented without the developing countries, their emissions are likely to rise even faster than the business-as-usual path, due to the problem of leakage. Leakage of emissions could come about through several channels. First, the output of energy-intensive industries could relocate from countries with emissions commitments to countries without. This could happen either if firms in these sectors relocate their plants to unregulated countries, or if firms in these sectors shrink in the regulated countries while their competitors in the unregulated countries expand. A particularly alarming danger is that a plant in a poor, unregulated country might use dirty technologies and thus emit more than a plant producing the same output would have in a high-standard, rich, regulated country, so that aggregate world emissions would actually go up rather than down!

Another channel of leakage runs via world energy prices. If participating countries succeed in cutting back their consumption of coal and oil, the high-carbon fossil fuels, demand will fall and the prices of these fuels will fall on world markets (other things equal). This is equally true if the initial policy is a carbon tax that raises the price to rich-country consumers as if it comes via other measures. Nonparticipating countries would naturally respond to declines in world oil and coal prices by increasing consumption.

Elaboration is available from Aldy and Frankel (2004), Frankel (1998, 2005c, 2007), Seidman and Lewis (2008), and many other sources.

Estimates vary regarding the damage in tons of increased GHG emissions from developing countries for every ton abated in an industrial country. But an authoritative survey concludes “Leakage rates in the range 5 to 20 per cent are common.”²

Even more salient politically than leakage is the related issue of competitiveness: American industries that are particularly intensive in energy or otherwise GHG-generating activities will be at a competitive disadvantage to firms in the same industries operating in nonregulated countries.³ Such sectors as aluminum, cement, glass, paper, chemicals, iron, and steel will point to real costs in terms of lost output, profits, and employment.⁴ They will seek protection and are likely to get it.

The policy response to fears of leakage and competitiveness can take a variety of forms. *Tariffs* on imports of goods from producers who do not operate under emission regulations are perhaps the most straightforward, except that ascertaining carbon content is difficult. *Border adjustment taxes* applies not just to import tariffs alone but to a combination of import tariffs and export subsidies. Broader phrases such as *trade controls*, import penalties, or *carbon-equalization measures* include the option—likely to be adopted in practice—of requiring

² Intergovernmental Panel on Climate Change (2001, chap. 8.3.2.3, pp. 536–44). Bordoff (2008, n. 4) reports studies’ estimates in the range of 8 to 11 percent, including an estimate from McKibbin and others (1999) that leakage if the United States adopted its Kyoto Protocol target unilaterally would have been 10 percent. Ho, Morgenstern, and Shih (2008) also find that the imposition of a price on carbon in the United States would produce substantial leakage for some industries, especially in the short run; they conclude that petrochemicals and cement are the most adversely impacted, followed by iron and steel, aluminum, and lime products. Demilly and Quirion (2008a) and Reinaud (2008) do not find large leakage effects from the first stage of the EU Emissions Trading System; but this tells us little about the next, much more serious, stage. I cannot help feeling that all these studies may underestimate some long-run general equilibrium effects.

³ It is not meaningful to talk about an adverse effect on the competitiveness of the American economy in the aggregate. Those sectors *low* in carbon intensity would in theory *benefit* from an increase in taxation of carbon relative to everything else. This theoretical point is admittedly not very intuitive. Far more likely to resonate publicly is the example that producers of renewable energy, and of the equipment that they use, would benefit from higher fossil fuel prices.

⁴ Houser and others (2008).

importers to buy emission permits, or “international reserve allowances.” For economists such as *importer permit requirements* are precisely equivalent to import tariffs—the cost of the permit is the same as the tariff rate. Others would not so readily make this connection, however. International law may well defy economic logic by treating import tariffs as impermissible but permit requirements for imports as acceptable.⁵ *Trade sanctions* go beyond trade controls: while the latter fall only on environmentally relevant sectors, the former target products that are arbitrary and unrelated to the non-compliant act, in an effort to induce compliance.⁶

The Possible Application of Trade Barriers by the United States

Of the twelve market-based climate change bills introduced in the 110th Congress, almost half called for some sort of border adjustments. Some would have featured a tax to be applied to fossil fuel imports. (This would be unobjectionable, *provided* the same tax is applied to the domestic production of the same fossil fuels; but otherwise it would be distortionary and illegal vis-à-vis the World Trade Organization.) Others would have required that energy-intensive imports surrender permits corresponding to the carbon emissions embodied in them.⁷ The Bingaman-Specter Low Carbon Economy Act of 2007 would have provided that “if other countries are deemed to be making inadequate efforts [in reducing global GHG emissions], starting in 2020 the president could require importers from such countries to submit special

⁵ Pauwelyn (2007); Brewer (2008); and Fischer and Fox (2009).

⁶ They are used multilaterally only by the WTO and United Nations Security Council, and are not currently under consideration as a mechanism for addressing climate change (Charnovitz 2003b, page 156). Pauwelyn [2007] compares some of these options more carefully, from a legal standpoint. Fischer and Fox [2009] compare four of them from an economic standpoint: import tax alone, export rebate alone, full border adjustment, and domestic production rebate. Hufbauer, Charnovitz, and Kim (2009, Chapter 3) are more exhaustive still.

⁷ The source for this is Resources for the Future. Or Hufbauer, Charnovitz and Kim (2009, Table 1.A.2).

emission allowances (from a separate reserve pool) to cover the carbon content of certain products.” Similarly, the 2007 Lieberman-Warner Bill would have required the president to determine what countries have taken comparable action to limit GHG emissions; for imports of covered goods from covered countries, the importer would then have had to buy international reserve allowances.⁸ In the 2007 bill, the requirement would have gone into effect in 2020. These requirements are equivalent to a tax on the covered imports. The two major presidential candidates in the 2008 U.S. election campaign apparently supported some version of these bills, including import penalties in the name of safeguarding competitiveness vis-à-vis developing countries.

In addition, a different law that has already been passed and gone into effect poses similar issues: The Energy Independence and Security Act of 2007 “limits U.S. government procurement of alternative fuel to those from which the lifecycle greenhouse gas emissions are equal to or less than those from conventional fuel from conventional petroleum sources.”⁹ Canada’s oil sands are vulnerable. Because Canada has ratified the Kyoto Protocol and the United States has not, the legality of this measure seems questionable, in the inexpert judgment of the author.

The Possible Application of Trade Barriers by the EU

It is possible that many in Washington do not realize that the United States is likely to be the victim of legal sanctions before it is the wielder of them. In Europe, firms have already entered

⁸ The Lieberman-Warner Bill, S 2191: Americas Climate Security Act of 2007, sections 6005–6.

⁹ Energy Independence and Security Act of 2007, section 526; cited in *Financial Times*, March 10, 2008. Pauwelyn (2008) deals with government procurement and Kyoto.

the first Kyoto budget period of binding emission limits, competitiveness concerns are well advanced, and the nonparticipating United States is an obvious target of resentment.¹⁰

After the United States failed to ratify Kyoto, European parliamentarians in 2005, and French prime minister Dominique de Villepin in 2006, proposed a “Kyoto carbon tax” or “green tax” against imports from the United States.¹¹ The European Commission had to make a decision on the issue in January 2008, when the European Union determined its emission targets for the post-Kyoto period. In preparation for this decision, French president Nicolas Sarkozy warned:

If large economies of the world do not engage in binding commitments to reduce emissions, European industry will have incentives to relocate to such countries. . . . The introduction of a parallel mechanism for border compensation against imports from countries that refuse to commit to binding reductions therefore appears essential, whether in the form of a tax adjustment or an obligation to buy permits by importers. This mechanism is in any case necessary in order to induce those countries to agree on such a commitment.¹²

The mechanism envisioned here sounds similar to that in the Bingaman-Specter and Lieberman-Warner bills, with the difference that it could go into effect soon, because Europe is already limiting emissions whereas the United States is not.

In the event, the EU Commission instead included this provision in its directive:

¹⁰ Bierman and Brohm (2005); Bhagwati and Mavroidis (2007); National Board of Trade, Government of Sweden (2004). Recent papers that compare the various options for border measures in a European context include Alexeeva-Talebi, Loschel and Mennel (2008), Demailly and Quiron (2008b), and Reinaud (2008).

¹¹ Beattie (2008); “Mandelson Rejects CO₂ Border Tax,” EurActiv.com, December 18, 2006.

¹² Letter to EU Commission president José Manuel Barroso, January 2008.

Energy-intensive industries which are determined to be exposed to significant risk of carbon leakage could receive a higher amount of free allocation or an effective carbon equalization system could be introduced with a view to putting EU and non-EU producers on a comparable footing. Such a system could apply to importers of goods requirements similar to those applicable to installations within the EU, by requiring the surrender of allowances.”¹³

The second of the two options, “carbon equalization,” sounds consistent with what is appropriate—and with the sort of measures suggested by Sarkozy and spelled out in detail in the U.S. bills. The first option is badly designed, however.

Free allocation of permits would help European industries that are carbon intensive and therefore vulnerable to competition from nonmembers by giving them a larger quantity of free GHG emission permits. According to simple microeconomic theory, this would do nothing to address leakage. Because carbon-intensive production is cheaper in nonparticipating countries, the European firms in theory would simply sell the permits they receive and pocket the money, with the carbon-intensive production still moving from Europe to the nonparticipants. Admittedly, in practice there might be some effects; for example, an infusion of liquidity might keep in operation a firm that otherwise would go bankrupt. But overall, there would probably be almost as much leakage as if there had been no policy response at all.¹⁴ Presumably, the purpose behind this option is not to minimize leakage, for which it would be the wrong remedy, nor even

¹³ The source for this is paragraph 13 of the “Directive of the European Parliament and of the Council Amending Directive 2003/87/EC so as to Improve and Extend the EU Greenhouse Gas Emissions Allowance Trading System,” January 2008.

¹⁴ Of course, free allocation of permits would be an equally bad way of protecting exposed industries in the United States. See Bordoff (2008).

to punish nonparticipating countries, but simply to buy off domestic interests so that they will not oppose action on climate change politically.

Would Trade Controls or Sanctions Be Compatible with the WTO?

Would measures that are directed against carbon dioxide emissions in other countries, as embodied in electricity or in goods produced with it, be acceptable under international law? Not many years ago, most international experts would have said that import barriers against carbon-intensive goods, whether tariffs or quantitative restrictions, would necessarily violate international agreements. Under the General Agreement on Tariffs and Trade (GATT), although countries could use import barriers to protect themselves against environmental damage that would otherwise occur within their own borders, they could not use import barriers in efforts to affect how goods are produced in foreign countries, so-called process and production methods (PPMs). A notorious example was the GATT ruling against U.S. barriers to imports of tuna from dolphin-unfriendly Mexican fishermen. But things have changed.

The World Trade Organization (WTO) came into existence, succeeding the GATT, at roughly the same time as the Kyoto Protocol. The drafters of each treaty showed more consideration for the other than do the rank and file among environmentalists and free traders, respectively. The WTO regime is more respectful of the environment than was its predecessor. Article XX allows exceptions to Articles I and III for purposes of health and conservation. The Preamble to the 1995 Marrakech Agreement establishing the WTO seeks “to protect and preserve the environment;” and the 2001 Doha Communiqué that sought to start a new round of negotiations declares: “The aims of . . . open and non-discriminatory trading system, and acting

for the protection of the environment . . . must be mutually supportive.” The Kyoto Protocol text is equally solicitous of the trade regime. It says that the parties should “strive to implement policies and measures . . . to minimize adverse effects . . . on international trade.” The United Nations Framework Convention on Climate Change features similar language.

GHG emissions are PPMs. Is this an obstacle to the application measures against them at the border? I do not see why it has to be. Three precedents can be cited: sea turtles in the Indian Ocean, ozone in the stratosphere, and tires in Brazil.

The true import of a 1998 WTO panel decision on the shrimp-turtle case was missed by almost everyone. The big significance was a pathbreaking ruling that environmental measures can target not only exported products (Article XX) but also partners’ PPMs—subject, as always, to nondiscrimination (Articles I and III). The United States was in the end able to seek to protect turtles in the Indian Ocean, provided it did so without discrimination against Asian fishermen. Environmentalists failed to notice or consolidate the PPM precedent, and to the contrary were misguidedly up in arms over this case.¹⁵

Another important precedent was the Montreal Protocol on stratospheric ozone depletion, which contained trade controls. The controls had two motivations.¹⁶ The first was to encourage countries to join. And the second, if major countries had remained outside, was to minimize leakage, the migration of the production of banned substances to nonparticipating countries. In the event, the first worked, so the second was not needed.

In case there is any doubt that Article XX, which uses the phrase “health and conservation,” also applies to environmental concerns such as climate change, a third precedent

¹⁵ For a full explanation of the legal issues, see Charnovitz (2003). Also see Bhagwati and Mavroidis (2007), Charnovitz and Weinstein (2001); Deal (2008); and Weinstein (2001).

¹⁶ Brack (1996).

is relevant. In 2007, a new WTO Appellate Body decision regarding Brazilian restrictions on imports of retreaded tires confirmed the applicability of Article XX(b): Rulings “accord considerable flexibility to WTO Member governments when they take trade-restrictive measures to protect life or health . . . [and] apply equally to issues related to trade and environmental protection, . . . including measures taken to combat global warming.”¹⁷

These three examples go a long way toward establishing the legitimacy of trade measures against PPMs. Many trade experts, both economists and international lawyers, are not yet convinced¹⁸—let alone representatives of India and other developing countries. I personally have come to believe that the Kyoto Protocol could have followed the Montreal Protocol by incorporating well-designed trade controls aimed at nonparticipants. One aspect that strengthens the applicability of the precedent is that we are not talking about targeting practices in other countries that harm solely the local environment, where the country can make the case that this is nobody else’s business. The depletion of the stratospheric ozone and the endangerment of sea turtles are global externalities. (It helped that these are turtles that migrate globally.) So is climate change from GHG emissions. A ton of carbon emitted into the atmosphere hurts all residents of the planet.

Principles for Designing Legitimate Penalties on Carbon-Intensive Imports

¹⁷ From a personal communication with Brendan McGivern, December 12, 2007.

¹⁸ Some experts believe that even multilateral trade penalties against nonmembers might not be permissible under the WTO. See Sampson (2000, 87).

Although the shrimp-turtle case and the Montreal Protocol help establish the principle that well-designed trade measures can legitimately target PPMs, at the same time they suggest principles that should help guide drafters as to what is good design. First, the existence of a multilaterally negotiated international treaty such as the Kyoto Protocol conditions the legitimacy of trade controls. On the one hand, that leakage to nonmembers could negate the goal of the protocol strengthens the case for (the right sort of) trade controls. It is stronger, for example, than in the shrimp-turtle case, which was largely a unilateral U.S. measure.¹⁹ On the other hand, the case is weaker than it was for the Montreal Protocol. (Multilateral initiatives like the latter are on firmer ground than unilateral initiatives.) The Kyoto Protocol could have made explicit allowance for multilateral trade controls, and chose not to. The case would be especially weak for American measures if the United States has still not ratified the protocol or a successor agreement. The Europeans have a relatively good case against the United States, until such time as the United States ratifies. But the case would be stronger still if a future multilateral agreement—for example, under the United Nations Framework Convention on Climate Change (UNFCCC)—agreed on the legitimacy of trade controls and on guidelines for their design.

Second, there is the question of the sorts of goods or services to be made subject to penalty. It would certainly be legitimate to apply tariffs against coal itself, assuming that the domestic taxation of coal or a domestic system of tradable permits was in place. It is probably also legitimate when applied to the carbon content of electricity, though this requires acceptance of the PPM principle. The big question is the carbon/energy content of manufactures. Trade sanctions would probably not be legitimate when applied solely as punishment for free riding,

¹⁹ Webster (2008) explains that unilateral measures more likely acceptable if in pursuit of an existing multilateral agreement such as the Kyoto Protocol. Even sea turtles are, however, given some protective status by their inclusion in Appendix 1 of the Convention on International Trade in Endangered Species of Wild Fauna and Flora.

against unrelated products of a nonmember, or, in a more extreme case, on clean inputs—for example, a ban on U.S. turbines used for low-carbon projects (unless perhaps economy-wide sanctions were multilaterally agreed by UNFCCC members).²⁰

Paradoxically, the need to keep out coal-generated electricity or aluminum from nonmembers of the Kyoto Protocol is greater than the need to keep out coal itself. The reason is that the Protocol already puts limits on within-country emissions. Assuming the limits are enforced, then the world community has no particular interest in how the country goes about cutting its emissions. But if the country imports coal-generated electricity or aluminum from nonmembers, the emissions occur outside its borders and the environmental objective is undermined.

It is hard to determine carbon content of manufactures. In practice, the best would be to stay with the half-dozen biggest-scale, most-energy-intensive industries—probably aluminum, cement, steel, paper, glass, perhaps iron and chemicals. Even here there are difficult questions. What if the energy used to smelt aluminum in another country is cleaner than in the importing country (Iceland's energy comes from hydropower and geothermal power) or dirtier (much of Australia's energy comes from coal)? How can one distinguish the marginal carbon content of the energy used for a particular aluminum shipment from the average carbon content of energy in the country of origin? These are questions that will have to be answered. But as soon as one goes beyond six or seven big industries, it becomes too difficult for even a good-faith investigator to discern the effective carbon content, and the process is also too liable to abuse. One would not want to levy tariffs against the car parts that are made with the metal that was produced in a

²⁰ Charnovitz (2003, 156) emphasizes the distinction between trade controls, which fall on environmentally relevant sectors, versus trade sanctions, where the targeted products are arbitrary and unrelated to the noncompliant act (and are used multilaterally only by the WTO and UN Security Council).

carbon-intensive way, or against the automobiles that used those car parts (they could be low-mileage hybrids!), or against the products of the firms that bought the cars, and so on.²¹

The Big Danger

Just because a government measure is given an environmental label does not necessarily mean that it is motivated primarily—or even at all—by bona fide environmental objectives. To see the point, one has only to look at the massive mistake of American subsidies of biofuels (and protection against competing imports from Brazil). If each country on its own imposes border penalties on imports in whatever way suits national politics, they will be poorly targeted, discriminatory, and often disguisedly protectionist. When reading the language in the U.S. congressional bills or the EU decision, it is not hard to imagine that special interests could take over for protectionist purposes the process whereby each government decides whether other countries are doing their share or what foreign competitors merit penalties.²² Thus the competitiveness provisions will indeed run afoul of the WTO, and they will deserve to.

It is important who makes the determinations regarding what countries are abiding by carbon-reduction commitments, what entity can retaliate against the noncompliers, what sectors are fair game, what sort of barriers are appropriate, and when a target country has moved into

²¹ The 2008 revision of the McCain-Lieberman Bill broadened “covered products” to include goods that generate emissions more indirectly (Bardoff 2008, n. 6).

²² The congressional language imposing penalties on imports from countries that do not tax carbon was apparently influenced by the International Brotherhood of Electrical Workers, which regularly lobbies for protection of American workers from foreign competition; see Beattie (2008). Simultaneously, the European Trade Union Confederation urged the EU Commission to tax imports from countries refusing to reduce emissions. See *Wall Street Journal* (2008).

compliance so that it is time to remove the penalty. One policy conclusion is that these decisions should be delegated to independent panels of experts rather than made by politicians.

The most important policy conclusion is that we need a multilateral regime to guide such measures. Ideally, such a regime would be negotiated along with a successor to the Kyoto Protocol that set targets for future periods and brings the United States and developing countries inside. But if that negotiation process takes too long, it might be useful in the shorter run for the United States to enter negotiations with the European Union to harmonize guidelines for border penalties, ideally in informal association with the secretariats of the UNFCCC and the WTO.²³

Why Take Multilateralism Seriously?

“Why should WTO obligations be taken seriously?” some may ask. There are three possible answers, based on considerations of international citizenship, good policy, and realpolitik.

First, with regard to international citizenship, one question is whether the United States wants to continue the drift of the recent past in the general direction of international rogue country status or rather return to the highly successful postwar strategy of adherence to international law and full membership in—indeed, leadership of—multilateral institutions. The latter course does not mean routinely subordinating U.S. law, let alone American interests, to international law. There will be cases where the United States wants to go its own way. But the effort on climate change should surely not be one of these cases. Among other reasons is the fact that GHG emissions are inherently a global externality. No single country can address the problem on its own, due to the free rider problem. Although there is a role for unilateral actions

²³ Sampson (1999).

on climate change—for example, by the United States, as part of a short-term effort to demonstrate seriousness of purpose and begin to catch up with the record of the Europeans—in the long term, multilateral action offers the only hope of addressing the problem. The multilateral institutions are already in place—specifically, the UNFCCC; its child, the Kyoto Protocol; and the WTO—and they were predominantly created under U.S. leadership.

Second, the basic designs and operations of these institutions happen to be relatively sensible, taking political realities as given. They are more sensible than most critics of the international institutions and their alleged violations of national sovereignty believe. This applies whether the critics are on the left or right, and whether their main concern is the environment or the economy.²⁴ One can place very heavy weight on economic goals and yet realize the desirability of addressing externalities, minimizing leakage, dealing with competitiveness concerns, and so forth. One can place very heavy weight on environmental goals and yet realize the virtues of market mechanisms, nondiscrimination, reciprocity, addressing international externalities *cooperatively*, preventing special interests from hijacking environmental language for their own financial gain, and so forth.

The third reason why the United States should be prepared to modify the sort of “international reserve allowances” language of the Lieberman-Warner Bill, and to move in the direction of multilateral coordination of guidelines for such measures, comes from hardheaded self interest: a desire to avoid being the victim of emulation or retaliation. Section 6006 of

²⁴ I have addressed elsewhere other ways in which the climate regime (Kyoto) could come into conflict with the trade regime (WTO), and the more general questions of whether free trade and environmental protection need be in conflict -- Frankel (2004, 2005a, 2005c).

Lieberman-Warner does not envision these measures going into effect until 2020.²⁵ This is as it should be, because any such bill must give the United States time to start playing the game before it can presume to punish other players for infractions. But the EU language could be translated into penalties against U.S. products any day. The EU members are far from the only governments that could claim to have taken stronger climate change policies than the United States.²⁶ It is in the American interest to have any border penalties governed by a sensible system of multilateral guidelines. The European Union might welcome U.S. participation in joint negotiations to agree on guidelines, as part of a process of negotiations over the Kyoto successor regime.

The argument is stronger than the historical examples of U.S. import barriers leading to subsequent emulation and retaliation that comes back to hit American exports (the Smoot Hawley tariff in 1930, antidumping cases in the 1980s, . . .). Here the United States has an opportunity to influence others' barriers against its goods ten years before it would be putting up barriers against theirs.

Concluding Recommendations

Both the economics and the law are complicated. The issues need further study. Nevertheless, this chapter offers a central message: border measures to address leakage need not necessarily

²⁵ The Boxer-Lieberman-Warner substitute version (S 3036), voted on in June 2008, moved the starting date for border adjustments forward to 2014.

²⁶ Even China has apparently enacted efficiency standards on automobiles, refrigerators, and air conditioners that exceed regulations in the United States. How will Americans react if China puts justified penalties on imports from the United States?

violate WTO law or sensible trade principles, but that there is a very great danger in practice that they will.

I conclude with several subjective judgments as to principles that could guide a country's border measures if its goal were indeed to reduce leakage and to avoid artificially tilting the playing field toward carbon-intensive imports from nonparticipating countries or damaging the world trading system, especially if it is viewed as politically necessary to do something to address competitiveness concerns. I classify thus characteristics of possible border measures into three categories, which I will name by color (for lack of better labels):

—The “white” category: those that seem to me reasonable and appropriate.²⁷

—The “black” category: those that seem to me very dangerous, in that they are likely to become an excuse for protectionism.

—The “gray” category: those that fall in between.

The white (appropriate) border measures could be either tariffs or (equivalently) a requirement for importers to surrender tradable permits. These principles include:

—Measures should follow some multilaterally agreed-to set of guidelines among countries participating in the emission targets of the Kyoto Protocol and/or its successors.

—Judgments as to findings of fact—which countries are complying or not, which industries are involved and what is their carbon content, which countries are entitled to respond with border measures, and the nature of the response—should be made by independent panels of experts.

²⁷ Hufbauer, Charnovitz and Kim (2009, Chapter 5) call this category “the green space” and present a list of desirable attributes which is more authoritative than the one I had drawn up, at least from a legal standpoint. Green is the more familiar color, but I had thought to avoid it because of possible confusion with the “green box” of the WTO's Agreement on Agriculture.

—Measures should only be applied by countries that are reducing their emissions in line with the Kyoto Protocol and/or its successors, against countries that are not, either due to refusal to join or to failure to comply.

—Border tax adjustments should target only imported fossil fuels, and a half dozen of the most energy-intensive major import-competing industries: aluminum, cement, steel, paper, and glass, and perhaps iron and chemicals.

The black (inappropriate) border measures include:

—Unilateral measures applied by countries that are not participating in the Kyoto Protocol or its successors.

—Calculations of carbon content of imports by formulas that presume firms necessarily use the same production processes as domestic competitors.²⁸

—Judgments as to findings of fact that are made by politicians, who are vulnerable to political pressure from interest groups for special protection.

—Unilateral measures that seek to sanction an entire country, rather than targeting narrowly defined energy-intensive sectors.

—Import barriers against products that are further removed from the carbon-intensive activity, such as firms that use inputs that are produced in an energy-intensive process.

—Subsidies—whether in the form of money or extra permit allocations—to domestic sectors that are considered to have been put at a competitive disadvantage.

²⁸ In the Venezuelan reformulated gasoline case, the WTO panel ruled that the United States should have allowed for differences in foreign firms' production processes. Venezuela successfully claimed that U.S. law violated national treatment—that is, discriminated in favor of domestic producers with regard to whether refineries were allowed to use individual composition baselines when measuring pollution reduction. Pauwelyn (2007) proposes that the US Customs Bureau assign imports an implicit carbon content based on the production techniques that are dominant in the United States, but as a back-up when the foreign producer does not voluntarily provide the information needed to calculate carbon content.

The gray (intermediate) measures include:

—Unilateral measures that are applied in the interim before there has been time for multilateral negotiation over a set of guidelines for border measures.

—The import penalties might follow the form of existing legislation on countervailing duties.

References

Aldy, Joseph, and Jeffrey Frankel. 2004. “Designing a Regime of Emission Commitments for Developing Countries That Is Cost-Effective and Equitable.” Paper written for conference on G20 Leaders and Climate Change, Council on Foreign Relations, New York, September 20–21.

Aldy, Joseph, Scott Barrett, and Robert Stavins. 2003. “Thirteen Plus One: A Comparison of Global Climate Architectures.” *Climate Policy* 3, no. 4: 373–97.

Alexeeva-Talebi, Victoria, Andreas Loschel and Tim Mennel, 2008, “Climate Policy and the Problem of Competitiveness: Border Tax Adjustments or Integrated Emissions Trading?” Discussion Paper 08-061, Zentrum für Europäische Wirtschaftsforschung GmbH, Mannheim, Germany.

Beattie, Alan. 2008. “Green Barricade: Trade Faces a New Test as Carbon Taxes Go Global.” *Financial Times*, January 24.

Bhagwati, Jagdish, and Petros C. Mavroidis. 2007. “Is Action Against U.S. Exports for Failure to Sign the Kyoto Protocol WTO-Legal?” *World Trade Review* 6: 299–310.

Bierman, Frank, and Rainer Brohm. 2005. “Implementing the Kyoto Protocol without the United States: The Strategic Role of Energy Tax Adjustments at the Border.” *Climate Policy* 4, no. 3: 289-302.

Bordoff, Jason. 2008. “International Trade Law and the Economics of Climate Policy: Evaluating the Legality and Effectiveness of Proposals to Address Competitiveness and Leakage Concerns.” Paper presented at Climate Change, Trade and Investment Conference: Is a Collision Inevitable? Brookings Institution, Washington, June.

Brack, D. 1996. *International Trade and the Montreal Protocol*. London: Royal Institute of International Affairs and Earthscan Publications.

- Brewer, T. L. 2003. "The Trade Regime and the Climate Regime: Institutional Evolution and Adaptation." *Climate Policy* 3, no. 4: 329–41.
- . 2004a. "Multinationals, the Environment and the WTO: Issues in the Environmental Goods and Services Industry and in Climate Change Mitigation." In *Multinationals, the Environment and Global Competition*, ed. S. Lundan, A. Rugman, and A. Verbecke. Oxford: Elsevier.
- . 2004b. "The WTO and the Kyoto Protocol: Interaction Issues." *Climate Policy* 4, no. 1: 3-12.
- Charnovitz, Steven. 2003a. "The Law of Environmental 'PPMs' in the WTO: Debunking the Myth of Illegality." *Yale Journal of International Law* 27, no. 1: 59–110.
- . 2003b. "Trade and Climate: Potential Conflicts and Synergies." In *Beyond Kyoto: Advancing the International Effort against Climate Change*. Washington: Pew Center on Global Climate Change.
- Charnovitz, Steven, and Michael Weinstein. 2001. "The Greening of the WTO." *Foreign Affairs* 80, no. 6: 147–56.
- Cosbey, Aaron, Sergio Saba, and Lucas Assuncao. 2003. "Options on Kyoto under WTO Rules." In *Implications, Including for Development, of the Interface between Environment and Trade Policies for Oil-Exporting Countries*. New York: United Nations.
- Deal, Timothy. 2008. *WTO Rules and Procedures and Their Implication for the Kyoto Protocol*. New York: United States Council for International Business.
- Demaiily, D. and P. Quirion, 2008a, "European Emission Trading Schemes and Competitiveness: A Case Study on the Iron and Steel Industry," *Energy Economics* 30, pp. 2009-2027.
- . 2008b, "Leakage from Climate Policies and Border Tax Adjustment: Lessons from a Geographic Model of the Cement Industry," forthcoming in *The Design of Climate Policy*, edited by Roger Guesnerie and Henry Tulkens, MIT Press.
- Fischer, Carolyn, and Alan Fox, 2009, "Comparing Policies to Combat Emissions Leakage: Border Tax Adjustment versus Rebates," Discussion Paper, February.
- Frankel, Jeffrey. 1998. "The Kyoto Agreement on Global Climate Change: The Administration Economic Analysis," Remarks to the *NBER Conference on Tax Policy and the Economy*, Oct. 20. At <http://ksghome.harvard.edu/~jfrankel/currentpubsspeeches.htm#On%20Climate%20Change>.
- . 2004. "Kyoto and Geneva: Linkage of the Climate Change Regime and the Trade Regime." Paper presented at Broadening Climate Discussion: The Linkage of Climate Change to Other Policy Areas, conference sponsored by Fondazione Eni Enrico Mattei and Massachusetts Institute of Technology, Venice, June.
- . 2005a. "Climate and Trade: Links between the Kyoto Protocol and WTO." *Environment* 47, no. 7: 8–19.

- . 2005b. “The Environment and Globalization.” In *Globalization: What’s New*, ed. Michael Weinstein. Columbia University Press. Reprinted in *Economics of the Environment: Selected Readings, Fifth Edition*, ed. R. Stavins. New York: W. W. Norton.
- . 2005c. “You’re Getting Warmer: The Most Feasible Path for Addressing Global Climate Change Does Run Through Kyoto.” In *Trade and Environment: Theory and Policy in the Context of EU Enlargement and Transition Economies*, ed. John Maxwell and Rafael Reuveny. Cheltenham, U.K.: Edward Elgar.
- . 2007. “Formulas for Quantitative Emission Targets.” In *Architectures for Agreement: Addressing Global Climate Change in the Post Kyoto World*, ed. Joseph E. Aldy and Robert Stavins. Cambridge University Press.
- Frankel, Jeffrey, and Andrew Rose. 2005. “Is Trade Good or Bad for the Environment? Sorting out the Causality.” *Review of Economics and Statistics* 87, no. 1: 85-91.
- Ho, Mun, Richard Morgenstern and Jhih-Shyang Shih, 2008, “Impact of Carbon Price Policies on U.S. Industry,” Discussion Paper No. 09-37, Resources for the Future, Washington DC, December.
- Houser, Trevor, Rob Bradley, Britt Childs, Jacob Werksman, and Robert Heilmayr. 2008. *Leveling the Carbon Playing Field: International Competition and US Climate Policy Design*. Washington: Peterson Institute for International Economics.
- Hufbauer, Gary, Steve Charnovitz, and Jisun Kim, 2009, Global Warming and the World Trading System, Peterson Institute for International Economics: Washington DC.
- Intergovernmental Panel on Climate Change. 2001. *Third Assessment Report: Climate Change 2001*, ed. Working Group III. Geneva.
- McKibbin, W., M. Ross, R. Shackleton, and P. Wilcoxon. 1999. *Emissions Trading, Capital Flows and the Kyoto Protocol*. Discussion Paper in International Economics 144. Brookings.
- McKibbin, Warwick, and Peter Wilcoxon, 2008, “The Economic and Environmental Effects of Border Adjustments for Climate Policy,” Brookings Conference on *Climate Change, Trade and Competitiveness: Is a Collision Inevitable?*, Washington, DC.
- National Board of Trade (Kommerskollegium), Government of Sweden. 2004. *Climate and Trade Rules: Harmony or Conflict?*
- Pauwelyn, Joost. 2008. *Procurement Policies, Kyoto Compliance and the WTO Agreement on Government Procurement: the EU Green Energy Procurement and the PPMs Debate*. Cambridge University Press.
- Reinaud, Julia, 2008, Issues Behind Competitiveness and Carbon Leakage – Focus on Heavy Industry, IEA Information Paper, International Energy Agency, Paris, October.

- Sampson, Gary. 1999. "WTO Rules and Climate Change: The Need for Policy Coherence." In *Global Climate Governance: A Report on the Inter-Linkages between the Kyoto Protocol and Other Multilateral Regimes*, ed. Bradnee Chambers. United Nations University.
- . 2000. *Trade, Environment and the WTO: The Post-Seattle Agenda*. Policy Essay 27. Washington: Overseas Development Council..
- Seidman, Laurence, and Kenneth Lewis. 2008. "Compensation and Contributions under an International Carbon Treaty." University of Delaware. Forthcoming, *Journal of Policy Modeling*, 2009.
- Wall Street Journal*. 2008. "Unions Back Carbon Tax on Big Polluting Nations." January 16.
- Webster, D. G. 2008. *Adaptive Governance: Dynamics of Atlantic Fisheries Management*. MIT Press.
- Weinstein, M. 2001. "Greens and Globalization: Declaring Defeat in the Face of Victory." *New York Times*, April 22.