

## **Multilateral Trade Agreements and Market-Based Environmental Policies**

Carolyn Fischer, Sandra Hoffmann, and Yutaka  
Yoshino

May 2002 • Discussion Paper 02-28



**RESOURCES**  
FOR THE FUTURE

Resources for the Future  
1616 P Street, NW  
Washington, D.C. 20036  
Telephone: 202-328-5000  
Fax: 202-939-3460  
Internet: <http://www.rff.org>

© 2002 Resources for the Future. All rights reserved. No portion of this paper may be reproduced without permission of the authors.

Discussion papers are research materials circulated by their authors for purposes of information and discussion. They have not necessarily undergone formal peer review or editorial treatment.

# **Multilateral Trade Agreements and Market-Based Environmental Policies**

Carolyn Fischer, Sandra Hoffmann, and Yutaka Yoshino

## **Abstract**

We review the legal provisions of the WTO regime that have important implications for national, market-based environmental policies. We evaluate those provisions for their effects on a member country's ability and incentives to design economically efficient environmental policies. International trade institutions do not recognize the polluter pays principle, posing some challenges for unilateral policies addressing cross-border pollutants and leakage. Nor do they recognize the economic equivalence of emission tax and permit regimes, leading to different potential constraints on policy design and leaving some environmental policies open to influence by protectionist motives. As many legality issues have yet to be disputed and resolved, opportunities exist to help the WTO and environmental institutions evolve in ways to enable and encourage good policymaking.

**Key Words:** trade, environment, WTO, GATT, market-based policies

**JEL Classification Numbers:** F1, Q38

## **Contents**

<b>Introduction</b> .....	<b>1</b>
<b>The GATT and National Environmental Policies</b> .....	<b>4</b>
Basic Principles.....	4
Subsidies Code.....	6
WTO Disputes .....	10
<b>Implications for Market-Based Policy Instruments</b> .....	<b>12</b>
Environmental Taxes .....	13
Implications for Tradable Emissions Allowances .....	17
Environmental Subsidies .....	21
<b>Conclusion</b> .....	<b>23</b>
<b>References</b> .....	<b>25</b>

# Multilateral Trade Agreements and Market-Based Environmental Policies

Carolyn Fischer, Sandra Hoffmann, and Yutaka Yoshino\*

## Introduction

The multilateral trading system has evolved continually since its inception following the Second World War. With successes in lowering barriers to trade, along with advances in technology, the world has witnessed unprecedented economic globalization in recent decades. Countries have become more interdependent through the exchange of goods and services and flows of capital, information, and to some extent, labor. How economic globalization and its governing institutions affect the environment—locally, nationally, and globally—has been a subject of heated debate among policymakers, journalists, academicians, businesses, labor unions, and most dramatically, street protestors at some international conferences.

The policy debate is often characterized in terms of free trade versus fair trade. Fair-trade advocates would modify trade liberalization policies by incorporating more domestic environmental and other social concerns, such as labor standards and human rights. Free-trade advocates seek the free flow of goods and services through market mechanisms with minimal intervention by national governments, whatever their political and social goals. In their view, protectionism and pollution are separate problems that require separate solutions. Responding to the public debate, researchers began exploring how international trade and the environment are related to each other. However, most studies have confined themselves to the single dimensions of economics or law.

Economists have analyzed how trade liberalization affects environmental quality through reallocation of resources, and how environmental policies affect trade patterns. The main hypotheses pursued have been twofold: On the one hand, does freer trade promote better environmental protection through rising incomes and the accompanying greater demand for environmental services? On the other hand, does freer trade drive dirty industries to relocate in

---

\* Carolyn Fischer and Sandra Hoffmann are Fellows at Resources for the Future, Washington, DC, and Yutaka Yoshino is a doctoral student in Economics at the University of Virginia.

“pollution havens” and induce governments to “race to the bottom” with lax standards by exacerbating the effects on competitiveness of costly environmental regulations? The empirical findings with regard to the latter linkages between trade and the environment have not been convincing: there is no clear evidence either that dirty industries migrate or that governments reduce environmental regulation in response to trade liberalization. In fact, there seems to be little evidence that differences in environmental standards affect trade patterns in any significant manner.<sup>1</sup> Some evidence supports the hypothesis that economic growth improves environmental quality.<sup>2</sup> Still, the debates have by no means concluded.

While economists have evaluated the broad incentives created by trade liberalization, legal analysts have considered the institutional aspects. They have focused on what international trade agreements such as the General Agreement on Tariffs and Trade (GATT), with the accompanying World Trade Organization (WTO), or the North America Free Trade Agreement (NAFTA) mean for the governing institutions pursuing national and global environmental goals. Indeed, these institutional concerns are at the forefront of the globalization debate.

Fair-trade and anti-globalization advocates raise concerns that trade agreements impose trade liberalization values over other social agendas, preventing individual countries from protecting themselves from legitimate harm. According to Public Citizen’s Global Trade Watch, recent WTO rulings “reveal a systemic bias in the WTO rules and the WTO dispute resolution process against the rights of sovereign states to enact and effectively enforce environmental laws.”<sup>3</sup> Free-trade advocates fear that socially motivated impediments to liberalization will mask illegitimate protectionist goals and will facilitate environmental paternalism, imposing standards that prevent countries from choosing their own levels of regulatory stringency according to their own situations. WTO Director General Michael Moore mused, “Perhaps the biggest challenge comes from those who want to constrain economic, political and social freedom in the name of some higher ideal. Some people cannot accept that others have different values and want to impose their own values on them.”<sup>4</sup>

---

<sup>1</sup> Tobey (1990), Jaffe et al. (1995) and Kahn (2000).

<sup>2</sup> Frankel and Rose (2002), Birdsall and Wheeler (1992), Lucas et al. (1992).

<sup>3</sup> Tuna-Dolphin, Shrimp-Turtle and Venezuela Gas rulings.  
<http://www.publiccitizen.org/trade/wto/ENVIRONMENT/>

<sup>4</sup> Moore (2000).

Most trade economists argue that trade and environmental policy fights should be kept in separate corners. Bhagwati (2002) argues that environmental problems should be targeted directly, rather than using trade barriers or sanctions, which would only compound the market distortion from the original problem: “Two wrongs do not make a right.” Similarly, trade agreements should only be used to liberalize trade. Unfortunately, in practice, international law can rarely be applied with surgical precision, and its development with only trade liberalization in mind can create problems by not foreseeing the implications for other policies. With both the pro- and anti-WTO camps arguing their opposing points from a base of national sovereignty over environmental policy, one may conclude that trade and environmental policies are indeed inextricably linked.

Since few economists have extended economic analysis to these important institutional interactions,<sup>5</sup> this paper seeks to fill some of that gap. Specifically, we study how current legal principles and statutory provisions of international trade agreements might restrict or enhance national environmental policies, and we evaluate the corresponding impacts on economic efficiency. We focus in particular on the implications of trade agreements for market-based environmental policies. Just as trade negotiators have reoriented trade protection toward price-based tools (“tarification”), today’s environmental policymakers are relying more heavily on fiscal instruments and market-oriented, incentive-based mechanisms, such as taxes and subsidies, to achieve their goals. In the next section, we highlight the legal provisions of the GATT that have important implications for national, market-based environmental policies. Then we evaluate those provisions for their effects on the economic efficiency of different environmental policies.

Although regional trade agreements also have implications for national environmental policies, we keep our focus on the GATT. The North American Free Trade Agreement (NAFTA) has some key differences in certain provisions, but for those most relevant to market-

---

<sup>5</sup> Notable exceptions are Bagwell and Staiger (2001) and Ederington (2000).

based policies, the treaty essentially parallels the GATT. Therefore, this discussion will be generally consistent with NAFTA issues as well.<sup>6</sup>

## The GATT and National Environmental Policies

### *Basic Principles*

Global trade is in large part governed by the GATT and related trade agreements under the auspices of World Trade Organization (WTO). The fundamental constraint the GATT legal framework imposes on national policymaking involves the nondiscriminatory treatment of goods traded between participating countries:

“We recognize that under WTO rules no country should be prevented from taking measures for the protection of human, animal or plant life or health, or of the environment at the levels it considers appropriate, subject to the requirement that they are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, and are otherwise in accordance with the provisions of the WTO Agreements.”<sup>7</sup>

### **National Treatment**

The guiding principle of *national treatment* is specified in Article III, which requires importing countries to treat foreign goods the same way they treat “like” domestic goods. That is, foreign goods must not be treated in a “less favorable” way than comparable domestic products, and no measures should be applied to foreign goods to protect domestic goods. Article III covers not only fiscal measures, such as taxes and subsidies, but also nonfiscal measures, such as standards and technical requirements.

---

<sup>6</sup> The possible exception lies in the controversial provision of Chapter 11, Rule (4): protection from indirect nationalization or expropriation, or from measures “tantamount to nationalization or expropriation.” However, since market-based instruments allow firms to seek the most profitable way of reducing pollution and offer other compliance options (like buying permits or paying taxes) should reductions be too difficult, it is hard to conceive of an environmental tax or tradable permit policy that would completely nullify the value of an investment. Although market-based policies might reduce returns, they are unlikely to be “tantamount to expropriation;” such challenges are most likely to arise from outright product bans that impact single firms. Market-based policies also have broad bases and do not target individual firms.

<sup>7</sup> WTO Ministerial Declaration, Fourth Session, Doha, 9 - 14 November 2001.

**the GATT Article III (National Treatment)**

1. The contracting parties recognize that **internal taxes and** other internal charges, and laws, **regulations** and requirements affecting the internal sale, offering for sale, purchase, transportation, distribution or use of products, and internal quantitative regulations requiring the mixture, processing or use of products in specified amounts or proportions, **should not be applied to imported or domestic products so as to afford protection to domestic production.**

2. The **products** of the territory of any contracting party imported into the territory of any other contracting party **shall not be subject, directly or indirectly, to internal taxes or other internal charges of any kind in excess of those applied, directly or indirectly, to like domestic products.** ...

4. The **products** of the territory of any contracting party imported into the territory of any other contracting party **shall be accorded treatment no less favorable than that accorded to like products of national origin** in respect of all laws, regulations and requirements affecting their internal sale, offering for sale, purchase, transportation, distribution or use. The provisions of this paragraph shall not prevent the application of differential internal transportation charges which are based exclusively on the economic operation of the means of transport and not on the nationality of the product.

(emphasis added)

For the most part, this requirement means that countries must impose their environmental taxes or regulations equally on domestic as well as imported goods. Nevertheless, under the GATT foreign products may be treated differently for a variety of reasons, whether deliberate (if the importing country has particular environmental objectives) or accidental (as side effects of environmental policies). For example, if a product could cause environmental damage or health problems, the government of the importing country may legitimately bar its importation.

**Least Trade-Restrictive Exceptions**

The general exceptions to nondiscrimination requirements are detailed in Article XX. Members may override their GATT obligations under several circumstances relevant for environmental policies, which are highlighted in the box. Exception (b) is if an action is necessary to protect human, animal, or plant life or health. Exception (g) provides leeway to conserve scarce natural resources if such measures are combined with restrictions on domestic production or consumption.

Exception (d) enables actions that are necessary to implement regulations, as long as those regulations themselves comply with the GATT, particularly the agreements embedded Article III. Expanding on the internal consistency requirement is a request that in all applications of Article XX, countries are asked to choose the *least trade-restrictive* measures. Article XX singles out “arbitrary or unjustifiable discrimination between countries where the same conditions prevail” and rejects “disguised restriction on international trade.” The concern is that



**the GATT Article XX (General Exceptions)**

Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent the adoption or enforcement by any contracting party of measures:

... (b) necessary to protect human, animal or plant life or health;

... (d) necessary to secure compliance with laws or regulations which are not inconsistent with the provisions of this Agreement,

... (g) relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption;...

environmental policies might be wielded to discriminate against foreign products for strategic trade objectives. Thus, the relationship between Article III and Article XX is essentially an issue of balancing domestic environmental protection on one hand and free trade on the other.

From the perspective of efficient environmental policy design, a narrower question of balance arises. On the one hand, the basic trade principles can not only benefit free exchange but also may promote more efficient and consistent environmental policies, at home and in competing countries, by preventing protectionist motives from distorting environmental regulation. On the other hand, blunt trade rules may have subtle costs if they prevent or distort the application of the most suitable policy tools for different environmental problems. These competing issues reappear in the context of specific policy provisions.

***Subsidies Code***

Today, policymakers are relying more heavily on fiscal instruments and market-oriented, incentive-based mechanisms, such as taxes and subsidies, to achieve their environmental goals. They may, for example, establish subsidies to encourage environmental protection or offer rebates to mitigate the adverse effects of environmental regulations on certain industries. The GATT Agreement on Subsidies and Countervailing Measures (hereafter, “Subsidies Code”), along with Article III, can have important implications for market-based policy instruments.

For environmentally motivated subsidies to run afoul of the GATT, they must fall first within the definition of a subsidy and then within the categories of prohibited or actionable subsidies. Then they must also not qualify under the general exceptions. Environmental taxes are also impacted by the Subsidies Code, which designates the types of taxes that may be relieved for exports (and not considered a subsidy) or that may be imposed on imports (to counteract a subsidy or to equalize tax incentives).

## Subsidies Defined

The Subsidies Code limits the concept of a subsidy to financial contributions by the government, which includes not only direct monetary transfers but also government revenues otherwise due that are forgone or not collected (e.g., tax credits). For a subsidy to be actionable, and thus subject to countervailing duty by an importing country, it has to be targeted at specific beneficiaries, such as certain industries or enterprises, within the exporting country (Article 2). Thus, a subsidy designed to benefit the economy as a whole, or distributed evenly throughout some sector of the economy, would not qualify as actionable. Furthermore, even a specific subsidy must be shown to have injured the industries or interests of another country in order to justify countervailing duties (Article 5(a), (b) and (c)).

Specific subsidies may fall into 3 categories under the GATT: prohibited, actionable, and nonactionable. In principle, the GATT prohibits subsidies for exports except for certain primary products, such as agricultural products. Also prohibited are subsidies requiring use of domestic inputs over imported goods. Actionable subsidies are subject to countervailing duties by importing countries. The GATT allows an importing country to impose countervailing duties if other WTO members' subsidies cause injury to its domestic industry. More precisely, subsidies can trigger countervailing duties if they nullify or impair benefits accruing directly or indirectly to other WTO members (in particular, a country may not introduce or increase a subsidy that has the effect of negating the value of a tariff cut), or in general, seriously prejudice the interest of another member.<sup>8</sup> Thus, if a governmental assistance scheme is targeted to a specific industry and goes beyond temporary assistance for adapting to a new environmental regulation, that subsidy might be subject to another country's countervailing duty.

---

<sup>8</sup> "Serious prejudice" may arise if the effect of a subsidy is manifested in import displacement or impediment in the subsidizing-country markets; significant price undercutting, significant price suppression, price depression, or lost sales in any market; or an increase in world market share (Article 6.2). The burden is on the subsidizing government to demonstrate that serious prejudice did not result from the subsidies in question.

**AGREEMENT ON SUBSIDIES AND COUNTERVAILING MEASURES (Selected Highlights)**  
(Does not apply to certain agricultural products)

**Part II: Prohibited Subsidies**

- Art. 3.1 (a) subsidies contingent... upon export performance  
(b) subsidies contingent... upon the use of domestic over imported goods.

**Part III: Actionable Subsidies**

- Art. 5: Adverse Effects  
(a) injury to the domestic industry of another Member;  
... (c) serious prejudice to the interests of another Member.  
Art. 6.1: Serious Prejudice  
(c) subsidies... other than one-time measures... which are given merely to provide time for the development of long-term solutions and to avoid acute social problems;...

**Part IV: Non-Actionable Subsidies**

- Art. 8.2 (a) assistance for research activities...  
(b) assistance to disadvantaged regions...  
(c) assistance to promote adaptation of existing facilities to new environmental requirements imposed by law and/or regulations which result in greater constraints and financial burden on firms, provided that the assistance:  
(i) is a one-time non-recurring measure; and  
(ii) is limited to 20 per cent of the cost of adaptation; and  
(iii) does not cover the cost of replacing and operating the assisted investment...; and  
(iv) is directly linked to and proportionate to a firm's planned reduction of nuisances and pollution, and does not cover any manufacturing cost savings which may be achieved; and  
(v) is available to all firms which can adopt the new equipment and/or production processes.

Nonactionable subsidies are not subject to such countervailing duties. Specifically, the Subsidies Code considers subsidies for adapting existing plant and equipment to new environmental requirements nonactionable (Article 8.2(c)). In addition, the GATT also classifies as nonactionable certain subsidies for industrial research and development activities (Article 8.2(a)), which would include research on pollution prevention and environmental protection technologies.

### **Border Adjustment of Taxes**

Incentive-based taxes like environmental levies tend to be relatively small in scope and revenues, compared to most taxes, and infrequently applied compared to regulations (with the exception perhaps of gasoline taxes in Europe or cigarette taxes). Thus, more attention has been paid to achieving efficient incentives across national borders for the major revenue raisers, like income or consumption taxes. Governments exempt exported goods from indirect taxes, such as a value-added tax (VAT) or sales tax, which are to be paid by consumers in the country of destination. In general, the GATT permits adjustment at the border for indirect taxes on “like” products, but not for direct taxes, such as income tax, which are imposed on factors of

production in the country of origin. The legal justification for the differential treatment is the difference in purpose between production taxes, which are origin based, and consumption taxes, which are destination based.

While it is generally clear that taxes on products are border adjustable and taxes on production are not, the issue becomes murky looking at taxes on products used in the production process. Treatment of intermediate inputs is a serious issue of concern for environmental tax policy, since many such taxes are levied on inputs like fuel or chemicals that serve as a proxy for actual emissions. The Subsidies Code has a special provision for cumulative prior-stage indirect taxes on goods and services used in the production of exported products, as distinct from value-added taxes.

The GATT Subsidies Code initially specified that taxes on inputs to production are border-adjustable only when the goods are physically incorporated into the exported products.<sup>9</sup> Thus, for example, a gasoline tax that may have environmental purposes would be adjustable, because energy is a qualifying material input in the exported products. But an environmental tax on noxious emissions would not be adjustable because pollution is a “disincorporated material output.” Thus, for example, a tax on leather would be adjustable, as a qualifying material input in exported baseball gloves, but a tax on the effluents from the tanning process would not, since effluents are a disincorporated material output. In many countries, environmental policies still take the form of taxes on consumption of pollution-related products, and thus the adjustability of these taxes at the border can create an asymmetry with taxes levied on actual emissions. Differential treatment may also arise for other policy tools, like emission allowances or tradable performance standards, which offer comparable incentives to a tax but are legally distinct.

A revision in the Uruguay Round broadened the category of adjustable taxes to allow rebates for indirect taxes on goods and services if they are “consumed” in the production of the exported product: “in addition to physically incorporated inputs, export rebates are permitted on “energy, fuels and oil used in the production process.”<sup>10</sup> This expansion raises critical questions for policies concerning energy or greenhouse gas emissions: Are specific taxes on energy are adjustable? If so, can adjustments only be applied to exports and not to imports? Allowing tax

---

<sup>9</sup> the GATT Agreement on Interpretation and Application of Article VI, XVI, and XXIII of the General Agreement on Tariffs and Trade.

<sup>10</sup> GATT Agreement on Subsidies and Countervailing Measures, Annex II, footnote 61.

rebates for exported goods without providing for tax levies on imported goods would create an important asymmetry. The U.S. government has been of the view that this footnote to Subsidy Code should not open the door to new border tax adjustments on energy.<sup>11</sup> However, the issue has not been clearly settled among legal experts.

### ***WTO Disputes***

Real understanding of the application of the GATT to market-based policies will come through experience with the WTO dispute resolution forum. Although they precede finalization of the Uruguay Round, two resolved cases offer insight into some of the key issues discussed here. The 1987 WTO case regarding the U.S. feedstock chemicals tax (Superfund Tax) is relevant for the treatment of environmental taxes on inputs. The 1993-94 dispute over corporate average fuel economy (CAFE) standards reflects the balancing act between Articles III and XX, as well as the politics of trade negotiations.

### **Superfund Tax**

To raise revenue for cleanup operations, the Superfund Act<sup>12</sup> imposed a tax on certain chemical inputs. Not only were border adjustments allowed on the inputs themselves, but a tax was also imposed on imported final products according to the content of feedstock chemicals used in production, assessed by weight. The European Community objected, but the WTO ruled that the border adjustment could stand.<sup>13</sup> Important to their findings were that 1) the tax was designed to raise revenue, not create incentives, and was imposed on like products; 2) the polluter pays principle is irrelevant anyway for the GATT; and 3) the inputs were taxed based on use, not value, and constituted part of the final product.<sup>14</sup>

Thus, polluting materials that are physically incorporated into the final products can be made subject to the importing country's taxes as long as such taxes are imposed equitably on both imported goods and "like" domestic goods. The definition of "physically incorporated" is

---

<sup>11</sup> Charnovitz (1994).

<sup>12</sup> United States Superfund Amendments and Reauthorization Act of 1986.

<sup>13</sup> United States – Taxes on Petroleum and Certain Imported Substances, Report of the Panel adopted on 17 June 1987 (L/6175 - 34S/136)

<sup>14</sup> Interestingly, though, the Panel quoted Article II, Paragraph 2(a), "in respect of an article from which the imported product has been manufactured or produced in whole or in part," not the term "physically incorporated."

revealed to be somewhat open to interpretation. The nature of the pollution problem does not matter in the case of a tax, which can also have non-environmental purposes in the form of revenue. The pollution rationale might well matter in the case of a regulatory standard.

### **CAFE Standards**

The dispute over CAFE standards reveals some of the room for interpretation between national treatment and the conservation policy exception. With CAFE standards, the U.S. government imposed on both U.S. and foreign automobile manufacturers a minimum standard for miles per gallon for each fleet to meet on average, as opposed to specific car makes and models. A penalty fee was levied if overall vehicle sales did not meet the standard. The European Community challenged the tax in 1993, alleging that it unduly disadvantaged European manufacturers, who exported more large luxury vehicles that were less fuel-efficient.<sup>15</sup>

In 1994, the GATT dispute panel found that an imported large car whose fuel economy could not be averaged with small cars would be treated less favorably than a “like” domestic large car in a fleet with many small cars, and that the regulation was therefore inconsistent with Article III:4. Then, a distinction was made between the fleet averaging requirement and separate accounting for foreign vehicles.

The basic policy of fleet averaging was granted exception under Article XX(g), since CAFE could be construed as intending to conserve an exhaustible resource, petroleum. Interestingly, in the deliberations, the panel declined to hold the US regulation to the “least trade restrictive” standard. The panel agreed with the EU that many more efficient and less discriminatory policy tools were available to reduce fuel consumption, like gasoline taxes. A legislative history of protectionist motives for CAFE could also be documented. However, the panel found it sufficient that improving fuel efficiency was a legitimate regulatory objective, and that CAFE did contribute to that goal. It may be interesting to note that the decision was promulgated while the U.S. Congress was deliberating over ratification of the Uruguay Round.

The separate accounting rule meant that multinational manufacturers could not use foreign imports to offset domestic vehicles with different fuel economy characteristics, or visa-versa. The panel found this rule inconsistent with the GATT, since it did not contribute directly

---

<sup>15</sup> In fact, 100% of the penalty imposed by this tax was borne by European companies.

to fuel conservation in the US and would not meet the Article XX(g) exception.<sup>16</sup> Thus, an accompanying penalty fee would not be legitimate under Article XX(d). However, the panel report was never adopted, and the U.S. dismissed the need to modify the separate accounting provision.<sup>17</sup>

### Implications for Market-Based Policy Instruments

The desirability of border adjustment of environmental policies depends largely on two factors: whether the pollution problem is local or transboundary in nature, and whether the pollution is generated by consumption or production activities. Local environmental externalities occur when the ecological or health damages remain in the same country in which the polluting behavior takes place. Cross-border pollutants cause damages in countries outside the location of the generating activity, and global pollutants are those that impose damages on the emitting country as well as others. Consumption externalities arise from use of the product, whereas production externalities come from the process of making the product. A gray area, in which energy products fall, is the consumption of polluting materials in the production process. For example, a pollution problem may emit directly from the consumption of fuel (as with carbon dioxide), or it may be in large part a function of the production process and emissions abatement equipment (as with sulfur dioxide).

Examples of a local consumption externality include packaging waste, which piles up in local landfills, or second-hand smoke. A local production externality could be NO<sub>x</sub> emissions from power plants affecting local air quality or chemical effluents from paper mills running into an inland lake. These pollutants may also cross borders in cases of wind or water transport. Greenhouse gases are a prime example of a global pollutant, and they can be generated both by consumption activities, like automobile emissions from driving, and production activities, like natural gas flaring in oil drilling.

We examine the implications of the national treatment, border adjustment, and subsidies provisions for the choice and implementation of different types of market based policies in the different pollution contexts. We focus first on environmental taxes, followed by emission

---

<sup>16</sup> Committee on Trade and Environment - GATT/WTO Dispute Settlement Practice Relating to GATT Article XX, Paragraphs (b), (d) and (g) - Note by the Secretariat, 08/03/2002.

<sup>17</sup> Vogel (1997).

allowances, including allocation issues, and finally subsidies. Table 1 summarizes the economic rationales and trade rules regarding border tax adjustments for environmental policies. The cases are discussed in detail with respect to environmental taxes, but apply to environmental regulations more generally.

### ***Environmental Taxes***

Environmental taxes “internalize” externalities by charging the polluter for the damages caused, so that the polluter takes those costs into account in determining his behavior. Some taxes are “user fees,” which charge participants for a public good or service, like park maintenance or regulatory enforcement costs. Incentive-based taxes are designed primarily to alter behavior, while user fees are intended primarily to raise revenue. Many environmental taxes combine some aspects of both goals, and both types are consistent with the widely recognized “polluter pays principle.” However, the GATT does not formally incorporate the polluter pays principle and can in certain instances give inconsistent guidelines.

### ***Consumption Externalities***

Local externalities can be fully internalized by applying taxes directly to the domestic activities that generate them. Environmental taxes for local externalities need not be harmonized across borders, but rather should reflect local conditions. If the externalities are purely a byproduct of consumption, the government should tax consumption of both domestic goods and imported foreign goods. In general, this takes the form of an indirect tax, and there should be no trade issues. For example, gasoline consumption can be taxed to reflect related damages from local air pollution and congestion, and no distinction can or should be made according to whether the product was refined at home or imported. For exported products, the Subsidy Code (Article 3.1(a) and Annex I note 58) allows border tax adjustments in the form of tax rebates for exported goods, and imports are subject to the same national taxes, based on the principle of national treatment (GATT Article III), in the same way that excise taxes are charged for purposes other than environmental goals.

For cross-border consumption externalities, efficiency dictates that each consuming country account for the damages occurring abroad as well as at home. The result would be for each to tax domestic and imported products at the global Pigouvian level, and border adjustments would be used to avoid double taxation. On its own, however, a consuming country would have little incentive to tax its own consumers for effects incurred abroad. The preference would be to charge only for domestic damages, and to “free ride,” enjoying the benefits of any regulation



undertaken abroad. The countering policy to insufficient regulation by its trading partner would be for the damaged country to tax its own polluting exports to the consuming country. Though an unlikely policy, it should not conflict with trade rules, since they are designed to reduce tariffs on imports, not exports. However, the effectiveness of taxing exports is limited by the extent to which the incidence of the tax would actually be borne by the foreign consumers. For a small country (or industry) that cannot influence market prices, the effect would be primarily to crowd out its exports, rather than raise prices and reduce foreign consumption. An export tax cannot address the externalities generated by consumption of the partner country's domestically manufactured goods, nor would there be an incentive to charge for the global consequences of incremental pollution. These problems highlight the need for diplomacy and a coordinated international response to cross-border pollution.

### **Production Externalities**

Many pollutants are byproducts of production and manufacturing processes rather than use of the final consumer product. In this case, environmental taxes should apply to production emissions. Where actual emissions cannot be monitored, taxes may be levied on behavior or inputs contributing to emissions. However, complicated legal questions surround the issue of input taxes. For taxes on materials that are physically incorporated into the final products, the GATT does allow border tax adjustments for both exports and imports. However, no adjustments are allowed for disincorporated inputs, including emissions, and adjustment for energy inputs may only be allowed for exports, if at all.

For a local pollutant, few economic rationales exist to tax imports, since the related production externalities are incurred elsewhere. Nor should exported products be exempt from the taxes accumulated during production, since the externality remains at home regardless of the destination of the product. However, pressure for such relief may arise from other concerns over the competitiveness of local manufacturing. Exempting exports from the tax violates the polluter pays principle, and could arguably qualify as an actionable subsidy under the GATT, depending on the design of the tax and rebate. While the trade partner would not suffer environmental damages, and from a sovereignty perspective should not be concerned with another country's local pollution, relative competitiveness would be affected. On the other hand, taxing imports would also violate polluter pays, and can conflict with the GATT, but not necessarily. The Superfund feedstock chemicals tax is an example of such a case.

For a cross-border pollutant, the efficient response to production externalities is similar, but raised by the scope of the damages: each country should tax the emissions associated with

producing both domestic and exported products at the global Pigouvian level. Again, absent an international agreement, individual countries have little incentive to raise production costs for impacts felt abroad.

The response to insufficient regulation abroad would be to tax imports to the extent the associated emissions are not taxed by the exporting country. Such an adjustment would certainly conflict with the GATT, however. If one country treats all production the same, whether for domestic or foreign use, having an emissions tax that is too low by global standards is not an actionable subsidy. Meanwhile, if the trade partner taxes imports to make up for the difference, it can be in violation of the “like treatment” requirements, since the corresponding home country tax is on emissions and not the like product.

Similarly, a country with a relatively stringent emissions tax might like to offset the impacts on competitiveness, which can be justified if it prevents leakage toward higher-emitting production by less regulated sectors.<sup>18</sup> Ideally, the offsetting mechanism would not exempt exports from emissions taxes altogether, but offer a subsidy to output while retaining the direct incentive to reduce emissions. A direct subsidy would certainly violate the GATT. Another option is an earmarked tax-rebate scheme, like the Swedish NO<sub>x</sub> tax, which rebates emissions tax revenues back to firms according to output shares, and behaves much like a tradable performance standard or output-allocated permits. Such schemes would likely pass muster with the trade rules, since the rebate applies to all output, not just exports. Still, arguments could be made under the GATT that the rebate is an actionable subsidy if tax earmarking is applied to export-oriented sectors and not others, although the leakage justification is by definition stronger in trade-sensitive sectors.

### **Environmental Taxes on Inputs**

As a result of these restrictions, countries may choose less efficient environmental taxes, eschewing actual emissions, which are disembodied, in favor of input taxes that may be deemed border adjustable. From a tax economics perspective, border adjustments for taxes imposed on intermediate goods are needed for tax neutrality, so that the taxes do not change countries’

---

<sup>18</sup> See Bernard, Fischer, and Vielle (2001).

competitive positions.<sup>19</sup> However, neutrality is not necessarily efficient for all environmental taxes. From an environmental perspective, border tax adjustments are only appropriate in certain situations. One is if the inputs contribute to a global pollution problem, and the trading partner country either does not tax the input or is also adjusting at the border. Maintaining competitiveness in the first case is important to prevent leakage of production, and thereby emissions, to the under-taxing country. In the second case, if the partner country has a tax and adjusts at the border, the home country must also make adjustments to prevent double taxation or escape from taxation.

Another situation is if the input, as incorporated into the final product, poses a local consumption externality. This would be the tax equivalent of a product standard. The tax on import content could give an incentive to foreign producers to use less of the damaging input, and relief on exports is appropriate since the damage is exported as well. The exception is when the use of the input in production creates a local pollution externality; in that case, border adjustment when trading the input is appropriate, but not when trading the final product, since the pollution damages do not follow the product.

As explained earlier, the legality of rebates for environmental taxes on energy is still unsettled. Apparently, the inclusion of energy inputs with physically incorporated ones resulted from a “gentleman’s agreement” that it would address a narrow set of taxes from a limited group of countries and would not be applied to energy taxes more generally, including carbon taxes.<sup>20</sup> But since the agreement appears to be absent in the public record of the Uruguay Round, and adjustment of energy taxes has not yet emerged as an international legal dispute, it remains of concern to some environmental legal experts.<sup>21</sup> Additional confusion surrounds whether the GATT would allow border adjustments for energy taxes on exports but not on imports.

Border adjustability may then impact the choice of environmental policy tool, particularly when competitiveness issues are of paramount political concern. Producers may prefer indirect taxes on products rather than direct taxes on production so that taxes can be adjusted at the border. Not only would such an adjustment not be efficient when the production process causes

---

<sup>19</sup> Poterba and Rotemberg (1995) have shown this holds in a perfectly competitive market for both intermediate and final goods. McCorriston and Sheldon (1997) showed that neutrality would not be sustained when markets were not perfectly competitive.

<sup>20</sup> Demaret and Stewardson (1994), p. 30.

<sup>21</sup> For instance, Charnovitz (1994) and Pearson (2000).

environmental externalities, but an indirect tax would not be well equipped to incorporate incentives for process changes or end-of-pipe pollution abatement.

### ***Implications for Tradable Emissions Allowances***

Although allowances in an emissions market function much like taxes in terms of their economic and incentive effects, they may not be recognized as equivalent by trade law. A system of domestic tradable emissions allowances (permits) is in itself consistent with the GATT, particularly given the general exceptions clause and that such a program would almost always be less trade restrictive than command-and-control regulations. However, a few design aspects could trigger questions about GATT consistency. First, incorporating border adjustment into a system of tradable permits—that is, requiring them for imports and exempting exports—could raise many of the same issues as with taxes and more regarding regulation. Second, a country could challenge the way in which permits were allocated by another government. Finally, providing for international trade in emission allowances raises a host of questions about how WTO rules would apply to allowance trades.

### **Border Adjustments**

The economic rationales for border adjustment of emissions permits would parallel those for environmental taxes, depending on the type of pollutant and the source activity. If permits become treated like taxes under the law, then the previous analysis applies. Declaring tradable permits legally dissimilar to indirect taxes, which is likely, leads to two possibilities for incorporating border adjustments: 1) it may be more difficult, since no provisions are explicitly made for it, as with taxes, or 2) it may be easier, since nothing explicitly disallows it, but some other caveats may apply.

Article XI of the GATT prohibits quantitative restrictions, including quotas, import and export licenses. To avoid a challenge of border adjustment on imports, importers must be given even footing on access to permits. This may mean allocating some to importers, withholding some for auction, and/or assuring a well-functioning permit market. Alternatively, the point of compliance for the permit system may have to be placed further downstream, away from the border transaction. An example would be to place the incidence of the carbon permit requirement on the combustion activity, rather than upstream at the point of fuel sales. The issue

may also be relevant for exports: for example, if electricity consumers rather than producers are responsible for compliance, a requirement on foreign buyers to hold permits could amount to an export license.<sup>22</sup>

Economists are usually indifferent to which party to a transaction bears the compliance requirement—the incidence of the tax or permit cost will be shared between them regardless of who pays. The choice depends more on the costs of administering the program and the appropriate target of the policy, be it emissions or output. Of concern is that if WTO interpretations diminish options for determining the point or target of compliance, the limitations could be costly. While making downstream emitters responsible for permits is best when process improvements and end-of-pipe abatement technologies are available, for pollutants like carbon which are proportional to fuel input use, being able to enforce a permit program upstream is a valuable option, leading to broader coverage and lower administrative costs.<sup>23</sup>

Typically, a domestic emissions trading program targets actual emissions, which are considered disincorporated inputs that are ineligible for adjustment in the tax analogy. Exempting exported products or imposing permit requirements on imported products for embodied emissions would likely violate the national treatment clause. The exception could be a greenhouse gas trading program, requiring permits for energy inputs according to their carbon intensity. In this case, the uncertainty surrounding treatment of fuels compounds the uncertainty regarding non-tax market-based instruments. However, if one accepts the “gentleman’s agreement” on the limited use of border adjustments for energy, they would likely be limited for permits as well.

### **Grandfathered Allowances**

Economists have shown that grandfathered permits, allocated in lump-sum fashion, have much of the same incentive and efficiency effects of auctioned permits.<sup>24</sup> However, instead of raising revenues for the government, the value of the emissions asset is given to the firms, which

---

<sup>22</sup> Werksman (1999).

<sup>23</sup> Fischer, Kerr and Toman (1998).

<sup>24</sup> Differences arise if the grandfathered permits are not given unconditionally, distorting long-run incentives, or if the revenues from an auction could reduce pre-existing taxes in the economy that already distort incentives.

can represent an important transfer of wealth.<sup>25</sup> One question for the legal institutions is whether this transfer could be construed as an implicit subsidy. The other is whether grandfathering disadvantages foreign traders who do not receive an allocation.

Recall that to be actionable, a subsidy must involve a direct transfer or foregone revenues and it must have specific beneficiaries (Subsidy Code, Article 1). It is unlikely an equitable domestic allocation method would be construed in this manner, particularly since the assets transferred are created by an environmental regulation and since a presumption of revenue collection would be questionable, given the rarity of auctioning in current experience. Furthermore, environmental subsidies can be considered nonactionable, if their purpose is to ease adaptation to new environmental regulations, an argument often made for grandfathering. But the GATT Subsidy Code also requires that the transfers be transitory (Article 8.2(c)), which they generally are not. A biased permit allocation that favors specific industries or a specific domestic firm, and that injures the industries or interests of another country, would more likely be considered actionable. In addition to the subsidies questions, the Article XI prohibition on quantitative restrictions may mean that, in the absence of a well-functioning secondary market for permits, some allowances would have to be set aside to assure access by foreign competitors. However, absent any case law, it is difficult to guess how a WTO panel might rule in these regards.

Allocating permits by auction for domestic and imported polluting goods would seem to avoid all of these problems. Auctioning also happens to be the allocation method usually preferred by economists, for efficiency and revenue recycling purposes. However, some form of giveaway is often necessary to secure acceptance of the policy in the first place, so restricting allocation options may inhibit the implementation of some good policies. In other cases, strategic allocations rules can be useful to help offset other distortions in markets with environmental externalities.

### **Output-Based Allocation**

With output-based allocation, permits are distributed to each participating producer according to its share of output among related domestic producers. In effect, this mechanism combines a cost of emissions with a subsidy to output, in the form of more permit allocations.

---

<sup>25</sup> Since permit prices are determined by marginal control costs, which increase with the total amount of abatement necessary, the total value of the permits can exceed the total abatement costs.

The implicit subsidy serves to mitigate the price increases associated with the regulation, but it also reduces conservation incentives and increases reliance on technologies that reduce emission rates in order to meet the cap.<sup>26</sup> In general, compared to lump-sum allocations or auctioning, the implicit subsidy from output-based allocation creates inefficient incentives, although some justification can lie in the prevention of emissions leakage to unregulated producers.<sup>27</sup> This scheme is still under consideration as a potential policy tool, but it has gained attention as a possible distribution mechanism in a cap-and-trade system, such as tradable emissions permits for carbon dioxide and NO<sub>x</sub>. The question is whether a WTO panel would consider this implicit subsidy an actionable subsidy.

The output-based allocation mechanism spans several rate-based environmental policy tools with similar incentives, including permit allocations, the tax-rebate scheme mentioned earlier, and also tradable performance standards. CAFE standards relate to this category, since the fleetwide average fuel economy standard mimics an intrafirm tradable performance standard, where each company trades “permits” among the makes and models within its own fleet to achieve the average level set by the government. Thus, the WTO panel decision on CAFE may offer insights into the application of output-based allocation schemes more generally. The finding that fleetwide averaging was a reasonable regulation under the GATT suggests that output-based allocation, built as an intrinsic design feature of a permit or tax system, would also be consistent. Some questions could arise depending on the specific rules for incorporating imports and exports into the program, but the principle is not likely to be problematic. In fact, a system of tradable permits with output-based allocation would better follow “like” treatment standards than CAFE, which does not allow trading across manufacturers, implying that each manufacturer faces different values for fuel economy improvements.

Unfortunately, 100% earmarking of emission allowances (or tax revenues) to output is rarely efficient. The size of the optimal subsidy depends on true emissions leakage: the extent to which the products of the regulated sectors can be easily substituted with unregulated ones, and the extent to which the accompanying emissions are damaging to the regulating country. However, an efficiently targeted subsidy to prevent emissions leakage in trade-sensitive sectors would likely be perceived as GATT-inconsistent, either if designed as separate from the permit

---

<sup>26</sup> Fischer (2001).

<sup>27</sup> Bernard, Fischer and Vielle (2001).

program (violating the Subsidy Code) or as differing output allocation rules within a program (violating national treatment).

### **International Allowance Trading**

Thus far we have focused on domestic emissions trading programs. For global pollutants, like greenhouse gases, the efficiency gains from allowing cross-border trades are expected to be significant, and trade is expected to be a key component of the implementation of the Kyoto Protocol. Likewise, concerns that each developed country make a reasonable effort to reduce its own emissions lead to calls for “supplementarity” provisions restricting trade, as well as limitations to purchasing “hot air,” excess allowances from the former Soviet Union. Thus, the question of international trading of emissions allowances is of utmost importance.

For the WTO, allowances themselves cannot logically be considered products and thereby subject to the prohibition on quantitative restrictions, since that is their definition, unless exempted under general exceptions. More likely, they are “licenses... entitling (under specified conditions) the holder to carry out a regulated activity within its territory.”<sup>28</sup> If not officially goods, tradable permits still have financial value, and thus may be indirectly subject to the General Agreement on Trade in Services (GATS). These rules may prevent GATS members with liberalized financial sectors from restricting permit imports from other member countries, creating problems for supplementarity provisions. On the other hand, under GATS, while the transaction could not be prohibited, the importing country government would not be obligated to recognize the permit. The potential for complications underscores the need to negotiate appropriate trade rules in tandem with rules implementing international environmental agreements.

### ***Environmental Subsidies***

#### **Abatement Subsidies**

Governments often provide subsidies to encourage industries to engage in pollution abatement activities. Abatement subsidies can be applied to emissions-reducing activities during

---

<sup>28</sup> Werksman (1999), p 255.



production or consumption. In the short run, they can offer equivalent incentives to an emissions tax, since the polluting agent saves money by emitting less. However, in the long run they inhibit incentives to reduce emissions by exiting the industry, and are therefore less efficient, violating the polluter-pays principle. Furthermore, the subsidies must be financed from general public revenues, which are costly to raise. However, domestic politics may argue for subsidies over taxes.

In the context of trade and the environment, abatement subsidies pose fewer issues than the other policy tools we have discussed, since border tax adjustment is not likely to be relevant. The GATT Subsidy Code explicitly allows domestic subsidies that alleviate the cost of adapting to new national environmental regulations. Abatement subsidies *per se* would therefore not be problematic; rather, it would be a matter of how the subsidy is coupled with other factors and conflicts with other parts of GATT provisions. Abatement subsidies that surpass transitional assistance may be frowned upon; however, since unlike the implicit subsidies discussed above, they are directly tied to environmental improvement, they may receive some cover from the general exceptions rule—unless a less trade-restrictive measure could achieve the goals. They could easily trigger GATT action if tied to the export performance of products receiving the subsidy, or to use of domestic products over imported products (GATT Subsidy Code Article 3.1(a)(b)). Although such linkages are not likely to be explicit, the Subsidy Code prohibits abatement subsidies as long as there is a *de facto* relationship between the subsidy and preferential treatment for domestic products.

### **Ecodumping**

An important question is whether the lack of strictly enforced environmental regulations can be considered an implicit subsidy to particular industries, against which other countries could apply countervailing duties, or “ecoduty.” This issue arises in the debate over the legality of “ecodumping” duties—the imposition of duties on imports from countries with lax environmental regulations. So far, no countries have imposed such duties to offset cost differentials due to national differences in pollution regulations. Yet interpreting some forms of environmental regulation (or lack thereof) as implicit subsidies could turn many existing national environmental policies into anticompetitive practices. Whether the GATT applies to implicit subsidies related to environmental policies is a quite subtle question, subject to further refinement through WTO rulings in actual cases.

The current dispute over Canadian softwood lumber may offer some clarification. The U.S. has levied countervailing duties, claiming that the Provincial governments managing the

forest resources charge below-market fees for logging rights. Conservationists support the retaliation, arguing that lax environmental regulations and enforcement constitute an implicit subsidy as well, contributing to stream and habitat degradation.<sup>29</sup> Canada disputes the claim that the right to harvest standing timber (stumpage) constitutes a “financial contribution” in the sense of Article 1.1 of the Subsidies Code.

## Conclusion

Most of the restrictions that multilateral trade agreements pose for market-based environmental policies are speculative at this point. Emissions taxes and tradable permit systems are not so widespread and have not yet significantly affected export industries. To challenge an environmental policy under the GATT, a member country must show both inconsistency with some rule and harm from the resulting trade impacts. Furthermore, to prove that the policy is not worthy of exception, the complainant must show that a less trade-restrictive policy option is available and effective, or possibly even that the policy does not contribute toward achieving a reasonable environmental goal at all.

Overall, in terms of national environmental policies, the GATT seems to have both room for interpretation and room for improvement. For the most part, the GATT can be (or can be made) quite consistent with sound market-based environmental policy. Where conflicts might arise has to do with particular aspects of policy design: border adjustments, allocation of emission rents, cross-border permit trades, and subsidies.

For local pollution problems, the GATT is largely consistent with efficient environmental policymaking. The exception is in the case of polluting inputs, where the GATT permits based on rules regarding physical incorporation, not the polluter-pays principle. These would not generally prevent a country from designing an efficient policy for addressing a local externality, but they would allow the country to incorporate trade-motivated adjustments into environmental policy. If that option is tempting, it may encourage countries to prefer input-oriented tax policies over more efficient emissions-oriented programs.

For global pollution problems, the GATT may create some barriers to implementing economically justified policies to prevent emissions leakage from more stringently regulated

---

<sup>29</sup> Natural Resources Defense Council (2001).

countries. However, there are likely to be some design options, like output-based allocation, that do not qualify as actionable subsidies. In any case, global pollutants require concerted international effort and agreement to be properly addressed, since individual countries have insufficient incentives on their own. Then international environmental agreements should themselves deal with the issue of border adjustment for market-based emission control programs. Some of that should be made easier by international trading in emissions allowances. WTO rules will have to catch up quickly to cope with these rather unorthodox assets that will have considerable financial and environmental value.

Many unanswered questions remain. Will environmental tax and permit policies that are economically equivalent be viewed as legally equivalent by trade institutions? Might the ongoing earmarking of pollution fee revenues to subsidize investment in pollution control equipment qualify as an actionable subsidy? Can the free allocation of tradable emission allowances be viewed as a direct transfer or foregone revenues? Or are subsidies built directly into a market-based environmental policy given broad berth? How important is the point of compliance for emissions permits when trade is involved? Any discrepancies among treatment of economically similar policies will affect their attractiveness to policymakers, particularly when competitiveness is a sensitive issue.

There is a natural tension between national sovereignty over environmental policy, free trade, and efficient environmental policy. On the one hand, some aspects of trade institutions may encourage efficient and coordinated national environmental policies. On the other hand, in some situations they may restrict countries from designing the most appropriate policy for a given problem. Worse yet, by concerning themselves more with trade barriers than with environmental rationales, they may divert protectionist impulses toward influencing environmental policies to gain exception to the free trade rules. Thus, as multilateral negotiations continue, disputes are settled and trade institutions evolve, it is important that environmental policy concerns be considered in tandem with the trade rules themselves, and not simply be relegated to side agreements. For freer trade to provide the benefits promised, good regulatory incentives are needed as well.

## References

- Bagwell, Kyle and Robert W. Staiger. (2001) "The WTO as a Mechanism for Securing Market Access Property Rights: Implications for Global Labor and Environmental Issues," Columbia University, Department of Economics. Mimeo.
- Bernard, A., C. Fischer, and M. Vielle. (2001). "Is There a Rationale for Rebating Environmental Levies?" RFF Discussion Paper 01-31. Washington, DC: Resources for the Future.
- Bhagwati, Jagdish. (2002) *Free Trade Today*. (Princeton, NJ: Princeton University Press).
- Birdsall, Nancy, and David Wheeler. (1992) "Trade Policy and Industrial Pollution in Latin America: Where are the Pollution Havens?" in Patrick Low ed., *International Trade and the Environment*, World Bank Discussion Paper 159. (Washington, D.C.: The World Bank).
- Charnovitz, Steve. (1994) "Free Trade, Fair Trade, Green Trade: Defogging the Debate," *Cornell International Law Journal* 27: 459-525.
- (1997) "A Critical Guide to the WTO's Report on Trade and Environment," *Arizona Journal of International and Comparative Law* 14(2): 341-379.
- Demaret, Paul and Raoul Stewardson. (1994) "Border Tax Adjustments under the GATT and EC Law and General Implications for Environmental Taxes," *Journal of World Trade* 1994: 5-65.
- GATT Secretariat. (1991) *GATT Annual Report*. (Geneva: GATT).
- Easty, Daniel C. (1994) *Greening the GATT: Trade, Environment, and the Future*. (Washington, D.C.: Institute of International Economics).
- Easty, Daniel C., and Damien Geradin. (1997) "Market Access, Competitiveness, and Harmonization: Environmental Protection in Regional Trade Agreements," *Harvard Environmental Law Review* 21: 265-336.
- Ederington, Josh. (2000) "International Coordination of Trade and Domestic Politics," University of Miami, Department of Economics. Mimeo.
- Ederington, Josh, and Jennie Minier. (2001) "Is Environmental Policy A Secondary Trade Barrier?: An Empirical Analysis," University of Miami, Department of Economics. Mimeo.

- Faber, Daniel A., and Robert E. Hudec. (1996) "GATT Legal Restraints on Domestic Environmental Regulations," in Jagdish Bhagwati and Robert E. Hudec, eds., *Fair Trade and Harmonization Vol. 2: Legal Analysis* (Cambridge: MIT Press).
- Fischer, Carolyn (2001). "Rebating Environmental Policy Revenues: Output-Based Allocations and Tradable Performance Standards," RFF Discussion Paper 01-22. Washington, DC: Resources for the Future.
- Fischer, Carolyn, Suzi Kerr and Michael A. Toman (1998). "Using Emissions Trading to Regulate U.S. Greenhouse Gas Emissions: An Overview of Policy Design and Implementation Issues," *National Tax Journal* v51, n3 (September 1998): 453-64.
- Frankel and Rose. (2002) "Is Trade Good or Bad for the Environment? Sorting Out the Causality." Kennedy School of Government, Harvard University. Mimeo.
- Jaffee, Adam B., Steven R. Peterson, Paul R. Portney, and Robert Stavins. (1995) "Environmental Regulations and the Competitiveness of U.S. Manufacturing: What Does the Evidence Tell Us?" *Journal of Economic Literature* 33(1): 132-63.
- Kahn, Matthew. (2000) "United State Pollution Intensive Trade Trends from 1972 to 1992," Tafts University. Mimeo.
- Lucas, Robert E.B., David Wheeler, and Hemamala Hettige. (1992) "Economic Development, Environmental Regulation and the International Migration of Toxic Industrial Pollution: 1960-1988," in Patrick Low ed., *International Trade and the Environment*. World Bank Discussion Paper 159. (Washington, D.C.: The World Bank).
- Natural Resources Defense Council. (2001) "Protecting Old Growth Forests and Endangered Species," NRDC Policy Paper, April, 2001.
- Moore, Michael. (2000) "The Backlash against Globalization?" WTO-DG Speech to Liberal International, Ottawa, October 26.
- Oates, Wallace E. (1972) *Fiscal Federalism*. (New York: Harcourt Brace Javanovich).
- Pearson, Charles S. (2000) *Economics and the Global Environment*. (Cambridge, UK: Cambridge University Press).
- Poterba, James M. and Julio J. Rotemberg. (1995) "Environmental Taxes on Intermediate and Final Goods When Both Can Be Imported," *International Tax and Public Finance* 2(2): 221-28

- Tobey, James A. (1990) "The Effects of Domestic Environmental Policies on Patterns of World Trade: An Empirical Test," *Kyklos* 43(2): 191-209.
- Vogel, David. (1997) "Trouble for Us and Trouble for Them: Social Regulations as Trade Barriers," in *Comparative Disadvantages?: Social Regulations and the Global Economy*, Pietro S. Nivola, Editor. (Washington, DC: Brookings Institution)
- Werksman, Jacob. (1999) "Greenhouse Gas Emissions Trading and the WTO," *Review of European Community & International Environmental Law* 8(3): 251-264.
- World Trade Organization. (1994) *Final Act of the 1986–1994 Uruguay Round*. (Geneva: World Trade Organization).
- World Trade Organization. (1999) *Trade and Environment (Special Studies 4)*. (Geneva: World Trade Organization).
- World Trade Organization, Committee on Trade and Environment. (1997) *Taxes and Charges for Environmental Purpose: Border Tax Adjustment (Note by the Secretariat)*. WT/CTE/W/47 (2 May 1997).
- World Trade Organization, Committee on Trade and Environment. (2002) *GATT/WTO Dispute Settlement Practice Relating to GATT Article XX, Paragraphs (b), (d) and (g) - Note by the Secretariat*. WT/CTE/W/203 (8 March 2002).

**Table 1. Border Adjustment for Environmental Policies**

<i>Polluting Activity</i>	<i>Economic Rationale: Local Pollutant</i>	<i>Economic Rationale: Global Pollutant</i>	<i>the GATT</i>
Consumption of final product	Adjust (Exempt exports, tax imports)	Adjust, except to the extent the trading partner is lax.	Adjust (less possible)
Use of intermediate input	Adjust for trade in input.  Don't adjust for trade in final product	Adjust for trade in input, except to the extent the trading partner is lax.  Don't adjust for trade in final product, except to the extent the trading partner is lax.	Adjust for trade in input.  Adjust if physically incorporated in final product.
Production	Don't adjust.	Tax imports to the extent the trading partner is lax.  Maintain emissions control incentives, but subsidize exports to the extent the partner is lax and leakage problematic.	No adjustment (except as countervailing duty to actionable subsidy by trading partner).  No overt subsidies or exemptions.