The Role of Border Tax Adjustments in Environmental Taxation:

Theory and U.S. Experience

Working Paper

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1. Introduction

There is increasing interest in the use of environmental taxes and other market instruments as a means of implementing national environmental policy.[1] However, in an increasingly integrated international marketplace, there is concern that such taxes may injure the competitive position of national industries. Such concerns have been the primary barrier to the adoption of broad-based carbon/energy taxes,[2] and have impeded the adoption of other environmental taxes.

The traditional approach to concerns about the competitive efforts of excise taxes and other similar instruments is through border tax adjustments (BTAs). There are several kinds of border tax adjustments, but the simplest and most common is the "destination system," in which traded goods are subject to the taxes of the importing ("destination") country and exempted from the taxes of the exporting ("origin") country. For instance, gasoline is trucked from Toronto to Buffalo is exempted from paying gasoline tax in Canada and subject to gasoline tax in New York, at the New York tax rate. BTAs are a necessary part of a tax on national or state consumption collected at the level of the manufacturer or wholesaler. They are a common feature of sales, excise, value added and other taxes. Because BTAs are often required for consistent treatment of a consumption tax base they universally regarded as a normal part of the tax and not as a form of local favoritism.

Section 2 of this paper demonstrates that BTAs are necessary not only to respond to competitiveness concerns, but alto to achieve the environmental goal of many environmental tax instruments. Section 3 briefly discusses the trade rules governing BTAs under the General Agreement on Tariffs and Trade (GATT). Section 4 examines the system of border adjustments under two important U.S. environmental taxes, the Superfund chemical excises and the Ozone-Depleting Chemicals Tax. Section 5 attempts to extract some basic lessons about BTAs on environmental taxes from the U.S. experience.

2. BTAs and the Effectiveness of Environmental Taxes

2.1. Environmental Consumption and Production Goals: A Fable

Angina and Salina are nations each troubled, in its own way, by salt. Angina is an aging nation with exploding national health insurance costs. It has decide that it must encourage a reduction in the consumption of salt in order to reduce the incidence of heart disease. Salina is troubled by runoff from its salt mines, which injure nearby wildlife and plants.

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[1] See, e.g. European Environment Agency, *Environmental Taxes: Implementation and Environmental Effectiveness*, Luxembourg: Office for Official Publications of the European Communities (1996); J. Andrew Hoerner, "Harnessing the Tax Code for Environmental Protection: A Survey of State Initiatives," State Tax Notes (forthcoming 1998).

[2] Frank Muller, " Mitigating Climate Change: The Case for Energy Taxes," *Environment* V. 38 No. 2 p. 12

This runoff is at an irreducible minimum given current mining technology. Salina wishes to discourage production of salt, and perhaps to compensate those injured by salt runoff.

Both nations decide to implement their policies through a tax on salt. Angina wishes to place a tax on national salt consumption. Currently the tax system in Angina is designed primarily to collect business taxes. Therefor Angina places a tax on salt producers and adds BTAs of the consumption-tax type, rebating the tax previously paid on exported salt and imposing a tax on imported salt at the same rate as if it had been produced domestically. Salina collects most of its tax revenues with retail sales taxes. It places a retail sales tax on salt. In order to implement a tax on national salt production, Salina must exempt imports produced outside of the nation and impose a tax on domestically produced salt which is exported. To do this, Salina needs special border adjustments of a different sort. This could be accomplished through several possible administrative mechanisms, but one is an import credit and an export tax, both in the amount of the domestic sales tax on salt.

2.2. BTAs and the Point of Collection

What lessons are to be drawn from the preceding tale? First, it is worth noting that, had the salt tax been imposed at the business level in Salina and at the retail sales level in Angina, neither nation would have needed an explicit system of border adjustments. The need for border adjustments depends on the point of collection and the tax base. BTAs may be necessary for either production or consumption taxes. For taxes collected at the retail sales level, BTAs are necessary for production taxes but not for consumption taxes. For taxes collected at the manufacturing level, BTAs are necessary for consumption taxes but not for production taxes. For taxes collected at some intermediate distribution level, BTAs may or may not be necessary for either type of tax, depending on the market structure.

A tax on national production and a tax on national consumption apply identically to goods which are both produced and consumed domestically. They differ only in how they treat imports and exports. A consumption tax imposes taxes on imports and exempts exports; a production tax is imposed on exports and exempts imports. Table 1 shows some examples of the type of BTA required to achieve a specified tax base, given a point of collection.

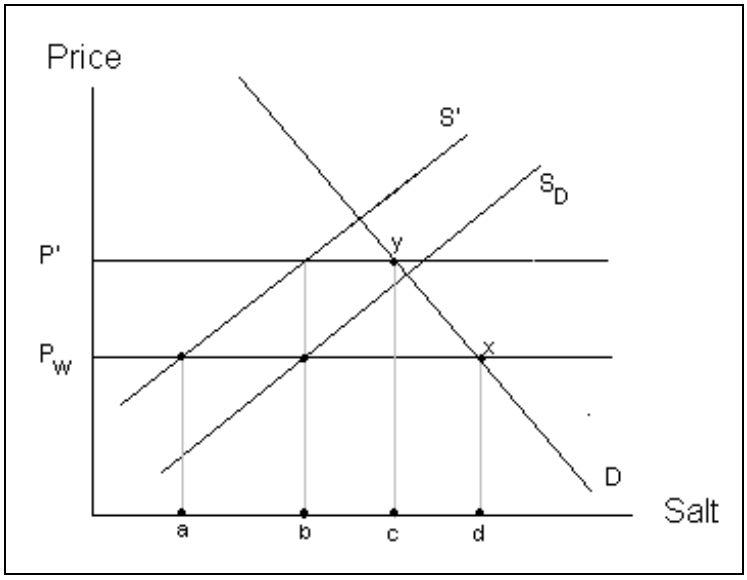
Tax Base	**Point of Collection**	**Import BTA**	**Export BTA**
Consumption	Retail sales	None	None
Consumption	Manufacturing	Impose tax	Rebate
Production	Retail Sales	Refundable credit	Rebate
Production	Manufacturing	None	None

Often border adjustments are necessary to properly implement a particular tax base with respect to a special type of transaction or taxpayer. For instance, although retail sales taxes or VAT taxes generally do not need BTAs to achieve a tax on national

consumption, BTAs may be desired for goods purchased at a retail level and carried across the border by individuals.

2.3. Legal and Economic Incidence

A second lesson from our fable is that border adjustments are necessary to make the economic incidence of the tax the same as the legal incidence. This in turn can be critical to achieving the environmental purpose of the tax. The relationship between legal and economic incidence can be demonstrated through a simple graphical analysis.[3] The graph below shows the case of a small nation which both produces and imports salt. The nation faces a world salt market with price P_w, at which it can buy any amount of salt. Pre-tax, the economy is at point x, and total salt purchases are equal to d, the amount demanded at the world price. At this price, domestic quantity supplied is b and imports are the difference between the quantities demanded and supplied, equal to d-b.



Now consider a consumption tax, with BTAs applying the tax to imports and exempting exports. (In the graph above, there are no net exports). Then both the domestic and the world supply schedules are shifted up by an equal amount, to S' and P=P', respectively. (A unit tax is portrayed, but the analysis would not change in any essential feature if an *ad valorum* tax were used instead). The economy moves from point x to point y. Because of the higher price, consumption of salt drops from d to c. However, *there is no impact at all on domestic producers*. Production remains at level b, and producers continue to receive an after-tax price of equal to P_w. The reduction in the quantity demanded domestically is fully offset through an equal reduction in imports.[4] We conclude that BTAs of the consumption-tax type result in reduced consumption, just as intended.

[3] This analysis is an extension of a graphical analysis taken from Robert H. Floyd, "GATT Provisions on Border Tax Adjustments," *Journal of World Trade Law* 489 at 495-7 (1973).

[4] Had this been a nation with both domestic production and exports, the same result would accrue: Post tax, the amount of domestic production is unchanged, and the reduction in domestic demand results in an increase in an equal increase in production for export.

Move now to the case of a production tax, where imports are untaxed and there is no remission of tax when taxed goods are exported. In this case, the domestic supply curve still shifts up to S', but the world supply curve remains at $P=P_w$, so the price as perceived by domestic purchasers is unchanged from the pre-tax case. Here the result is quite different. Here, the *quantity demanded remains unchanged* at d. However, the quantity supplied domestically has now fallen to a, the point where the new domestic supply curve intersects the world price level. Thus, where BTAs implement a domestic production tax, production is reduced, again as intended.

This conclusion is quite striking. The impact of an environmental tax can be fully shifted from producers to consumers or conversely by the choice of the type of BTA. This is true even if the percentage of goods which currently move in trade is quite small. The choice of BTA type is an essential feature of most environmental taxes, and not a merely an incidental administrative detail.

3. GATT-Legality of BTAs on Embodied Inputs[5]

The legal status of BTAs on excise taxes on is unambiguous. They are explicitly allowed by the General Agreement on Tariffs and Trade (GATT) (as amended by the Uruguay Round Amendments which created the World Trade Organization (WTO)[6]) provided that the tax imposed on imports is no greater than the domestic tax[7] and the rebate of tax on export is no greater than the tax previously paid.[8] Note that the GATT does not impose any requirement that nations adopt a tax base which can be administered without double taxation, in fact or in principle.[9] For instance, nations can impose a BTA on imports without any corresponding

[5] For a more extensive treatment of the legal issues concerning BTAs under GATT, see, e.g., Paul Demeret & Raoul Stewardson, "Border Tax Adjustment Under GATT and EC Law and General Implications for Environmental Taxes," *Journal of World Trade*, Vol. 28, No. 4 (1994); Hoerner and Muller, *Carbon Taxes for Climate Protection in a Competitive World*, Swiss Ministry for Foreign Economic Affairs (1998), available from the Center for a Sustainable Economy, Washington DC.

[6] Final Act Embodying Uruguay Round of Multilateral Trade Negotiations, Marrakech 15 April 1995, entered into force 1 January 1995.

[7] GATT Art. III: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. Moreover, no contracting party shall apply internal taxes.... to imported or domestic products in a manner contrary to the principles set forth in paragraph 1." The referenced language in Art. III:1 provides that internal taxes "should not be applied to imported or domestic products so as to afford protection to domestic production."

[8] Ad Article XVI, provides that certain BTAs on exports are not subsidies. It states: "The exemption of an exported product from duties or taxes born by the like product when destined for domestic consumption, or the remission of such duties or taxes in amounts not in excess of those which have accrued, shall not be deemed a subsidy."

[9] For example, a report by the GATT Secretariat found that under current GATT rules:

- A product destined for export can be exempted from domestic taxes or given a rebate or remission by the country of export, then taxes by the country of import (destination principle);
- a product destined for export could be taxed by the country of export and exempted from taxes by the country of import (origin principle);
- a product destined for export could be taxed by the country of export and the country of import (double taxation); and

rebate for exports. The U.S. Superfund tax on crude oil and petrochemicals had this structure.[10]

However, some advocates of unbridled free trade argue that BTAs on environmental taxes embodied in pollution-intensive traded goods are or should be barred when the tax is on emissions or a polluting input rather than the good itself.[11] There are two basic legal arguments for this position. First, some claim that BTAs are allowed on taxes on *products*, but not on taxes on processes or on inputs to production which are not physically incorporated into the final product. Second, some argue that the rebate of taxes on embodied fuels is barred by the GATT Subsidies Code's ban on rebating *prior stage cumulative indirect taxes.* We will address these arguments sections 3.1 and 3.2, respectively.

Whether a particular BTA is allowed under GATT is a question of the legal interpretation of an international treaty. However, the legal debate is heavily influenced by political and administrative concerns. Some believe that international competition has the salutory effect of limiting the freedom of governments to influence private markets. This is a political argument against BTAs, which allow nations freedom to adopt a wider range of policies through the tax system. It will not be further addressed here, except to say that the WTO is not well-adapted institutionally to consider and balance the full range of concerns which face democratically-elected national governments. There is also a concern that BTAs on embodied imports will be difficult to administer or enforce. These concerns are addressed in Sections 4 and 5 below.

3.1. BTAs on process taxes are allowed under the GATT

The GATT allows BTAs on taxes that fall "directly or indirectly" on "like [domestic] products."[12] It was the intent of the original GATT negotiators that process as well as product charges be border adjustable. This language was first introduced by U.S. negotiator Oscar B. Ryder at the London Preparatory Committee as part of the process of drafting the charter of the Havana Charter, the precursor to GATT. The Brazilian delegate, Mr. Rodrigues, demanded to know what was meant by the addition of the term "or indirectly." Mr. Ryder replied that the language was to allow border adjustments on "a tax, not a tax on a product as such, but on the processing of a product, which are covered by the word 'indirectly' here."[13]

- a product destined for export could be taxed by neither the country of export nor the country of import (tax exemption).

Border Tax Adjustment: Note by the Secretariat, TRE/W/20, (11 January 1994). This result is not changed in any essential way by the Uruguay Round Amendments.

[10] 26 USCA §4611.

[11] See, e.g., *Trade and the Environment Bulletin,* No. 10, 11 October 1994, GATT Document TE 010, where it is reported that delegations from several nations to the Subcommittee on Trade and Environment of the Preparatory Committee for the WTO maintained that "adjustment of taxes or charges on unincorporated processes and production methods is not permitted."

[12] See note 7, *supra*.

[13] Quotations from EPCT/A/PV/9, pp. 18-19. See also EPCT/C.II/11; EPCT/C.II/W.5, p.5; and EPCT/W/181, p. 3, referred to in the GATT Analytical Index 1993.

The process/product distinction has its origin in the proposed decision of the Tuna-Dolphin Panel.[14] This standard, like the Tuna-Dolphin decision itself, has never been adopted by the GATT contracting parties or by the World Trade Organization. Moreover, numerous scholars have observed that the process/product distinction itself was rooted in a misunderstanding by the panel of the GATT rules governing BTAs.[15]

3.2. Taxes on embodied inputs are not prior stage cumulative indirect taxes

Border adjustment of taxes on embodied inputs is not barred by the ban on prior stage cumulative indirect (PSCI) taxes, for two reasons. First, the Uruguay Round Amendments to the GATT specifically excluded taxes on fossil fuels from the scope of the PSCI tax ban. See the Agreement on Subsidies and Countervailing Measures, Annex II, footnote 61??. Second, energy taxes are not PSCI taxes because they are not "cumulative." Although energy is used in every phase of the manufacturing process, each unit of fuel is taxed only once. This contrasts with the standard example of a PSCI tax, the cascade tax. A cascade tax is a tax on the value of all products sold, including goods used as materials in the manufacture of other goods. Cascade taxes cumulate, because the tax on, for example, sheet steel used to make an automobile, becomes part of the cost of manufacturing the automobile and the tax is *itself taxed again* when the automobile is sold. Cascade taxes were once common in Europe, but are now extinct in all but a few developing nations, having been replaced by VATs.

4. Border Adjustments in U.S. Environmental Taxes

This section will examine the systems of border adjustments used by two major U.S. environmental excise taxes: The Superfund Chemical Excises[16] (Superfund Tax) and the Ozone-Depleting Chemicals (ODC) Tax.[17] The two taxes have quite different environmental purposes. The primary purpose of the Superfund Tax was to raise revenue for a trust fund devoted to the cleanup of contaminated toxic waste sites, where individual responsible parties capable of paying could not be identified. The tax was designed as a rough-justice attempt to place the burden of such cleanup on those responsible for generating the wastes, but was not intended to influence behavior through the price system. The tax is modest: a few dollars per ton of the taxed chemicals and substances. Due to a failure of Congress and the Administration to agree on various aspects of cleanup financing, the tax was allowed to sunset at the end of 1995.[18]

The ODC tax, on the other hand, was intended by Congress to "permit market forces to aid the work of finding substitutes" for the taxed chemicals.[19] It was intended to

[14] Report of the Panel *United States -- Restrictions on the Import of Tuna*, 30 ILM 1594 (1991). By joint agreement of the U.S. and Mexico, the report has not been submitted to the contracting Parties.
[15] See citations at note 5, supra, Charnovits, Goldberg
[16] 26 USCA 4611 to 4672.
[17] 26 USCA 4681-4682.
[18] 26 USCA 4661(c) states that the chemicals tax applies only when the Hazardous Substances Superfund Financing Rate is on crude oil applies. 26 USCA 4611(e)(1) sunsets that provision on January 1, 1996.
[19] House Committee on the Budget Report on HR 3299, House Report 101-247. For a discussion of the legislative history and its implications for the purpose of the ODC tax, see Hoerner, *infra* note 20.

influence behavior through the price system and was effective both in raising the price of taxed chemicals and in discouraging their production.[20] The tax was phased in gradually over a period of years. For the most important ODCs, the tax is currently more than five times the ex-tax price.

Both taxes were essentially designed as taxes on national consumption of the taxed substances. The have BTAs of the consumption type: Tax is imposed on import and tax relief is granted on some types of export. The BTA systems under the two taxes are similar in broad outline but differ considerably in detailed application. BTAs for the Superfund Tax are described in section 4.1; for the ODC Tax in section 4.2. Finally, section 4.3 discusses the problem of evasion and steps taken to combat it, using the ODC Tax as an example.

4.1. The Superfund Chemical Excises

The United States Superfund Amendments and Reauthorization Act of 1986 created a system of taxes to fund the cleanup of toxic waste disposal sites, including a petroleum products excise, a corporate income tax surcharge, and a system of excises on taxable chemicals and substances. The Superfund chemical excises apply to sale or use of the enumerated chemicals in the U.S. As a result, the taxes are subject to BTAs appropriate to a tax on consumption collected at the level of the manufacturer: Imports are taxed on the first sale or use by the importer, and any tax previously collected on exports is rebated. Because the tax is collected on the first domestic sale or use, rebate of tax on export is not always necessary. When a manufacturer exports a taxed chemical without any sale to an intermediate distributor, no taxable event has occurred and no explicit BTA is required.[21]

Evasion problems under the Superfund tax were modest. The tax rate varied by chemical, but the most highly taxed chemicals paid a rate of only $4.87/ton. This rate was not a high enough percentage of value to motivate elaborate evasion or smuggling schemes.

The BTAs apply not only to taxable chemicals enumerated in 26 USCA 4661, but also to untaxed chemicals manufactured using taxed chemicals as a feedstock. These chemicals are referred to in the tax code as "taxable substances."[22] The Superfund Tax applies no domestic tax to taxable substances. BTAs were created on taxable substances equal to the tax paid on the taxable chemicals used to manufacture those substances.

Taxable substances are of two types. First, there are substances on an initial list contained in the statute.[23] Second, they are substances approved by the Secretary of the Treasury under an application process created by the statute.[24] To be approved as a taxable

[20] J. Andrew Hoerner, "Taxing Pollution," in Elizabeth Cook, ed., *Ozone Protection in the United States: Elements of Success*, Washington DC: World Resources Institute (1996).
[21] 26 USCA 4662(e).
[22] 26 USC 4672(a).
[23] 26 USCA 4672(a)(3).
[24] 26 USCA 4672(a)(2)(B).

substance, the taxpayer must establish that taxable chemicals constitute at least 50 percent of the chemicals used to produce that substance, by either weight or value.

When a taxable substance is imported, a tax is imposed on the importer at the first sale or use. There is a three-tier system for determining the tax rate on an imported taxable substance.[25] First, the importer may provide detailed information on the taxable chemicals actually used in manufacture of the taxable substance. In this case, the tax is based on the amount of tax that would have been paid on the taxable chemicals if the taxable substance had been manufactured in the United States. Where the importer fails to provide such information, the Superfund legislation created two alternative systems for calculating tax liability. The U.S. Treasury Department issues regulations stating for each taxable substance the amount of taxed chemicals used to produce that substance in the U.S. under the predominant method of manufacture. Imports are then taxed based on the amount of taxable chemicals that would have been used to produce the goods in the United States using the U.S. predominant method of production. Finally, where no regulation has been issued, a penalty tax of five percent of the value of the import was imposed.

Where a taxable substance is exported, a credit or refund (without interest) is available to the manufacturer or importer in the amount of the tax previously paid. As a precondition of receiving the refund, the party who paid the tax must either pay the refunded tax to the exporter or receive a waiver of such payment from the exporter.[26] In the alternative, if the party who paid the tax waives the credit or refund, the exporter is allowed to receive it. [27] In either case, the refund or credit is based on tax actually paid, and not on the tax imputed under the predominant method of production. Except for taxable substances, there is no tax on the import of goods manufactured using or incorporating taxed chemicals (including mixtures) and no rebate on the export of such goods.

It is important to observe that under the system of border adjustments applied to taxable substances, it is not necessary for all of the atoms in the taxable chemical to be physically incorporated into the taxable substance. The measure of the amount of tax on taxable substances for BTA purposes is the tax on the materials used in the manufacture of the taxable substance. This tax is not pro-rated by mass, weight or value when only a portion of the taxable chemical is incorporated into the taxable substance, provided the taxable chemical has been consumed in the manufacturing process. Thus the Superfund taxable substance BTAs are BTAs on the manufacturing processes, not on physical products.

The GATT has approved the system of BTAs on process taxes used by the Superfund taxes. In response to a conciliation request from Canada, Mexico, and the European Union, a GATT conciliation panel was formed to examine the consistency of the system of BTAs under the Superfund chemical taxes with international trade rules. The GATT

[25] 26 USCA 4671(b).
[26] 26 USCA 4662(e)(2).
[27] 26 USCA 4662(e)(3).

Superfund Panel Report [28] found that for purposes of Article III the tax on imports of taxable substances manufactured with taxable chemicals did not treat those goods differently than similar goods produced in the United States.[29] The Panel stated that:

> The tax is imposed on imported substances because they are produced from chemicals subject to an excise tax in the United States and the tax rate is determined in principle in relation to the amount of those chemicals used and not in relation to the value of the imported substance.[30]

The Conciliation Panel approved the system of BTAs on taxable substances based on the actual consumption of taxable chemicals in their production, and the system of imputation based on the predominant method of manufacture. However, it rejected the fallback BTA of five percent of value on the grounds that it imposed a higher tax on imports than on similar domestic production.[31]

4.2. The Ozone-Depleting Chemicals (ODC) Tax

The U.S. adopted a multi-pronged approach to ODC reduction, employing both a system of production allowances and a tax. The tax applies to a long list of chemicals, primarily chlorofluorcarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and halons, at rates which are generally proportional to their ozone-depleting potential, subject to various phase-in rates and exceptions.[32] The ODC tax is a tax on the national consumption of ODCs, whether directly or through the consumption goods manufactured using ODCs. When ODCs are imported, the importer is liable for a tax equal to the domestic tax on that chemical on the first sale or use. On export, tax is rebated either to the manufacturer or the exporter, but not both, under a system of waivers and proof requirements similar to those described above for the Superfund taxes.[33] The value of the total export rebates to a manufacturer are capped, under a complex formula which has the effect of preventing the firm from receiving a rebate on a larger percentage of the firm's total allowable production than the percentage that exports were of that firm's production in a specified base year (which varies by chemical).[34]

In addition, BTAs apply to all products which contain or are produced with ODCs, unless the Secretary of the Treasury determines that only a *de minimis* amount of such products were used in the manufacture or production.[35] The *de minimis* exception does not apply to refrigeration or air conditioning equipment, aerosols or foams, or to electronic equipment.[36] By regulation, the Secretary has set the level of *de minimis* use at one tenth

[28] GATT Panel Report *United States - Taxes on Petroleum and Certain Imported Substances*, L/6175, BISD 34S/136, 154 ff., adopted on 17 June 1987.
[29] Id. at 162-3, paragraph 5.2.8.
[30] Id.
[31] Id. footnote 28 at 163, paragraph 5.2.9.

[32] 26 USCA 4681 through 4682.
[33] 26 USCA 4682(d)(3)(A). See text accompanying notes 26 and 27.
[34] 26 USCA 4682 (d)(3)(B).
[35] 26 USCA 4682(c).
[36] Id.

of one percent of the cost of the importer's cost of acquiring the product.[37] The *de minimis* exception is quite important in the areas where it applies. Indeed, the Secretary has not identified any product, manufactured with an ODC but not physically containing it, which does not fall within the *de minimis* rule, except those in the categories where that rule does not apply.

Imports of products which physically contain ODCs (like refrigerators which use ODC as a coolant) or which are manufactured with ODCs (like many types of electronic equipment, which were cleaned with ODC solvents or chemical mixtures which include ODCs (many solvents, propellants and refrigerants) are taxed based on the tax that would have been paid on ODCs used in their manufacture, had it occurred in the U.S. Like the Superfund Tax, the ODC Tax on such "taxable products" is based on the actual consumption of ODCs when that information is reported by the taxpayer. When the taxpayer does not supply such information, the same alternate valuation system is used as under the Superfund taxable substances import tax, i.e. the tax is based on the amount of ODC used to produce comparable products in the U.S. under the predominant method of production, as determined by the Treasury.[38] The Treasury has published a list of such items – the "Imported Products Table." Only items on the imported products table are treated as taxable to the importer.[39] There is no comparable rebate for export of products containing or manufactured with ODCs.

Also, like the Superfund tax, the ODC tax applies to chemicals used in the manufacture traded products which are not physically present in the product.[40] Again, the BTAs on taxable products (as distinct from taxable chemicals) should be regarded as BTAs on a manufacturing process rather than on a traded product. To date, no country has alleged that applying the Ozone-Depleting Chemicals Tax to imports violates any GATT or WTO standard.[41]

4.3. Evasion and Enforcement under the ODC Tax

Environmental taxes, like all excise taxes, require enforcement to prevent evasion. The incentive to smuggle CFCs was large. In 1994-5, the taxed price of CFC-11 and CFC-12 were roughly triple the untaxed price.[42] Importers selling at the legal price without paying the tax could pocket more than twice their production costs. Although it is difficult to reliably quantify the level of an illegal activity, at its peak in 1994-5 smuggling was variously estimated by industry and government sources in the range of

[37] 26 CFR 52.4682-3(b)(2)
[38] 26 USCA 4681(b)(2) incorporates by reference the provisions governing valuation of imported taxable substances from 26 USCA 4671(b)(2) and (3) and apply them to taxable products under the ODC tax.
[39] 26 CFR 52.4682-3(b)(1).
[40] Under current regulations ozone-depleting chemicals are considered to be used in the manufacture of an imported product if they are physically incorporated into the product, released into the air in the process of manufacturing the product, or used in the manufacture of the product and the cost of the ODC is properly allocable to the product." CFR 52.4682-3(d)(2).
[41] This is not entirely conclusive because the tax on embodied ODCs is usually very small relative to the price of the traded good.
[42] See Hoerner, *supra* note 20, at page 46-7.

20 to 40 million pounds per year.[43] This amounts to ten to twenty percent of legal production, and so constitutes a major loss of revenue and a serious increment to national ODC consumption.

In response to this smuggling problem, the U.S. created the Interagency Task Force on Enforcement of Ozone-Depleting Substance Laws and Regulation in October of 1994. Agencies involved were the Stratospheric Protection Division and the Criminal Enforcement Division of the Environmental Protection Agency (EPA), the Customs Agency, the Department of Justice Environmental Crimes Section, and the Internal Revenue Service. The Interagency Task Force created a system of information sharing, cross-agency training, and enforcement coordination of the EPA's ODC tracking system with customs records has been important to identifying false exports (described below).

The Interagency Task Force has also been instrumental in the criminal enforcement of the laws and regulations governing ODC taxation and commerce. A coordinated criminal enforcement effort, known as Operation Cool Breeze, which focused on tracking of imports and transshipments and a careful document and licensing cross-checks, appears to have been particularly successful in identifying evasion activities. As of the date of writing, 62 people have been criminally convicted of ODC smuggling or tax evasion. Largely in response to coordinated enforcement activities, smuggling is believed to have fallen to less than a third of its former level. A variety of other enforcement initiatives, such as a hotline for tips on ODC smuggling, have also been implemented. Cooperation between legitimate producers and law enforcement agents has been critical to identifying smuggling operations in a number of cases.

Evasion of the ODC Tax has taken a number of forms. Here are some of the more important:

Content mislabeling. One simple way to avoid tax is to label a taxable product as an untaxed product. Prevention of content mislabeling requires a physical inspection by custom agents. In the early years of the ODC tax, customs agents were handicapped by a lack of knowledge about how to recognize and test possible mislabeled ODCs. Customs lacked training on ODC tax evasion and did not have good equipment for testing for the presence of ODCs. The training problem has largely been remedied through the activities of the Interagency Task Force. EPA officials have now trained more than 300 customs agents to identify and test suspect shipments. In addition, the Alliance for a Responsible Atmospheric Policy, an industry group, has donated five portable ODC identification devices to customs.

False exports. ODCs that are transshipped through the U.S. to a foreign destination are never liable for tax. If these ODCs are diverted to domestic use, the tax is avoided. Similarly, with ODCs which are imported and then re-exported, the export gives rise to a credit or refund against the tax which can, subject to certain limitations, equal the tax

[43] Duncan Brack, Growth and Control of Illegal Trade in Ozone-Depleting Substances, Paper presented at the Taipei International conference on Ozone Layer Protection, December 1997, London: Royal Institute of International Affairs.

paid. The largest tax avoidance schemes uncovered in the U.S. have used transshipment or false exports as the tax avoidance device. In one such case, it was shown that a single company had submitted false manifests and invoices purporting to show the export of nearly 4000 tons of CFC-12, with a retail value of about $52 million. In reality, none of this material was exported. Instead it was sold domestically.

Daisy-chaining. Daisy chaining is a method of evasion whereby a shell company without assets is used as the importer, and falsely certifies to subsequent purchasers that tax has been paid. It can sometimes be prevented through careful choice of the point of taxation, or by licensing importers and requiring proof of financial capability. For instance, the U.S. has had a serious daisy-chaining problem with U.S. motor fuels taxes.[44] Subsequently, the point of taxation was generally shifted to the terminal rack, a facility from which tanker trucks are filled to transport fuels to retail filling stations. This, together with an initiative to dye taxed fuel, reduced evasion to more normal levels.

False recycling. Although imports of recycled ODCs are still subject to the tax, they are not covered by import quantity restrictions. Because ex-tax price of CFCs is higher in the U.S. than in most of the world, there is a motive to sell CFCs in the U.S. market even when tax is paid, although the profits are more modest. In the early days of the tax it was common for new ODCs to be labeled as recycled. In 1996 the EPA changed the regulations to require proof that such chemicals were truly recycled and to get pre-approval from the Agency 15 days before the shipment leaves its port of origin.[45]

Classic smuggling. It is still possible to avoid customs altogether by entering the country somewhere other than a legal port of entry. To prevent classic smuggling, borders must be physically patrolled. U.S. officials believe classic smuggling has been a relatively unimportant channel for ODC tax evasion, although there has been a small amount of smuggling over the Mexican border and via Indian Reservations that border on both the U.S. and Canada. Most of this material is destined for the automotive air conditioning market via small repair shops.

In conclusion, it is worth observing that, given the relatively high tax on ODCs, smuggling efforts were quite predictable. Although enforcement efforts ultimately proved fairly effective, it might have been possible to avoid much of the flooding of the market with illegal imports if the enforcement task force had been established sooner.

5. Lessons from US Experience

5.1. **BTAs can enhance the environmental benefit and political feasibility of environmental taxes while reducing their economic cost.**

[44] U.S. Federal Highway Administration. *Fuel Tax Evasion: The Joint Federal/State Motor Fuel Tax Compliance Project*, Report No. FHWA-PL-92-028 (June 1, 1992)

[45] U.S. EPA, "Protection of Stratospheric Ozone: Administrative Changes to Final Rule to Phase Out ODCs," Federal Register, May 10, 1995, Vol. 60: 24970.

The U.S. experience, especially with the ODC Tax, establishes the importance of BTAs to achieving the benefits of environmental taxation. As a result of the BTA system, the domestic ODC industry was protected from foreign predation while an orderly phase-out of ODCs was achieved. This enabled US chemical companies to play a leading role in the development of commercially viable substitutes for the ODCs in a wide range of processes, substitutes of which are now in use around the world. The ODC tax was high enough that, without the BTAs, the domestic industry would have been rapidly extinguished by foreign imports, with no resulting benefit to the global environment. Given this market reality, the political reality is that the U.S. Congress would never have enacted the ODC tax without BTAs.

Concerns about the international competitiveness of pollution intensive industries have been the primary barrier to adoption of such taxes in many nations.[46] On the other hand, exempting the most polluting industries from pollution taxes raises significant issues of fairness. BTAs allow nations to address the issue of competitiveness while maintaining the environmental incentive.

5.2. A tax on embodied inputs is administrable.

The U.S. Superfund chemical taxes and ODC Tax show that BTAs on polluting inputs to manufacturing can be administered. Both the Superfund taxes and the ODC Tax apply to some groups of taxed products which are physically incorporated into the traded products and to some taxed products which are physically incorporated into the traded products and to some taxed products which were used in the manufacture of taxed products without physical incorporation. In both cases, the BTAs on taxed products which are used in the manufacture of traded goods and not physically incorporated are admnistratively identical to BTAs on physically incorporated inputs. In the case of the Superfund taxes, the system of BTAs on process taxes has been explicitly approved by the GATT. Similar BTAs under the ODC Tax have never been challenged and remain in place.

5.3. BTAs should be avoided where the tax is a trivial percentage of the price

The administrative burden of border adjustments on particular products or processes rises proportionally to the number of goods to which the BTAs are applied. In many cases, taxed products will be used as inputs to the manufacturing of many untaxed products. These products may in turn be used as inputs to yet further products. By the time several steps of incorporation are traced out, the taxed product may be directly or indirectly incorporated into nearly every physical product traded. In such a case, the administrative burden of BTAs on environmental taxes would be very large indeed.

The U.S. environmental taxes have employed a variety of strategies to avoid such unmanageable administrative burdens. In the case of the Superfund taxes, BTAs are limited to primary products for which the share of taxable chemicals in production is very large – at least 50 percent. In the case of the ODC Tax, BTAs were allowed only for a few product classes or where the value of the tax exceeded a *de minimis* amount (which it never did). In

[46] See Muller, *supra* note 2.

both cases, BTAs were applied only to products on a specified list with a clear administrative process for addition or removal.

However, it should be remembered that political pressure from affected industries can lead to proposals which impose administrative burdens far in excess of any plausible economic benefit. The burden of the ODC Tax on electronic equipment was trivial, and the BTAs on such goods, however important they may have been to the politics of passing the tax, were economically silly. Similarly, during the debate over the Btu tax legislation introduced by the Clinton Administration in 1993, it was proposed to apply BTAs on all goods for which the cost of energy exceeded two percent of the cost of production.[47] This would have applied BTAs to a very large number of goods where the value of the tax was approximately one tenth of one percent of the value of the traded good. (The Btu tax would have raised the average cost of energy by 4 to 6 percent). On the other hand, the two-percent standard would have been quite sensible if it were applied to the cost of the energy tax rather than the cost of the energy. In that case, only a tiny handful of energy-intensive raw materials would have qualified for border adjustments.[48]

5.4. If the tax is a significant percentage of the price, there will be evasion efforts.

For the Superfund taxes, which rarely exceeded a few percent of the value of the product and applied to goods typically traded in bulk, evasion of the BTAs was a minor problem.[49] However, for the ODC Tax, evasion was quite serious. Experience with other products subject to significant excise tax burdens such as cigarettes, motor fuels and alcoholic beverages, leads to the conclusion that, for most excise taxes, evasion will be a problem when the tax is a substantial fraction of the price. Environmental taxes are no exception to this rule.

5.5. Evasion can be kept to acceptable levels by careful design and proactive enforcement.

In the context of traditional excises, a variety of legal, administrative, and enforcement techniques have been identified to help keep evasion down to manageable proportions and assure that evaders are caught and punished. The lesson from U.S. experience is that this is possible for environmental taxes as well. However, it takes forethought, careful administrative design, and proactive enforcement. U.S. experience suggests that cooperation is also critical: both cooperation among responsible agencies, and cooperation between government and legitimate businesses. Finally, U.S. experience suggests that it may be best to create an enforcement task force as soon as possible, rather than waiting until severe smuggling problems become apparent.

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[47] U.S. House of Representatives Resolution H.R. 2141 at proposed Internal Revenue Code section 4456 and 4457.

[48] See e.g. J. Andrew Hoerner, *Alternative Approaches to Offsetting the Competitive Burden of a Carbon/Energy Tax,* ACEEE Working Paper, Washington, DC: American Council for an Energy-Efficient Economy (1997).

[49] Personally communication with several administrators.